

The Impact of Technology on a
Democratic Political System in South Africa

by

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POLITICAL SYSTEM IN SOUTH AFRICA**

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**UNIVERSITY OF PRETORIA
ABSTRACT**

**THE IMPACT OF TECHNOLOGY ON A DEMOCRATIC POLITICAL
SYSTEM IN SOUTH AFRICA**

by EP Mokgobu

The democratisation process in South Africa has subjected the country to the global effects of the challenges that culminated in a nation that is facing the demands for socioeconomic needs coupled with technological advancement. Advances in technology in the global arena present both opportunities and threats to the South African democracy and its concomitant socioeconomic imperatives.

The democratisation process in South Africa is consequential to the inextricably bound relationship between technology, modernisation and democracy. This triad pattern precipitates the South African democratic political system.

Advances in technology are also imperative for human and national security, but the intensity of pervasiveness may have serious ramifications for the appraisal for political stability in a democratic South Africa.

Technology is one of the major sources underpinning and strengthening democracy in a political system. However, technology also affects the daily life of the ordinary citizen, depending on the manner in which decisions are made to implement a technology policy. The South African government through its technology approach has an action plan for growth, which aims to set the economy on a more competitive footing. The action plan engages major technological projects to benefit the broader society but overlooks a major factor in the "democratic theory of technology", namely the imperative that communities be consulted about technology decisions. These efforts are concerned exclusively with democratic procedures in making policy decisions about technologies.

The South African government in 1996 reformed its technology policy approach so as to ensure that democratic values are prevalent and that citizens have access to technology. This policy approach raises concern about improving the democratic and the socioeconomic wellbeing of society, while inversely there is the uncertainty whether advances in technology can support and enhance the intended policy approach in the democratisation process in South Africa.

This problem of whether technologies are substantively democratic, that is whether technology policy decisions are compatible with perpetuating a democratic political system, resulted in the need to investigate and appraise democratic theories and further critically analyse approaches and challenges in democratic politics of technology within the South African democratic political system.

The study looks at the role and magnitude of technology in a democratic South Africa. It presents and argues the hypothesis that “*greater advance in technology tends to enhance the democratisation process in a political system*”. Much of the argument is devoted to providing evidence that technology influences both human and national security and as such demonstrates how technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

Technology is ubiquitous within South Africa’s democratic political system and it may be considered a boon or bane. It encompasses both benefits and disadvantages such that it poses complex options for a democratic political system in both its approach and implementation within a policy framework. The social dichotomy of this policy framework raises the need for further inquiry as to the reasoning and application of technology in addressing socioeconomic imperatives for concretising democracy, thus creating “a better life for all”. The democratic imperatives within the policy framework dictate an analysis to the ventured hypothesis that “advances in technology will enhance democracy in a political system”, and it is in this regard that

South Africa is used as an archetype to disembark at a logical deduction to validate this hypothesis in the study.

**UNIVERSITEIT VAN PRETORIA
OPSOMMING**

**THE IMPACT OF TECHNOLOGY ON A DEMOCRATIC POLITICAL
SYSTEM IN SOUTH AFRICA**

by EP Mokgobu

Die proses van demokratisering in Suid-Afrika het die land onderwerp aan die wêreldwye uitwerking van die uitdagings wat uitloop het op 'n nasie wat voor die eise van sosioekonomiese behoeftes en gepaardgaande tegnologiese vordering staan. Vordering op die gebied van die tegnologie in die wêreldarena hou sowel geleenthede as bedreigings in vir Suid-Afrika se demokrasie en sy bygaande sosioekonomiese imperatiewe.

Die demokratiseringsproses in Suid-Afrika vloei voort uit die noue verband tussen tegnologie, modernisering en demokrasie. Hierdie drietal presipiteer die Suid-Afrikaanse demokratiese politieke stelsel.

Vordering op die gebied van tegnologie is ook noodsaaklik vir menslike en nasionale sekerhied, maar die intensiteit van die verspreiding daarvan kan ernstige vertakkinge meebring vir die beoordeling vir politieke stabiliteit in 'n demokratiese Suid-Afrika.

Tegnologie is een van die hoofbronne wat demokrasie in 'n politieke stelsel steun en versterk. Tegnologie raak egter ook die daaglikse lewe van die gewone burger, afhangende van die wyse waarop besluite geneem word vir die implementering van 'n tegnologiebeleid. Met sy benadering tot tegnologie het die Suid-Afrikaanse regering 'n plan van aksie vir groei, wat daarop gemik is om die ekonomie meer mededingend te maak. Die plan van aksie span groot tegnologiese projekte in om tot voordeel van die breër gemeenskap te strek maar misken 'n groot faktor in die "demokratiese teorie van tegnologie", naamlik die noodsaaklikheid dat gemeenskappe oor tegnologiebesluite geraadpleeg moet word. Hierdie pogings is uitsluitlik gemoeid met demokratiese prosedures om beleidsbesluite oor tegnologieë te maak.

In 1996 het die Suid-Afrikaanse regering sy tegnologiebeleidsbenadering hersien ten einde te verseker dat demokratiese waardes oorheersend is en burgers toegang tot tegnologie het. Hierdie beleidsbenadering wek egter kommer oor die verbetering van die demokratiese en sosioekonomiese welvaart van die gemeenskap, terwyl aan die ander kant onsekerheid bestaan of, in die demokratiseringsproses in Suid-Afrika, vordering op die gebied van tegnologie die beoogde beleidsbenadering kan ondersteun en verbeter.

Hierdie probleem, naamlik of tegnologieë substansieel demokraties is, dit wil sê of besluite oor tegnologiebeleid versoenbaar is met die voortbestaan van 'n demokratiese politieke stelsel, het gelei tot die behoefte om demokratiese teorieë te ondersoek en te takseer, en verder om benaderings en uitdagings in die demokratiese politiek van tegnologie in die Suid-Afrikaanse demokratiese politieke stelsel krities te analiseer.

Die studie bekyk die rol en omvang van tegnologie in 'n demokratiese Suid-Afrika. Die hipotese dat "*groter vordering in tegnologie daartoe neig om die demokratiseringsproses in 'n politieke stelsel te verbeter*" word in die studie voorgestel en geargumenteer. Die argument bestaan grotendeels daaruit om bewys te lewer dat tegnologie die menslike sowel as die nasionale sekerheid beïnvloed, en sodoende word getoon hoe tegnologie as 'n sistematiese aanwending van kennis op hulpbronne as 'n goeie instrument kan dien om demokrasie in Suid-Afrika te handhaaf.

Tegnologie is alomteenwoordig in die Suid-Afrikaanse demokratiese politieke stelsel, en dit kan as seën of vloek beskou word. Dit behels voordele sowel as nadele in soverre dit komplekse keuses vir 'n demokratiese politieke stelsel stel, beide in die benadering en in die implementering daarvan binne 'n beleidsraamwerk. Die sosiale tweeledigheid van hierdie beleidsraamwerk gee aanleiding tot die behoefte om verder ondersoek in te stel na die redenasie en aanwending van tegnologie in die hantering van sosioekonomiese noodsaaklikhede ten einde demokrasie te konkretiseer, om sodoende "'n beter lewe vir almal" te bewerstellig. Die demokratiese imperatiewe binne die beleidsraamwerk dikteer 'n ontleding van die gewaagde hipotese dat "groter vordering in tegnologie demokrasie in 'n politieke stelsel sal verbeter", en dit is in

hierdie opsig dat Suid-Afrika as 'n argetipe gebruik word om by 'n logiese afleiding te kom om hierdie hipotese in die studie te staaf.

EXECUTIVE SUMMARY

The impact of technology on democracy has presented a plethora of literature dissonance and has equally stimulated challenges in the global political arena. It is commonly noted that technology has precipitated itself and is continuously effecting the modernisation process in South Africa; and as such any patterns of modernity in the political system warrant an analysis of concern.

South Africa has moved from a shun-orientated status quo towards a nation that is growing economically, scientifically and technologically after democratisation, and subsequent competition in the international arena presents great opportunities but also threats to societal needs. South Africa is confronted by critical needs that are intimately connected with advances in technology.

The advent of a democracy in South Africa has also seen initiatives taken by government to review and reform the country's technology approach. In 1996 the government published the Science and Technology Policy, which envisages a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture. This future should ensure that democratic values are prevalent and that citizens have access to technology as regards the provision, availability and accessibility of basic services, which in turn will give the government a basic ground to strengthen democracy.

Democracy is preconditioned by stability and equality, which improves capabilities that advance technology as a systematic application of knowledge to resources in order to produce goods and services.

The government's concern about improving the democratic and the socio-economic wellbeing of society, inversely questions the certainty of whether technology can support and enhance democracy.

Global debates on the notion of technology as an aspect capable of enhancing democracy and its impact on socio-economic development are also imperative for national security in a political system. Preponderant challenges are to comprehend

how technology is being perceived in the unevenly distributed socio-economic resources in South Africa. The intensity of its pervasiveness in relation to time and space, and the opportunities and threats are also presented to determine how technology, particularly information and communication technologies (ICT), can pose theoretical and conceptual change that has serious ramifications for the assessment of human and national security in a democratic South Africa.

Technology is regarded as one of the major sources underpinning and strengthening democracy in a political system. However, technology also affects the daily life of the ordinary citizen, depending on the manner in which decisions are made to implement a technology policy. The South African government unveiled its new action plan for growth, which aims to set the economy on a more competitive footing. The action plan engages major technological projects to benefit the broader society but overlooks a major factor in the "democratic theory of technology", namely the imperative that communities be consulted about technology decisions. These efforts are concerned exclusively with democratic procedures in making policy decisions about technologies.

This study addresses the problem of whether technologies are substantively democratic, that is whether technology policy decisions are compatible with perpetuating a democratic political system. The study will investigate and appraise democratic theories and further critically analyse approaches and challenges in democratic politics of technology in South Africa. The study examines the character of and crisis in technology, and considers what theoretical and practical resources are available within the South African democratic political system.

Furthermore the study intends providing evidence that technology influences both human and national security, which forms part of the conditions for a democratic political system.

The literature review is conducted and assessed to reflect aspects pertinent to technology, and which relate to issues that are considered most important for democratisation in SA. The data reviewed assisted in developing practical solutions for the application of technology in enhancing democracy in South Africa.

The study further presents and argues the hypothesis that “*greater advance in technology tends to enhance stability in a democratic political system*”. Much of the argument is devoted to demonstrating that the systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa. It also provides a useful critical review of how technology can assist in shaping challenges of human security in the political, social, military and economic environment of a democratic political system.

As this study is intended to look into the role and magnitude of technology in a democratic South Africa, it may not necessarily apply universally.

ABBREVIATIONS

ANC	African National Congress
COSATU	Congress of South African Trade Unions
CSIR	Council for Scientific and Industrial Research
DACST	Department of Arts, Culture, Science and Technology
DoC	Department of Communications
DSTV	Digital Satellite TV
DTI	Department of Trade and Industry
ESKOM	Electricity Supply Commission (South Africa)
GDP	Gross Domestic Product
GEAR	Growth, Equity and Redistribution
GIS	Geographical Information Systems
GNP	Gross National Product
HDI	Human Development Index
HSRC	Human Sciences Research Council
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
IDRC	International Development Research Centre
ILO	International Labour Organisation
IMF	International Monetary Fund
IPR	Intellectual Property Rights
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunication Union
JSE	Johannesburg Stock Exchange
NGO	Non-Governmental Organisation
NITF	National IT Forum
NRF	National Research Foundation
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
RDP	Reconstruction and Development Programme
RSA	Republic of South Africa
SA	South Africa
SABC	South African Broadcasting Corporation
SADC	Southern African Development Community
SANDF	South African National Defence Force
SATRA	South African Telecommunications Regulatory Authority
SBDC	Small Business Development Corporation
SITA	State IT Agency
SMMEs	Small, medium and micro-enterprises
UNCSTD	United Nations Commission on Science and Technology for Development
USAID	United States Agency for International Development
UNDP	United Nations Development Programme
Unesco	United Nations Educational, Scientific and Cultural Organisation
WTO	World Trade Organisation
Y2K	Year 2000

CHAPTER ONE

INTRODUCTION AND PROBLEM STATEMENT

Introduction

South African politics have in the last quarter of the twentieth century presented a baffling array of complex transitional political dynamics. These multifaceted political issues include, among other things, the role of technology, which is seen as a benefit factor that is presented against the risk and dangers of those who uphold and cherish advances in technology. This confrontation poses very difficult choices for society and government when it comes to making policy decisions, particularly decisions that are technology related. Some of the most challenging issues result because of the ability of technological advancements and deployment to outpace the capacity of the institutions to determine the extent of the impact that technology has on democratic society. In many cases the rate of technological advance has far outstripped the capabilities to assess and evaluate implications and those of institutional monitoring and control.

Technology is regarded as the sum total of human tools and methods, devised by human beings to control the environment for societal net benefit. It is regarded as a systematic application of knowledge to resources in order to produce goods and services (Stilwell: 1994), because it is fundamentally instrumental and is itself morally neutral, usable for both good and ill. There are, of course, dangers of abuse and misuse of technology and the tendency to technologically divide society, but these appear to be problems not of technology but sometimes of policy implementations and of its human users, which needs to be addressed appropriately in general. And, besides abuse, misuse and policy implementation, there is a genuine problem of technology itself: the unintended and undesired consequences attending its proper use. There is temptation to question whether the problems of technology can be dealt with, on the one hand, by technology assessment and careful regulation - to handle side

effects and misuse, and, on the other hand, by goodwill, compassion, and the love of humanity – to prevent abuse. This combination will enable us to solve the problems technology creates, without sacrificing its delightful fruits. (Kass, 1993.)

The development, advances and use of technologies are a driving force in socio-economic prosperity and national security. Maintaining the strength and competitiveness of technological enterprise is vital.

In the current climate of intensifying global competition, technological advancement, and political uncertainties, there is a need for identifying critical technological approaches as the concentration of effort becomes even greater. (National Critical Technologies Report, 1995.)

South Africa undertook transformation to assume the strength and competitiveness of technology approach to intensify global competition and further address political imperatives for a democratic society. The 1994 elections ushered in a new democracy in South Africa, with the ANC-led government winning the elections on the basis of a vision of "A Better Life for All". This vision was highly structured in the Reconstruction and Development Programme (RDP). This programme served as the guideline for the technology policy, which in 1996 was published as a White Paper on Science and Technology. The policy is built upon the twin concepts of innovation and national system of innovation. This developmental approach and application of technology contained in the policy are central to the growth and development strategy of the government as it seeks to address the needs of a vision of a better life for all.

To achieve this vision there is a need to make provision for basic needs such as housing, education, safety, security, job creation, environment, and international trade, and to remain globally competitive, thus ensuring that a favourable socio-economic climate exists that can attract investments in technology.

The level of investment in technologies also has an influence on its advancement, which can extend or hinder democracy's reach. For example, technology can make it easier for people to track legislation, express preferences, ensure accountability by officeholders, and rally support for a specific political cause of action. Technology holds out the promise of giving the masses a stake in the political process and drawing the disenchanted back from political cynicism. But for that to happen, technology will

have to be appealing and accessible. And policy-makers will have to make democratic participation as important a goal of technology policy as consumer convenience and economic growth. (Benton Foundation, 2000.)

Challenges abound for a democratic political system in ensuring that democracy functions properly and citizens have access to technology and information about it. Other information, e.g. on rights and obligations concerning health and education, are also important. The government must guarantee that the information is available and accessible. On the other hand, information technology gives the authorities a very powerful tool to strengthen the rule of law. New technology can and will affect democratic societies. Information technology does not, however, change the fundamental principles of law and ethics. (Magnusson, Orlrich, Gudmundsson and Sigurdardttira: <http://www.statskontoret.se/gol-democracy/iceland.htm>.)

People have benefited enormously from invention, discovery and technical advances, ranging from electricity to vaccines, from advances in food production to information technology designed to advance democracy. Considering the beneficial effects of technology on the nation's quality of life and general prosperity, government has a vested interest in maintaining a strong infrastructure for innovation and research, a responsibility it shares with other stakeholders such as business and labour and the education, industry and non-governmental sectors. Traditionally governments have focused on ensuring that the basic needs of citizens are met, involving for example housing, education, product standards, safety, security, infrastructure, environment and international trade, and on ensuring that a favourable climate exists to attract investments in technology and innovation. Economic growth, job creation and sustaining the quality of life and the environment require continued public and private investments in technology. The high level of technological change in the global village demands short-term policies of government to reflect the changing nature, skill requirements and location of jobs, in response to the introduction of new technologies. Longer-term organisational and institutional changes are also required for the society to experience the full benefit of such technologies. Such policies and actions need to take into account the impact of the digital divide in a society and the resistance to fear of technology, which is mostly due to the absence of a proper national technology culture.

There are claims that the South African society is divided by severe forms of inequality that coincide with racial differences and also by the notion of the digital divide, that is the technology and information gap between rich and poor, and between rural and urban communities. Van Dijk (in Hacker and Van Dijk 2000) questions whether the ideals of digital democracy transcend the purported inequality of information access attending socio-economic gaps. It would be unrealistic to expect that democracy by itself will lead to harmony in inter-group relations amidst inappropriate technological advancements. Democratisation under such conditions may even exacerbate the adversarial problems of societal integrations. Since knowledge is regarded as power, some groups in society may start thinking that by virtue of their having access to information through the use of technology they are more advantaged than another group who may not be privileged to have access to information technology. The compilation of firmly entrenched inequalities, which undermine the rational basis for democracy, gives rise to the antithesis of a full or complete democratisation. It is anticipated that if all political spheres, particular those characterised by the degree of inequality, are simultaneously and evenly subjected to a process of democratisation, society will gradually be transformed. Most theories of modernisation also assume that differentials will narrow, culminating in the democratic state characterised by harmony and political cohesion.

Problem statement

The problem the study investigates is the impact of technology on a democratic political system. Specifically the study seeks to determine:

- 1) The extent to which the government's technology policy has since its inception influenced the South African democracy. That is, has the policy succeeded in achieving the broad priority areas it covers regarding the promotion of competitiveness and creating employment, political participation, political stability and predictability?
- 2) To what extent, if any, has technology succeeded in enhancing the quality of life; developing human resources, and working towards environmental sustainability in South Africa?

- 3) What is South Africa's level of success in bridging the digital divide and the level of success in promoting a viable information society?

The significance of the study

The study is particularly significant for four reasons. Firstly, the study provides empirical evidence concerning the extent to which the 1996 South African Science and Technology Policy anticipates a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture. Secondly, the study demonstrates the support for theories constructed along the modernisation process. Demonstrating support for such theories assists in the realisation that the world is changing so fast that democracy is endangered unless citizens are continuously involved in policy-making, and possible technology strategy intervention will be suggested. Thirdly, the study adds valuable data to the literature on the democratic politics of technology. In addition, the literature review allows comparisons to be made with earlier studies conducted on the democratisation process in South Africa. Lastly, the study tests the assumption that advances in technology enhance political stability in a democratic political system.

Purpose and objectives

The purpose of the study is to examine the South African technology policy, as well as the relationship between technology and democracy. The objectives are as follows:

- To analyse the proposition that technology influences stability and is regarded as one of the conditions for democracy in a political system.
- To investigate the proposition that a systematic application of knowledge to resources can provide a good tool for enhancing democracy in South Africa.
- To enquire whether technology can shape challenges to the political, social, military and economic environment of the political system.
- To test and analyse whether a thorough process of consultation can culminate in a well-functioning technology policy.

Rationale of the study

Since April 1974 the number of democracies in the world has multiplied dramatically. The number increased moderately in the late 1970s and early 1980s as several states experienced transitions from authoritarian, mostly military, rule to democratic rule. By the end of 1995 the pace of global democratic expansion accelerated markedly.

In seminal formulation, Samuel Huntington termed this post-1974 period the "third wave" of global democratic expansion and its central importance is shown in the regional and international democratisation effects. Huntington defines a "wave of democratisation" simply as "a group of democratic transitions that occur within a specific period of time and that significantly outnumber transitions in the opposite direction during that period". (Diamond, 1999) The trend that began in Southern Europe in the mid-1970s spread to the military regimes of South America in the late 1970s and early 1980s and reached East, Southeast, and South Asia by the mid to late 1980s. The end of the 1980s saw a surge of transitions from communist authoritarian rule in Eastern Europe and the former Soviet Union and a trend towards democracy in Central America as well. The democratic trend spread to Africa in 1990, beginning in February of that year with the sovereign National Conference in Benin, the release of Nelson Mandela and the unbanning of the African National Congress. By 1998 there were more democratic political systems on the African continent.

In South Africa, the 1994 elections presented a new democracy, delivering not only a universal right to vote but also formal equality before the law, avenues for citizen's participation in governance, and statutory institutions bolstering democracy. The second democratic elections in 1999 took place amidst large-scale societal transformation and reform and presented opportunities to investigate the impact of technology on democracy in South Africa.

Democracy in South Africa has seen initiatives taken by government to review and reform its policies, including its technology approach. The 1996 government technology policy envisages a brighter future for all citizens. The policy has since its inception had some impact on the South African democracy, presenting various challenges in terms of the promotion of competitiveness and job creation and the

extent of success in enhancing the quality of life, human resources development, environmental sustainability, and narrowing of the digital divide. Any attempt to address these questions warrants an analysis of the impact of the technology policy on the South African democratic political system.

Within the ambit of the South African democratic political system, the technology approach justifies a policy analysis, which should be placed in the context of the rationalisation of the state and politics as a policy-making activity. The notion that the world is full of puzzles and problems, which could be solved rationally through the application of human reason and knowledge, forms the backbone of this study. Thus the approach in policy analysis in terms of the desire for knowledgeable governance, that is the acquisition of facts and knowledge about problems, is to formulate better solutions.

This technology approach is supported by Lasswell when he suggests that policy science settled on two main approaches which could be defined in terms of knowledge in the policy process and knowledge of the policy process. (Lasswell (1970) Policy analysis is concerned with knowledge of the policy process while the analysis of the policy is concerned with knowledge about the formulation and implementation of public policy.

David Easton (1953, 1959) established a policy approach that provided a model of the political “system” which influenced the way in which the study of policy (outputs) began to conceptualise the relationship between policy-making, policy outputs and its wider environment. His model views the policy process in terms of received inputs – in the form of flows from the environment, mediated through input channels (parties, media, interest groups) – and demands within the political system (with inputs), and the conversion of such inputs and demands into policy outputs and outcomes. (Parsons,1995)

Policy consists of "outputs" of the political process. It reflects the impact of government policy decisions on society, that is, its ability to make things better or to make things worse. A distinctive area of study in policy analysis was developed purposely to examine how the policy was initiated, formulated and implemented, and how the policy process could be improved. Policy analysis is not only concerned with

issues of efficiency and effectiveness, i.e. with the "how" of the policy-making. It also addresses the "what" of policy-making: the nature of government "outputs" and their "outcomes" for the larger society. At the heart of policy analysis is the normative question such as "what is government for" and what is the nature of the "good society". Any attempt to evaluate the performance of government or the political system must therefore consider some deepest political and ideological division in the discipline itself. (Heywood, 1997)

Policy analysis is set to be concerned with improving the methods by which problems are identified and defined, goals are specified, alternatives evaluated, options selected and performance measured. It thus focuses on what Bobrow and Dryzek (1987) term "knowledge based interventions in public policy making".

In analysing the impact of technology, as a systematic application of knowledge to resources, on democracy, the study does not only ask the question how plausible, feasible and viable is technology, but goes beyond this to translate technology in a way that will incorporate the complex realities of democracy. This poses a challenge to expand the theoretical boundaries within which the democracy has traditionally been shaped, a challenge that is intensified by the thematic nexus of technology, democracy and policy studies as a subfield of political science.

The technology policy culminates with the evaluation and review of policy, leading, in theory at least, to decisions being made about the maintenance, succession or termination of some policy aspects. This will complete the policy cycle in the sense that information acquired through evaluation can be fed back into the initiation and formulation stages. This process may show up new policy proposals and help to refine and improve existing policy. For the purpose of addressing substantive issues related to the appropriateness or effectiveness of technology approach in South Africa, evaluation might shed light on procedural issues, such as how the formulation stage is organised, who is consulted and when, and how implementation is controlled.

The South African government is concerned about improving the wellbeing of society. Such concerns inversely question the certainty of whether technology can support democratisation. In view of these concerns and technology-related problems, the scope for assessment, monitoring and evaluation of technology impact has grown

enormously in response to the demand for democratisation and the increasing complexities and challenges of providing goods and services to meet the basic need.

Democracy is predicated by political stability and equality in the distribution of socio-economic needs. Advance towards stability and equality will improve the inputs (demand and supports) where the creation of (technology) capabilities by the systematic application of knowledge to resources produces equitable distribution of goods and services within a democratic political system.

If severe forms of political instability and inequality divide South African society, it would be unrealistic to expect that advancements in technology will by themselves sustain democracy. Democracy under such conditions may even exacerbate the adversarial problems of technology in society. The collection of firmly entrenched instability and inequalities, which undermine the rational basis for democracy, gives rise to the premise of an undemocratic political system. It is probable that if all spheres of the environment in a political system, and in particular those characterised by advances in technology, are simultaneously and evenly subjected to demand and support, the outputs will have an impact on a democracy. Differentials will narrow, culminating in the egalitarian state characterised by prosperity and democratic rule.

The question on the social and economic preconditions for a democratic South African society also refers to conditions for stability. Lou (1983) has indicated that “equality means stability; inequality, movement”. The implication is that an advance towards social economic equality will improve the stability of democracy. The improvement would be the outcome of a process of development. It could also result from a radical redistribution of income, wealth and economic opportunities.

(Haasbroek, 1994)

The study presents a policy analysis of technology by evaluating its impact on South Africa as a democratic political system. It will argue that the South African technology policy as an aspect of politics is directly related to the character of democracy and therefore its performance can only be evaluated in the light of its impact according to what actually happens for good or ill. The study will begin with some contextual conditions that strongly argue for increased attention to the linkage

between technology and democracy. It then briefly explores the meaning, characteristics, and necessary condition of democracy, and next posits some hypothetical linkages between democracy and technology content or design. Most of the work will develop these pathways or linkages as a subject matter for political science.

As a subject matter for political scientists, the role of technology has evoked renewed interest in the wellbeing and vitality of the democratic political system. It is generally agreed that a political system benefits from having a stable democratic rule. Whether or not the South African technology policy has abated or changed the wellbeing of society, there is an apprehension as to whether technology policies can stimulate, diminish, or change the nature of democracy. It concerns the need for strategies in order to bridge the technology divide, requirements for technological advancement, unsatisfactory technological enterprise, and lack of clear channels through which technology can promote social and economic progress in a democratic political system. And lastly, the problems of technology concern not only problems of ends and means but rather the control of unintended consequences, as well as the basic moral and political question.

These issues mar South African democracy, despite several years of seemingly aggressive governmental policies to alleviate them. Rather than disappearing as issues, such technological problems permeate the debates on such diverse subjects as defence, health and welfare, and social and economic aspects. The persistence of these technological problems represents not only a policy failure, but also a misrepresentation of democratic rule. Governance structures have altered dramatically with information and communication technologies. Programmes in which the government plays a critical role have replaced governmental agencies in areas as widely divergent as telecommunications, postal services, broadcasting, health services and provision of water and environmental aspects. Political science principles of governmental accountability through elected leaders may operate poorly where lines of democratic control and accountability are different and less direct. The accumulation of both theory and empirical research linking public policy and institutions with democracy provides a particularly favourable context for further work in this policy area.

The relationship of technology to democracy in the South African democratic political system is an unfinished and open-ended political phenomenon. As John Dryzek (1996) has argued, democratic governance is largely striving to expand the franchise, scope, and authenticity of democracy. Franchise refers to the number of active participants in any political setting, scope concerns the domains of life under public control, and authenticity is the degree to which democratic control is substantive, informed, and competently engaged. None of these ought to take place at the expense of the other. Expanded franchise, for example, must not lead to superficial deliberation that impairs authenticity. Of course, there are many forces apart from policy that affect democratic rule, such as interest groups, political parties, leadership, and the press. However, since the important work of Lowi (1964) and Wilson (1979), which connected the content of policy with patterns of politics, substantial literature has developed that traces the consequences of public policies, including technology, to politics and to democracy.

There are pathways through which technology policy content may influence the character of democracy. There are critical conditions for democracy: there needs to be open field for public discourse in which all relevant points of view regarding technology are expressed; citizens ought to view their role as citizens as important, as involving obligations as well as rights, and they need to be convinced that government has the interest and capacity to solve technology problems; society needs to be supportive of technology policies and be positively involved in formulating shared goals; and there must be means to hold government accountable for its actions. These important conditions for democracy are directly related to consequences flowing from policy designs, namely: the framing of issues; how targets are constructed; the structure of implementation and delivery systems; and transparency of governmental actions and citizens' access to information. These issues reflect how policy affects the framing of problems and their discourse.

Definition of terms

- Science – improvement of natural knowledge. It is both a method by which knowledge is gained and the knowledge that results from that process: the constellation of facts, theories, and methods collected in current text (Kuhn, 1970).
- Technology – the systematic application of knowledge to resources to produce goods and services (Stilwell, 1994), or putting knowledge into practice, to alter and control the material conditions of life, or to “create a reality according to design” (Grove, 1980).
- Technology management – the management process by which organisations identify access and use available international technology to achieve ongoing competitive advantage, profit growth and shareholder value through optimum customer and community benefits.
- Technology strategy – is concerned with exploiting, developing and maintaining the sum total of the organisation’s knowledge and competencies.
- Political system - a network of relationships through which government generates "outputs" (policies) in response to "inputs" (demand and support) from the general public.
- Democratisation - the advance of liberal-democratic reform, implying, in particular, the granting of basic freedoms and the widening of popular participation and electoral choice.
- Functionalism – approaches to the state focus on the role or purpose of the state institution. Its central function being invariably seen as the maintenance of social order and the delivery of social stability.
- Modernisation - refers to the contrast and transition between a ‘traditional’ society organized by hierarchical division by class or caste and the type of ‘modern’ society that is based on trade and industry, organized by function, such that the major functions are performed by modular social systems that include the political system, the public service, the armed forces, the legal system, the economy, religion, education, the health service, the mass media, etc
- Public policy – an action which employs governmental authority to commit resources in support of a preferred value.

- Policy analysis – concerned with improving the methods by which problems are identified and defined, goals are specified, alternatives evaluated, options selected and performance measured.
- Socio-economic public policy - a look at how public policy is the outcome of economic and social factors, which have a major influence on the making of policy and upon its outcome.
- Productivity – the term productivity generally refers to the ratio of output units per input unit. It assumes that there is a process which transforms units of input into units of output.

Delimitations of the study

The study will be confined to available primary information sources, i.e. already existing textual information, such as annual reports, mission statements, memoranda, official documents – including white papers, green papers and press reports, as well as secondary information sources drawn from the library, press reports, discussion papers, comments, debate, and information obtained from the Internet.

Limitations of the study

The study will be limited due to the fact that literature review can, according to Mouton (2001), at best only summarise and organise the existing scholarship. Even a critical review of the literature cannot produce new or validate existing, empirical insight, it can only lead to theoretical insight. Further limitation will be that the study is restricted to South Africa, and within the context of a new democracy, advances in technology and the dynamics of transitional democratic politics progress rapidly. Caution will be taken against generalisation.

Overview of the research programme

As has been stated already, technology is ubiquitous within South Africa's democratic political system. It has both benefits and disadvantages and also poses a difficult choice for society and government as regards policy approach. The social dichotomy of this nature raises the need for further inquiry as to the reasoning and application to technology as the systematic application of knowledge to resources in addressing

democratic imperatives. The second chapter is the review of literature; it discusses and reviews the literature relevant to this topic. Chapter 3 sets out the research design. It provides the key concepts used in the study. It also discusses the methodological premises, justification for the hypothesis, data analysis and interpretation, and the shortcomings. Chapter 4 looks at the role of technology in the development of the modernisation process. Chapter 5 discusses information technology as an imperative for securing democracy. Chapter 6 focuses on South Africa within the context of a democratic political system. Chapter 7 focuses on the national democratic politics of technology, and, lastly, Chapter 8 will present the conclusions and recommendations about the hypotheses and the research problem, and the implication of the policy and practice for both public and private sector analysts and managers. It will discuss the limitations of the research and identify areas for further research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

The purpose of the study is to examine the impact of technology on a democratic political system in South Africa. The study investigates the relationship between technology, as a systematic application of knowledge to resources to produce goods and services, and democracy in South Africa's democratic political system. This chapter deals with the review and analysis of the literature relevant to this topic. The chapter provides three themes, which are the core of the theoretical background, of which the objective is to discuss technology in different perspectives where there is a major impact on the democratisation environment in a political system. The following themes are the key constructs: *the historical overview of the literature debates on technology policy; the democratisation process in South Africa; South Africa's technology policy; the democratic politics of technology*, and a summary to conclude the chapter.

The above key constructs in the study correspond with the divisions of works under review. They are central themes of the study and are clearly manifested in the formulation of the research problem. (Mouton 2001) The objective in this particular instance is to determine, through inductive reasoning, the definition and description of the key construct in the study. Each presents a broad context, then current variations and challenges, a review of selected literature, and finally a perspective relating to the hypothesis in this thesis. Each theme presents a set of premises pertaining to each construct in a democratic political system, broadly considered. Some of these find corroboration within other chapters, particularly in relation to the links between them as categories of analysis.

Literature that supports this study

This research is both interdisciplinary and integrative, and therefore draws on areas of study not usually considered connected. Drawing on literature from political sciences and extended analyses of technology means not all relevant studies could be covered. Areas of public administration and management are omitted. Rather than exhausting a narrow area of research, the intent here is to focus and examine broad areas in order to identify patterns that exist across the separate categories of analysis where in-depth analysis normally occurs. The deductive derivation of the research hypothesis suggests links between disciplines; it draws on sources, which are to be found relevant to the processes of technology policy formulation and governance in the South African democratic political system. Crow and Sarewitz (2000) see technology as a force that can transform social structures and create new phenomena. Because this study falls into the general category of a deductive goal, it realises the potential of technology to enhance the democratic political system. The provision of access to information and technology and instituting mechanisms for democratisation at all levels of society is a fundamental assumption of this thesis, and is supported by modernisation theories. Some of the literature below does not share this point of reference, being mostly concerned with non-critical contribution to political science. This is particularly evident in the business literature. Other areas, such as studies of media, technology and society, and in particular electronic governance, are overtly concerned with social outcomes. This study addresses the overlaps and gaps in these approaches in order to accumulate a perspective that is intended to be both a practical and a theoretical contribution. The relevant areas are outlined below, along with the additional perspective provided by the current research.

Themes of the literature review

The following themes are the key constructs in this literature review study. Firstly the chapter looks at *the historical overview of the literature debates on technology policy*; secondly at *the democratisation process in South Africa*; thirdly at *South Africa's technology policy*, and fourthly at *the democratic politics of technology*. *A summary of analysis* concludes the key constructs, which correspond with the divisions of the works under review.

A historical overview of the literature debate on technology policy

There has been more literature on technology policy approaches in the past two decades. The development of this literature started around the late 1960s and continued to the early 1980s, and focused mostly on the concept of "appropriate technology" or "intermediate technology" as it is commonly known. The concept first originated from the Neoclassical discussion on the "choice of technique", where many social scientists criticised developing countries for choosing the "overly capital-intensive" technologies in their import substitution industrialisation strategy and called for them to choose more labour-intensive technologies which were more suited to their own environment. The concept was subsequently adopted by a more radical school of thought in Schumacher's book "Small is Beautiful" (1973) and the Dependency theories. Both these schools argued that not only were the technologies imported from the advanced countries inappropriate for the local environment, they were also inappropriate for meeting the real consumption needs of the population. (Emmanuel, 1981).

From the late 1970s the debate moved to a more productive phase. Rather than debating at the general level whether imported technologies were appropriate or inappropriate, the debate was on why some countries were more successful in absorbing imported technologies than others. The consensus that emerged out of this debate was that, to some extent, developing countries needed some degree of technological capability if they were to be successful in choosing, adapting, and making incremental improvements of imported technologies. It was also emphasised that irreversible investments were often needed in building such technological capability and that policy actions had an important role to play in the process. (Fransman and King, 1984.) The crucial point in this particular instance is that technology needs to be assimilated in society. Imported technology needs to be invested and must be adapted to local conditions if the appropriate national productivity levels are to be achieved. Where productivity levels are high, other socio-economic imperatives are covered and the standard of living gets boosted.

From the 1980s the literature became more sophisticated. Rosenberg (1982), Nelson and Winter (1982), and Freeman (1982) opened new debates in the study of technology. They laid emphasis on the evolutionary nature of the advances in technology and the importance of institutional and political policy factors in the process. (Dosi et al.1988.) These developments culminated in the birth of the concept of "national systems of innovation" (NSI), which South Africa adopted as its policy approach (White Paper, 1996) and through which the institutional initiatives were undertaken by government in the establishment of the National Advisory Council on Innovation Act, no 55 of 1997 (NACI Act), the primary objective of which is to advise the Minister on issues of science and technology policy. The importance is based on the role of institutional factors, and particular emphasis was placed on the inter-relationship between the constituent parts of the institutional complex in the determination of technological progress. (Lundvall, 1992 and Nelson, 1993).

These two schools of thought differed in their solutions. The former strongly advocated small-scale industrialisation, while the latter also wanted capital-new theoretical developments. They influenced the literature on technology policy, producing a new breed of theoretically sophisticated and empirically well-grounded literature, of which the most updated synthesis is that of Lall and Teubal (1988).

Most authors assert that the world markets, especially in developing countries like South Africa, may fail to generate a socially desirable degree of technological progress and that it is only the type of political policies that may be necessary to resolve this problem.

At best this literature review's contribution can be related to two areas that have been relatively ignored in the existing South African literature, namely the political and the institutional aspects of technology policy design and implementation. Succinctly stated, whether a technology's design and its use are compatible with perpetuating democratic social relations. (Scolve, 1995)

It would be a gross injustice to state that authors who contributed to the debate on technology policy in South Africa have completely neglected these two aspects. However, it would not be too much of an overstatement to mention that most of other

literature reviewed was decided rather on the basis of some objective theory diffusion, with little attention to the political aspect of technology policy design and implementation. In the same breath it would also be wrong to say that institutional factors have been neglected in some literature, especially given the numerous writings on national systems of innovation. However, it would be fair to say that far more attention has been paid in the literature to the institutions related to knowledge generation. (White Paper, 1996).

The political aspects of technology policy in South Africa unfortunately lacked a relatively well-developed literature which this study could draw from. Most literature dwells on industrial technology, with technology policy considered as the subcomponent of political sciences.

Having drawn some literature from other developing countries with experience, which were more less in the same situation as South Africa, the earliest stage of the debate on industrial policy was prompted by the success of Japan in dealing with the industrial changes they made towards their technology policy. (Johnson (ed.) and Thompson, 1989.) Subsequent literature was also mostly concerned with industrial policy, for instance the debate that started in the mid-1980s and culminated in the debate surrounding the World Bank's "East Asian Miracle Report". (World Bank, 1993). The debate at this stage was not really fruitful for the purpose of this study as it focused on establishing the existence of industrial policy in East Asia, with little relevant lessons to draw for the South African experience. Most authors argued that little industrial policy existed in both South Africa and the East Asian countries (Shcultze, 1983 and Balassa, 1988), and that its execution was mainly involved in the technical process, without some political elements which would have been useful to compare and analyse with the South African democracy.

Literature on the scope of the democratisation process in South Africa

Since the 1994 elections in South Africa there has been interest in the progress and the extent of the democratisation process. There is now substantial literature on many

aspects of democracy in South Africa, aspects which include issues of national security, socio-economic development, poverty alleviation, etc. The review in this section provides an overview of the issues and answers of various authors and relates them to the above analysis of democracy in South Africa. Most debates on South Africa's democracy justify theories around liberal democracy and the continuation of concerns about democracy in general. MacKinley (2001) argues that the African National Congress (ANC) became the standard-bearer of liberal democracy in South Africa. Since coming to power in 1994 it has followed the liberal democratic formula of institutionalising the combination of individual rights and capitalist market economics. South Africa's smooth transition from apartheid to democracy (Williams 2000) also outlines neoliberalism. Williams also presents the major shifts in the ANC's economic policy and makes particular reference to the role that the neoliberal discourse played in delegitimising alternatives and stifling debate during the transition. Now integrated with the global offensive mounted by internationalised corporate and finance capital, liberal democracy has acquired the mantle of a necessary and natural political product of an equally necessary and natural economic order. (McKinley 2001.)

Other aspects of the South African democracy relate more to opportunities created by democracy. Some authors are pessimistic or critically ambivalent about South Africa's democracy, while others are relatively optimistic. Muthuinen, Khoza and Magubane (2000) give a corresponding review on the democracy in South Africa. They have reviewed the institutional forms and capacities that underpin South Africa's democracy and argue that a new culture of participatory democratic governance has emerged short of addressing prevailing inequalities.

Literature on the South African technology policy challenges

Prevailing technology policy challenges are the same as the insurmountable challenges of social inequalities that still face the South African democratic government. Lamounier (2002) in Tulchin (2000) observed challenges that social inequality present to democratic governments around the world. One of the particular themes which he looked at is the effects of globalisation on the distribution of income and wealth within national frontiers; he also looked at the impact of inequality on the stability and the quality of democratic governance. He thus presented an analysis of the future of democracies as being able to redress social ills of the past. The latter is important for this part of the study as there is a direct link between the effects of globalisation and the advances of technology, and the relative ease with which these travel across national boundaries.

Technology has inevitable political and economic effects. There are empirical grounds, as suggested by most authors, that technology as propounded by the effects of globalisation has more effects that influence the economic performance of a country. This is because the flow of the intellectual phenomenon presents ideas across the border. The intellectual phenomenon is more significant than transporting goods and resources as potential for technology in a democratic political system. It is also more real than in economic and political life, and thus knowledge in this regard plays a vital role in determining technology policy imperatives. The challenges for the South African policy imperative are that it should not be mapped outside the dictates of the globalisation effects. Schimmitter points out that globalisation may not even exist in any material sense but if enough people believe that it is present and potent, it will produce a significant effect by anticipated reaction. (Schimmitter 1999)

The main conclusion that emerged from this literature debate was that, although the policy tools used, such as tariffs, subsidies, tax privileges, etc., were in many ways similar for most countries, there were important differences in the way they were designed and implemented. For example, the Small, Medium and Macro Enterprise (SMME) and the Black Economic Empowerment (BEE) industry policy protection in South Africa come with relatively clear performance targets, like market performance and the extent of advancement given the incentives and non-incentives to the non-

industry performers, which would be penalised in the allocation of related privileges. And what determined these differences were direct factors such as political intervention directed by the government that is willing and able to provide material support.

The study endeavours to develop an analysis of the political and the institutional aspects of technology policy in South Africa, using some of the insights from the industrial policy literature and a very limited literature from technology policy itself. This was not necessarily simply a re-interpretation of the existing literature discussions on these issues in the policy debate. The study does not only seek to provide a somewhat more fine distinction analysis of the political factors in the policy process than what is currently available, but also undertakes to develop a more institutionally-focused analysis of the impact of technology in a democratic political system, with specific reference to South Africa. Before doing that, however, one also needs to identify the main characteristics of technology policy, as these characteristics will affect the way in which a democratic political system functions.

There are generally two extreme opinions presented by different authors: some believe that technology is a boon to democracy, while others believe that it is destructive to democracy. In an effort to demystify the cyber-utopia and the neo-ludite view, most literature makes reference to the fact that both schools of thought are correct in some respect as the policy process is also resultant from the political effect of advances in technology. It defines the ranges of how government communicates with its citizens and how society communicates amongst itself in a nation state given the level of advancement. The impact of technology, and particularly of information and communication technology, is a reflection of the extent to which innovations can be explored, and also gives an indication of the inefficiencies in the political system, which can sometimes be presented as a threat to democracy. Tetty (2001) asserts that even if more people are getting a lot of information, this does not translate into a significant expansion in the numbers and categories of those who engage in, and hence influence, the direction of democratic politics in the country.

There are dominant reasons why some authors see technology as being a threat to democracy. It is, firstly, premised from the fact that global network technologies have

no boundaries, that they do not respect any boundaries and at times undermine the enforcement of the rule of law, which defines the essence of democracy in a democratic political system. Democracy makes good neighbours in an increasingly interconnected world; it has both the means and the motives to promote the democratic process abroad. (Talbot 1996.) For instance, the availability of information and communication technologies (ICT) is the ease with which one can create a public sphere in 'cyberspace' through the use of personal computers, modems and telephone lines, the new global communications which are being established. In most parts of the world different organisations are integrated into the webs of horizontal, non-hierarchical exchange, and have already proved themselves able to counter censorship and disinformation. Interest and pressure groups have to a larger extent made use of the new technologies to advance their course, for example "one of the important tools of the Zapatista movement in southern Mexico has been the internet". The movement's leader, Subcomandante Marcos, carries a small computer, through which he has been able to communicate with the rest of the world in a form that is not easily controlled by the government. (Ferdinand, 2000.) In fact, individuals can even find a way on the Internet to send a message to the Subcomandante. Communication was vital because for the rebel movement to succeed, it needed involvement from oppressed people all over the world, not just from the Chiapas. (Lutz, 1999). Secondly, it is argued that technology is dominated by the English language and as such is seen as eroding cultural differences and giving preference to a new set of national commercialism and consumerism values that thrive on the net; despite the global network that may integrate different communities there is therefore a concern regarding the growth of transnational cultural industries, as well as liberalisation policies pursued by organisations like the World Trade Organisation, which may reinforce current patterns of cultural colonialism. Technological innovations are in fact the enormous growth of international trade, and very supportive, liberal, political climate has facilitated the rapid transnational proliferation of mass market, advertising and electronic entertainment produced by mega conglomerates. A uniform consumer lifestyle is being aggressively marketed across the globe. Thirdly, the private and privatising environment of the Internet in particular is seen as destroying national democratic values. Although the South African economy has distinct positive privatising features in its technology approach, it is also hampered by political uncertainty, poor productivity, an over-emphasis on the

exploitation of natural resources, and consumer-driven economic cycles. Hawkins (1992) maintains that, to achieve rapid growth, South Africa will have to transform its economy to become investment driven and export intensive, with the emphasis on manufacturing and services. Private sector alliances with foreign multinationals could provide South Africa with access to the technology and marketing skills it needs.

Southall (2000) alludes to the fact that South Africa's first universal suffrage election of 1994 inaugurated a transition from apartheid to democracy. Yet there are continuing debates about the quality of that democracy that promised a better life for all during those first elections. He is cautiously optimistic to note that, although South Africa faces several problems and long-term challenges that could easily erode its democratic potential, democracy is acquiring a basic strength. The transition, which transformed South Africa from a pariah nation into a progressive multicultural democracy, is identified as a model throughout Africa and a symbol of hope for struggling democratisation processes elsewhere. Jung and Shapiro (1995) have a worrying notion that there is a possibility that the South African democracy may lack some of the basic ingredients of a viable democracy due to the fact that the transition has been negotiated between the ANC and the apartheid government. The exploration and evaluation of the conjecture of the dynamics of democratisation presents challenges for the political system to concretise a democratic order.

South Africa's consolidation of democracy must be judged according to its own society's political involvement in the policy decisions and how it meets its achievement of social democratic vision. Under such provisions, South Africa is not a consolidated democracy but an emerging one; its transformation has been more political than economic. South Africa has witnessed considerable institutional and representational change, but certain behavioural and attitudinal elements continue to hinder its democratisation. Specifically, there is a technological divide in society, particularly between the rich and the poor, and the urban and rural communities. There is also a considerable allegation of corruption among the levels of government officials, which has led to the disillusionment of the population. (Dreijmanis 2000.)

In an attempt to enhance democracy, the first democratically elected President of South Africa, Nelson Mandela, encouraged all the citizens of South Africa to take the

national project of accelerated and fundamental transformation of the country very seriously. He also encouraged the people to unite in a new patriotism in order to achieve the goal of creating a new society. He suggested some investment challenges that needed to be met, some new roles for local government, and some ways in which democracy could be promoted. Finally, he encouraged citizens to work together to make their country a winning nation. (Mandela 1996.)

The objective of this call was primarily the recognition of concerns about poor performance as regards the provision of socio-economic services in South Africa. Simkins (1996) maintains that South Africa's economic future depends on moving towards the conditions for cooperation, where all facets of the social services will be intertwined with the economic aspects. He had looked at the problems associated with the state's reconstruction efforts in terms of housing, health and education, the development context, taxes, spending, and poverty, and the move towards cooperation with business. He is doubtful whether, in the absence of political policy interventions, the delicate political balancing act required to achieve cooperation can be sustained long enough.

Currently different policies coexist in South Africa, for instance those that deal with individual human rights and with traditional communal obligations. Diverse political communities propagate different models of citizenship, even as citizens act out simultaneous membership in multiple groups. South Africans thus adhere ambiguously to conflicting notions of transformational society as is dictated by modernity and tradition, and economic needs. Society has to reconcile itself with those vestigial subjugations and disparities of privilege that continue to bother it. (Ramphela 2001.) The repercussion of these disparities in a diverse political community is also symbiotic to the technological divide which has been clearly documented as dividing society along the technological lines. Hence in an attempt to bridge the gap, South Africa has to recognise the importance thereof. President Mbeki, through the International Presidential Advisory Council on Information and Communication Technology, has taken wide initiatives to solicit advice in order to cover all elements of the information and communication technology sector in order to monitor rapid changes and keep track of the application, thus keeping pace with inevitable advances in technology and its applications. (ANC 2001.)

Technology policy in South Africa has been debated across a broad spectrum of society with vastly different interests. During the literature debate process it emerged that caution should be taken as the inherent power of technology application could lead to abuse in both government and society. For this reason Christianson (1990) presents an argument about certain inherent characteristics of technology which might be abused and with which a state may instil fear in its society and its neighbours. He specifically makes reference to nuclear power capability, which he says may undermine the public accountability of decision makers. He contends that there is a strong case for the demand that public policy decisions meet clearly defined criteria for rationality. He demonstrates that irrational policy decisions pose a distinctive threat to liberal democratic principles in South Africa; for instance, he says that nuclear power has been mooted as the answer to South Africa's long-term electricity requirements. However, nuclear power is controversial, and there is increasing awareness worldwide of both adverse environmental implications and its costliness. There are also other issues that demand careful consideration, and public policy decisions, such as the decision to launch a nuclear power programme, need to take account of clearly identified standards of accountability and rationality. Advanced technologies like nuclear power pose distinctive problems. These are discussed with specific reference to the nuclear option in South Africa. (Christianson, 1990).

There are some aspects of technology, especially information and communication technology (ICT), that present another level of power and control in a political system. Willett (1995) agrees that this level of power and accountability should be able to identify the beliefs, myths and values attending to the notion of democratic accountability. He asserts that this will show how the basis for the right to communicate should be established, as well as the strategies necessary for this right to be recognised, understood and accepted, and thereby legitimising the democratisation process. Challenges abound for ICT as an instrument to fast track a democratic process.

The South African Parliament also faces challenges that are posed by an increasing reliance on ICT; it has to have the ability to uphold the values and principles of an

inclusive participatory democracy for all South African citizens. The potential value to Parliament of harnessing increasingly sophisticated ICT vests in the ability of such technologies to play a critical role in facilitating co-operative governance and overcoming the information gap between itself and the majority of South African citizens. Consideration does however become important when there is an increasing dependency on such sophisticated technologies, which needs to be weighed up against the ability of Parliament to uphold, simultaneously, the democratic values of freedom and equality of access for the majority of citizens who may not have access to such sophisticated technologies. (Groenewald, 2000).

Despite all these technological efforts regarding socio-economic and political problems, South Africa has taken a courageous position with its adoption of a policy on the National System of Innovation (NSI) approach. Blake (1996) maintains that if an effective national system of innovation is the main approach of the policy, IT has to play a very central role in the realisation of that policy system. He further alludes that information and technology both enable and depend on a national system of innovation and that the IT industry in South Africa can be a major driver for the economy. He thinks that the information society makes great demands on human resources and that current deployment of IT is hampered by having far too few people with ability for innovation in IT.

Envisaged within the context of NSI is the new mode of production – centred on information technology and instantaneous worldwide electronic communication – which has become dominant in the era of transnational capitalism. There have been arguments around this topic; at the forefront is Louw (1995) who argues that if South Africa's potential is to be realised, the country will need to be fully integrated into the global electronic grid of information. If the challenge of a post-Fordist information economy is accepted, South Africa needs to concern itself with producing a population able to operate within an 'information economy'. This requires critical and aware media producers and users, which, in turn, requires a degree of coordination between media policy and education policy formulators. Contemporary cultural studies should grasp the opportunities offered by the flux of the post-apartheid reconstruction of society to demonstrate that a democratic political system can be built by co-opting the post-Fordist media technologies developed by multinational

capitalism. Louw's argument is also followed by Budlender (1995), who argues in his claim that by providing people with the capacity to use communications they will be able to make their demands more forcefully and successfully, testifying to a deeply urban-biased vision.

Literature on a theoretical construct of the democratic politics of technology

In the last years there has been a momentous continuation of victories in the world arena for liberty, human rights, and market economies. Historically these have been associated with democracy, thus democracy has emerged as a political system of choice around the globe. Within this democratic political system technologies have been exploited not only to enhance society's socio-economic conditions but also to enhance the democratic rule. The impact of technology upon lifestyles (Weeamantry 1993) that have been maintained for centuries, if not millennia, has been profound and widespread.

Tracing back to the genesis, a growing awareness of the problems at the interface between the expanding domain of technology and human rights prompted the General Assembly of the United Nations in 1975 to proclaim its Declaration on the Use of Scientific and Technological Progress in the Interest of Peace for the Benefit of Mankind (resolution 3384 (XXX) of 10 November 1975). This declaration called upon all states to take appropriate measures to prevent the use of scientific and technological developments to limit or interfere with the enjoyment of human rights and fundamental freedoms of the individual as enshrined in the Universal Declaration of Human Rights, the International Conventions on Human Rights and other relevant international documents. The same Declaration called upon all states to cooperate in the establishment, strengthening the development of the scientific and technological capacity of developing countries with a view to accelerating the realisation of the social and economic rights of the people of those countries.

In his book *Democracy and Technology*, Sclove (1995) presents a "disdain from the epistemological inanity of value free technology and the reductionist fallacy of technological determinism". He argues that misunderstanding about technologies enhances their relative structural significance, because it enables technologies to exert

their influence with only limited awareness of how, or even that they do. It is given that technology constitutes an influential social structure. He considers how this particular structure relates to the traditional question of democratic theory. What he ponders is the optimal size of a democratic community, the minimal standards of an informed citizenry, and whether communitarian/cooperative technologies would provide alternatives to today's monstrous business enterprises and public bureaucracies

Sclove (1995) has been brave to confront the possibility of conducting elections through the Internet; he does alternatively give unqualified endorsement to the popular notion that "virtual communities" might one day replace territorially defined states as the predominant locus of democratic politics. The apparent anarchy of the Internet is plainly at odds with the emerging hegemony of corporate control over cyberspace; the outcome of the struggle is as yet unclear. He provides clear illustrations of political and economic alternatives to social gigantism that give practical expression to the belief that technologically alternatives mediated tyranny, while a clear and present danger is not our necessary fate. From cooperative networks of small manufacturing firms to the non-profit centre for technology, democracy and technology are replete with practical illustrations of innovations, which permit the democratisation of technology in small and medium scale context. If this is less than a prophecy of a techno-democratic utopia, so much the better.

With regard to the hegemonic institutions of transitional business and the state, he maintains that "at a minimum they too should be reorganised into federations of quasi-autonomous, democratic divisions and subsidiaries". He is realistic enough to acknowledge that, although some decentralisation is taking place under the sway of strategic planning initiatives and reengineering programmes, any claim that a more democratic ethos is accompanying such organisational restructuring is at best premature. The summary in the Sclove literature is that it is possible to evolve societies in which people live with greater freedom, exert greater influence on their circumstance, and experience greater dignity, self-esteem, purpose and wellbeing.

It is said that the 21st century has promising scientific and technological innovations that were previously regarded as fictitious. Developments in nanotechnology, microelectromechanical systems (MEMS), genetic engineering, cloning, robotics, and

optical and quantum computing are likely to have a great impact upon the future structure of the society. While there is wide dispute as to whether these advances will be a boon or bane to humanity, there is a consensus opinion that change is coming. Joy (2000) sees a future that is frightfully bleak. He maintains that “accustomed to living with almost routine scientific breakthroughs, we have yet to come to terms with the fact that the most compelling 21st century technologies – robotics, genetic, engineering, and nanotechnology – pose a different threat than the technologies that have come before”. He warns that society has become enamoured with the quest for scientific knowledge, that it no longer bothers to consider the impacts of the societal discoveries. Moreover, he is concerned that the self-replicating abilities of novel innovations in genetic engineering, robotics, and nanotechnologies (GNR) could produce dire results, including the end of humanity.

In the light of this potential danger, Joy suggests a controversial solution: verifiable, voluntary relinquishment of dangerous GNR technologies. He writes that “this requires vigilance and personal responsibility by those who would work on both NBC (nuclear, biological, and chemical weapons) and GNR technologies to avoid implementing weapons of mass destruction and knowledge-enabled mass destruction”.

Joy (2000)’s sentiments are rebutted by Brown and Duguid (2000). They use the “ballyhoo associated with the dawning of the nuclear age in the 1950s to make their case”, by referring to the fact that techno enthusiasts had previously predicted the “end of power monopolies, the emergence of the ‘electronic cottage’, the death of the city and the decline of the corporation”. They both believe that much of Joy’s pessimism stems from a tunnel vision that leaves people out of a picture and focuses on technology in splendid isolation. Brown and Duguid hold that the future is only profoundly bleak if one looks at it through the “6D” lenses of: demassification, decentralisation, disintermediation, despecialisation, disaggregation and demarketisation.

Dertouzos (2000) is also critical and troubled by the notion that human logic can anticipate the effects of intended or unintended acts, and the more arrogant notion that human reasoning can determine the course of the universe. He counters that society in

its ability to assess consequences can rely on its humanity, feeling and beliefs when determining the impact of technology. Unlike Joy, who would prohibit certain types of research because of their potential dangers, Dertouzos states that "we should instead proceed, but stay vigilant, ready to stop, when danger is imminent, using our full humanity to make that determination".

Crow and Sarewitz (2000) both see technology and innovations as forces that can remake social structures and create new phenomena, which in turn lead to new institutions and response mechanisms. They believe that nanotechnology has the potential to be another catalyst for sweeping societal change. Their point is not to predict the future of nanotechnology and its impact but to illustrate the direction and scale of thinking that will be necessary if we are to successfully manage the interaction of new knowledge and innovation with society. They warn that the revolution is coming; that we can allow ourselves to be caught by surprise or we can prepare for it in order to enhance the benefit and reduce the disruption and dislocation that must accompany any revolution.

Nowadays it is clear to everyone that there is this problem of technology. It can be argued that no other comparably larger theoretical issue impinges so directly on daily life as does this problem in its various aspects.

It therefore follows that there is an adequate confrontation or reckoning with this issue in its full theoretical dimensions. For the most part this problem comes to light only as the problems of specific technologies. Is it moral and desirable for biological engineering to alter natural species? For example, who has the right to decide whether a foetus should be aborted or a patient disconnected from life-support machines? How are we to deal with the potential dangers of environmental degradation or nuclear war? Different technologies bring different problems, but beneath this apparent variety three practical questions seem to be raised by every advance in shaman power: Is it moral and desirable to do what this new capacity enables us to do? On whom devolves the right to decide this question? And how does one control the unanticipated or unintended consequences that may emerge from the exercise of this power? These are the problems arising from the development of a particular new technology, posed as a difficulty that is usually treated as a technical problem or as

policy questions to be resolved within the context of established moral and legal practice.

Not far beneath the surface of these practical issues, however, hang theoretical questions about the rational coherence, the psychological impact and the moral propriety of technology. The question can be asked if modern scientific rationalism can give an adequate account of the world, and especially of the human world, including the human capacity for science. Is the vision of nature and of man that imposes on society compatible with a truly human life, and does the technological project for the mastery of nature not violate some sacred or perhaps salutary limit on human power established by nature? These questions always cloud the existing policy debates. While escaping their direct attention, they constitute the problem of technology in a deeper and more interesting sense that guides the inquiry.

Amongst the critics of technology, Heidegger stands outside and against liberal democracy, which he sees as merely a political manifestation of technological rationalism. He views liberal politics and technological science from when it began to emerge at about the same time when it sprouted from premises concerning the autonomy of practical and theoretical reason to scriptural or technological absolutes. Critics of technology like him were nourished by shared hopes for humanity's progressive self-improvement through its conquest of political and natural worlds. Crow and Sarewitz (2000) also support each other symbiotically; they see liberalism protecting free and public scientific inquiry, with the latter having generated the technological and economic growth on which the former has depended. Because of this intimate connection, it seems peculiarly difficult for thinkers working within the liberal democratic tradition to confront the problem of technology in its most radical form, as the relative silence on this topic by liberal theorists John Rawls, Ronald Dworkin and Robert Nozick would seem to indicate. But for the same reason it is above all necessary for liberals to address it. The problem of technology is, to a very great extent, the problem of liberal democracy.

A general tone is set by Kass (1993) in specifying problems of technology, and by thinking about its possible implications for liberal democracy. He worries about technology because it provokes anew the age-old question of human happiness at the

same time that it tends to undercut the validity of such questions and endangers society's capacity to lead good and happy lives. According to him, liberal democrats must rediscover the richer, non-technological conception of liberty and dignity, if they are to keep their moral bearings in modern age.

Bimber (2001) asserts that some aspects of democracy appear more sensitive than others to the availability throughout society of political information. Individual-level political engagement poses a puzzle in this regard. An instrumental-quantitative conception of information central to rational theories and also found in some behavioural theories of participation, appears contradicted by historical trends. He alludes that contemporary expansion in political information is made possible by new information technology. He presents a model of the relationship between information availability and political engagement, based on survey data of Internet use between 1996 and 1999. The presentation is relevant to the debate whether the information revolution will prove salutary for participation, and at the same time sheds light on contending theories of information. His finding reveals that little relationship exists; the only form of participation demonstrably connected to Internet use is donating money. This finding fails to support instrumental conceptions of information and instead endorses cognitive conceptions employed in psychological and certain behavioural theories of political engagement.

Miller (2001) maintains that what moderns call technology is essential to liberal democracy, for without the increase of wealth, knowledge and opportunity that technology provides, the ruling majority could not be an enlightened middle class. Nevertheless, critics point to advancing technology's harmful side, with some hope to prevent these harms by tight controls. Others despair that technology lies beyond our control. In a neglected 1858/59 lecture and related speeches, Abraham Lincoln grappled with these issues and their implications for democratic statecraft. Although convinced that "discoveries and inventions" had rescued humankind from savage beginnings, produced abundance, and put genuine democracy within reach, Lincoln recognised that advancing technology alone would not guarantee freedom, but might bring new forms of mastery. Lincolnian statecraft seeks to moderate or limit this advance, not through stringent controls but by a moral teaching that builds on the natural right to oneself and includes a comprehensive doctrine of labour.

The effects of new information and communication technologies (ICTs) on democratic political systems in industrial societies have also been investigated by Chambat (2000), who in his study describes early adoption of ICTs by political institutions, e.g. computerised polling and voting, and evaluates the benefits and drawbacks. Preliminary evidence suggests that ICTs have not been that successful in improving political participation; the reaction of citizens to “teledemocracy” are not what has been said about the hype of technology. Looking at the machinery of government, he concurs that ICTs have been adopted successfully, improving public administration, decision-making, and information management. The role of ICTs in the public space is better off in terms of how it impacts on individuals in a society, the social communication network, mass media use and political function, and community cohesion. Contrary to Chambat, Slaton and Becker in their arguments assert that modern representative democracy was neither intended nor designed to function as a democracy, and progress in the past 200 years has come from the persistence of citizens operating outside established hierarchical power structures (Slaton and Becker 2000). A transformation of modern representative democracy is under way, and information and communication technology (ICT) is a key component in the evolution of more participatory democratic governments. The failings of modern representative democracy are highlighted by the decline in voting turnout rates and a high level of dissatisfaction with and distrust of elected political leaders. While advances in technology and the expansion and availability of information can hinder and harm efforts to advance democracy, a balance is sought to the discourse by emphasizing the potentials and benefits and by seeking solutions to problems in the representative systems. This is approached through the examination of four areas of enormous innovation and experimentation in utilizing ICT to develop new forms of greater citizen participation within representative democracy and for creating more effective direct democracy: voting from home, scientific deliberative polling, electronic town meetings, and direct democracy activities. The main conclusion is that ICT has aided forces that favour a stronger influence by citizens in representative government, which is already in the process of being transformed as nations move toward the global economy and citizens insist on more self-governance.

Stevenson (2000) seeks to tie in arguments that can be connected to the development of a global media culture and concerns around cosmopolitan forms of democracy. This is done by considering arguments for firstly a global human rights initiative in respect of global media conglomerates; secondly technological change in respect of digital cultures; and lastly the arrival of what Castells has described as the culture of "real virtuality." These views and perspectives are assessed in terms of the contributions they are likely to make towards what he calls a "cautious cosmopolitanism". He seeks to make some definite policy reference that helps foster conditions in which cosmopolitan democracy flourishes.

Cherny and Kapkov (2000) present an analysis of the rapid and dramatic changes in the politics and economics of the world during the twentieth century, and reveal that the role of science and high technology becomes extremely important for international development, security, and cooperation. The consequences of fundamental research become critical for mankind, and they determine and define preventive security. International scientific and technological cooperation, coupled with the financial power of the dollar, will make it possible to avoid an "end of history" or a "clash of civilizations", as well as to resolve many world conflicts. The importance that science and technology holds for the future of humanity must be added to the current definition of "democracy".

Catinat and Vedel (2000) contend that public intervention is the key to fulfilment of the promise of digital democracy. He describes liberal and digital democracy by alluding to an argument for government empowerment of digital information dissemination referring to economic, contextual, marketing, and subjectivity issues. Policy considerations are listed, such as privacy protection and access to infrastructure, public information, and services. Details are included of the cultural, educational, and sexual composition of Internet users. There is an examination of international gaps in technological access and changes in information-access policies. Exemplification of ways in which public actions may promote digital democracy includes specific methods for providing information and elucidation of laws concerning public access to data. Also considered are pivotal actions in the liberalisation and sponsorship of telecommunications. A government role in

promoting public awareness and enthusiasm for computer use, system design promotion, and organisation is important.

Barber (1999) argues that there are at least three scenarios for the future relationship of technology and democracy: (1) the Pangloss scenario, which is rooted in complacency and is simply a projection of current attitudes and trends; (2) the Pandora scenario, which looks at the worst possible case in terms of the inherent dangers of technological determinism; and (3) the Jeffersonian scenario, which seeks out the affirmative uses of new technology to nurture modern democratic life. He concludes that uses of technology that will nurture strong democracy require hard and imaginative work for which the political will appears to be lacking.

As in previous cases, Sclove (1995) argues that, insofar as citizens ought to be empowered to participate in shaping their society's basic circumstances and technologies profoundly affect and partly constitute those circumstances, it follows that technological design and practice should be democratised. He presents his argument in three parts. Part I synthesises two disparate bodies of knowledge. One is a corpus of recent research into the social dimensions of technology. The other is that body of knowledge and practice known as democratic theory. Part II develops a provisional system of design criteria for distinguishing technologies that are compatible with democracy from those that are not. Part III elaborates on the concept of the democratic politics of technology. Challenging the foundations of modern economic thought, the author argues that the democratic theory of technology qualifies as a coherent alternative to neoclassical welfare economics. Indeed, reinvigorated democratic politics should largely supersede conventional economic reasoning as a basis for technological decisions.

Hager (1993) revisited the developments in Germany that during the past two decades the mobilisation of grassroots citizen groups has posed a fundamental challenge to institutional politics. One important, often-overlooked aspect of this challenge is the relationship of democratising movements to technology. Grassroots protest arose mainly in reaction to large, state-sponsored technological projects. Citizen movements reopened the question of the citizen's proper role in technological decision-making, which had long been part of theoretical discourse. Grassroots activists challenged not only policy decisions but also the legitimacy of the bureaucratic institutions that

produced those decisions. Informed political participation has raised the technical competence of policy in Germany, while eroding the legitimacy of traditional policy-making institutions. Citizen groups have since directed their efforts toward developing alternative political forms that will reconcile technical competence and participatory democracy. The theories of Claus Offe and Jurgen Habermas illuminate the legitimation problems that lead to citizen protest.

Weinberg (1990) considers two questions: Do the two technologies that represent the highest engineering achievements of this democratic age (nuclear energy and the microchip manifested in instant communication and precise control) threaten the stability and freedom of liberal democracies? Can technologies that pose risks, but are regarded by many experts as necessary for survival, survive democracy? In short, the author asks whether modern technology and democracy can coexist

Summary of the literature review and analysis

Challenges in the political, social and the economic milieu prompted the review of the literature, which demonstrated that technology could have an influence over a democratic political system. It is evident that technology can shape the military and the economic environment of the political system. It is also clear that technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

The important question that was addressed is whether technologies are substantively democratic, and whether technology policy decisions are compatible with perpetuating a democratic political system. The review investigated and appraised democratic theories and analysed approaches and challenges in democratic politics of technology, which could be applied in South Africa. Specifically the focus was the character and crisis in technology, and also the theoretical and practical resources that are available for democratisation in South Africa.

In essence, if democracy is impacted by technology, as systematic application of knowledge to resources to produce goods and services, it also enhances stability and

equality. Therefore, it can shape challenges in the environment of a democratic political system by maintaining stability; it will also deliver material prosperity, and foster democratic rule in society.

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.

CHAPTER FOUR

THE ROLE OF TECHNOLOGY IN THE MODERNISATION PROCESS

Introduction

This chapter aims to recognise the modernisation process within the context of the role technology has played and the wider socio-economic and political changes that took place over the past years, particularly in South Africa. It examines the transitions in political culture in relation to the re-conceptualisation of the role of technology as a factor contributing to the modernisation process, while taking experiences from other countries into consideration. The chapter specifically looks at the modernisation of democracy through technology.

The process of modernisation in SA is closely related to the perspectives of integration and political strategies that have been defined as the "rationalisation of society", which claims the imposition of a specific form of social progress. (Feenberg, 1986). This process is also articulated by Marx's political revelation that originates from the growing rationalisation of society in terms of both technical progress and of his common understanding of society. Modernisation is being perceived as a process of transformation in the political culture that tends to establish new forms of governance and to redefine the links between state apparatuses and socio-economic structures.

In view of this analysis, this chapter examines the role of technology in the modernisation process, and how technology influences democratisation. It is argued that advances in technology reflect the wider challenge for modernisation in South African society. Some of the main features of this process are the changing links between politics and the economy, and the redefinition of political participation and liberal democracy. Furthermore, the chapter argues that modernisation is a contradictory process. There is no era clearly defined by 'modernity'. Tradition and modernisation coexist in a strenuous symbiotic relationship. In the context of South African political dynamics, however, political modernity coexisted symbiotically with the democratisation and the concomitant advances in technology. The chapter makes

reference to both scholastic approaches, as most of the background assumptions derived from the thought that helped to explain the causal relationship between modernity and technology.

The conception of political modernisation

The concept of modernisation emerged after the Second World War as a result of the global dismantling of European empires, and was seen as the development theory concerned with the development gap between the North and the South, and how best to lessen this gap so that the Third World could develop more rapidly and more successfully. It was during this time that humanities and social sciences were swept by a wave of technological determinism. If technology was praised for modernising societies, it was also blamed for the crisis it caused in culture. Whether interpreted in optimistic or pessimistic terms, determinism appeared to offer a fundamental account of modernity as a unified phenomenon.

This early period of the political modernisation phase is the central element of the early discourse, primarily of progress and control over both society and nature, which come together in the notion of the rational society. Rationality in society refers to what Feenberg (2003) calls "...the generalisation of technical rationality as a cultural form specifically, the introduction of calculation and control into social process with a consequent increase in inefficiency". Succinctly stated, it refers to the idea of man's ability to shape both the social and the physical world. This ability of man to take control of his environment is what in sociology is regarded as functionalism, which takes the form of an explicit evolutionist perspective with regard to sociology of development, as that of the modernisation process.

The modernisation process takes a bipolar view of the world, that all societies can be divided into two varieties, i.e. traditional and modern. An influential exponent of this dichotomy was economist WW Rostow. The modernisation process is driven by a number of different ideologies, which share the basic assumption that it is possible to outline the most desirable development of society. Rostow depicted five stages of sociological growth. The first of these stages is the traditional society, which is an astoundingly general category; it links together a vast diversity of different societies, ranging from stone age cultures to France on the verge of its revolution at the end of the eighteenth century. But he asserts that the similarities outweigh the differences

between them. (Rostow, 1960). These similarities include: 'pre-Newtonian' science and technology; a basically agricultural economy; and a rigid ascriptive system based on bloodline, kinship, etc. Until just before the industrial revolution that took place in Western Europe two centuries ago, all human societies were based on this form. This stage of development can be said to encompass all societies prior to the 17th century, which possess little of the structural characteristics that can be seen today.

Next come the preconditions for take-off. This stage is said to be often triggered by a stimulus from outside, such as imperial profit motives. It is characterised by an increase in trade, services, communications, and the beginnings of industry, especially extractive industries, such as mining. The economy becomes more specialised and interdependent, less localised, and self-sufficient. Rational science plays a more major role. An elite group comes to power, which wishes rather to re-invest its wealth rather than squander it. This is the period whereby a society begins to grow at a steady rate, both in quantity and quality. Essentially, the political, social, and manufacturing sectors are reformed to allow growth within all aspects of the country, and the society can be said to be emerging as a modern, market-oriented civilisation. The preconditions for this are various, but can be categorised as a general change in direction through all walks of society, toward the transition from a traditional to a modern society. The final two stages are natural extensions from the take-off: the drive to maturity is the expansion of the newly developed ideas and technology into other divisions of society, that is, a period of consolidation. Modern science and technology are extended to most if not all branches of the economy, and thus the range of leading sectors is widened, and the age of high mass consumption, which is a description of a period of further consolidation and advancement, and is as such not clearly separated from the 'drive to maturity' (Bell, 1973). Because of the high level of economic development, choices can be made about how the society works, and what its priorities are. Wealth can be channelled into individual consumption, as in the USA, or channelled into a welfare state, as in Western Europe, or social and political power. This is the final stage whereby the progress made previously has been fully filtered throughout the economy and culture, and is essentially the state of a country where little or no growth is longer necessary to maintain itself. (Rostow, 1960).

In simplifying the progress that has filtered through the economy and culture, the modernisation process assumes the fundamental proposition that people in traditional

societies should adopt the characteristics of modern societies in order to modernise their social, political and economic institutions. The main characteristic of modernisation is that of its simplicity, which dictates to the traditional society to recognise what is needed, from examination of other 'take-offs' to modernity, for their own culture to evolve. Having been modernised, the modern societies can assist in the evolution of the traditional society, which may not necessarily be the case. As a theoretical model, Rostow's perspective on modernisation is useful in that it is indiscriminate and unsophisticated as it requires little adaptation from one culture to the other. The basis of the concept is that the ultimate goal already exists and can be examined readily, and that this is what the developing country should strive for, hence the technologies that exist could easily be adapted to suit the environment in the developing countries. Although Rostow makes no attempt to isolate individual cases and discover the different ways to adapt the theory to suit the environment, the concept does provide the structure and ground rules to benchmark its applicability within the South African context. (Rostow, 1960).

Based on the foregoing, the South African model could also be depicted from other theories that are central to all modernisation and political development. These theories also present the notion that all societies have passed, or are in the process of passing, from a condition in which a bundle of related characteristics which can be broadly classified as traditional predominates to one in which modern characteristics predominate. A consideration of this series of changes as it relates to politics has been a relatively belated development in political science and rests on the work of social scientists concerned with the broader distinction between tradition and modernity. In its early development from the 1920s on, political science's lack of concern with change (Huntington, 1971), let alone with the modernising change from traditional to modern, can be traced to a number of factors. First, political science was concerned almost exclusively with relatively stable political systems, essentially those of Western Europe and North America. These had elements of change that could be studied, for example the rise and fall of particular political changes in balance of power between executives and legislatures, but did not seem to exhibit fundamental overall change. Political science also neglected fundamental change because its practitioners sought autonomy for their discipline by rejecting historical approaches, a

rejection reinforced by its adoption of behaviourism, which emphasised non-historical evidence such as surveys, interviews and observation.

The rise in modernity and hence in the study of political change, which became synonymous with political development, began in the 1950s as a result of the attempt of Western and particularly American political scientists to come to grips with the changes brought by the Second World War and, where Europeans ruled over dependent territories, the beginnings of decolonisation, in Asia, Africa, the Caribbean and Latin America – the areas that were later to be described as the Third World. Political scientists studying Africa were in the forefront of this movement. Thus, for example, David Apter's study of "political institutional transfer in the Gold Coast" (now Ghana) was researched as early as 1952 and first published in 1955, before Ghana's independence. (Apter, 1955). It was essentially an attempt to explain and predict modernisation; the institutional transfer was from traditional to modern, independence, direct institutions, in terms of Weber's threefold typology of authority.

Apter was a pioneer in his attempt to explain modernity and political development. The work played a major role in first focusing the attention of political scientists on developmental problems. Almond and Coleman (1960) in their book *The Politics of the Developing Areas*, have laid some of the ground rules for the study of political development, notably a characterisation of the distinction between traditional and modern social systems and a functional model of the political system which, it was claimed, had universal applicability. Almond and his collaborators were by no means the only authors to construct models of political development on the basis of these static formulations.

At the most general level, the distinction between modern and traditional is equivalent to a distinction between what are considered rational approaches to social organisation, action, and goals, as contrasted with irrational approaches. Without a predominance of rationality, modernity cannot exist. Already a caution is warranted. Rationality is in the eye of the beholder, what is rational to the self-proclaimed modern man may be hopelessly irrational to the man he has labelled as a traditionalist. Almond's characterisation of the rational/modern dichotomy rests on the pattern variables developed by Talcott Parsons but are part of a long tradition on political

thought. Three of these dichotomies are considered particularly relevant; ascription/achievement; diffuseness/specificity; and particularism/universality. (Parsons, 1951).

In a traditional society in which ascriptive values predominate, individuals will – to take but one aspect of life – be appointed to high office because of their family caste, sex or age. In a society (modern) in which achievement values predominate, an appointment will be made on the basis of clear indications that a person is qualified to carry out a particular function through the skills he has acquired rather than the status he has inherited. Secondly, in traditional society where diffuse values predominate, there will be, for example, little actual specialisation of activities or actors or perception of such specialisation. The economic, political and religious systems will merge both in the theory and practice of participants. By contrast, in a modern society where specific values predominate, individuals will both perceive and act in the knowledge that there are clear distinctions not only between the political, religious and economic spheres but also, for example, between different aspects of the political, such as the legislature, the executive and the judiciary. Finally, where particularist values predominate (in traditional societies), there may be a sharp distinction between, for example, the rights and obligations of different sectors of the population. Only a few might for instance be free men or entitled to own property or to pursue certain occupations. In a modern society where universalist values predominate, obligations and rights applicable to one man will tend to be applicable to everyone. (Nwabuzo and Mueller, 1985).

It should be noted that the above three dichotomies are of course closely related. Universalism, for example, implies an orientation towards achievement values. Finally, to Almond, the dichotomy between traditional and modern is not intended to be a rigid one. No society, or its political system, is from this point of view seen to be entirely traditional or modern. Rather, all political systems are transitional systems. There is also a need to look at the functional model of the political system, which together with the traditional/modern dichotomy forms the basis for the dynamic elements of the model of political development.

Like the characterisation of traditional and modern societies, Almond's model of the political system is by no means original. Aiming to provide interconnected analytical

concepts that would be applicable to any political system – however primitive or advanced – the functional model avoids such formalistic terms as legislature, executive and political party, and certainly any explicit reference to the machinery or characteristics of any specific political system. Whether such reference is implicit is another question. The emphasis is on the functions that the system performs, and the core of the model is developed from David Easton's notion of the political system as having certain inputs. Almond's model can be simply categorised as the input/output process, where for example *Inputs* are socialisation and recruitment, interest articulation, interest aggregation, and communication, and *Outputs* are rule-making, rule-implementation and rule-adjudication.

The model is elaborated in Almond's work in collaboration with Powell, partly to counteract criticism that the original model was static and had conservative implications. Almond and Powell conceded that the earlier framework was suitable mainly for the analysis of political systems in a given cross-section of time. It did not allow for explaining developmental patterns, that is to explain how political systems change and why they change. (Almond and Powell, 1966).

In the model, the outputs are characterised in terms of their relationship to their environment: they may be regulative, extractive, distributive, symbolic and responsive capacities. Implicit in such categorisations is the notion that a successful modernisation process or political development depends on the ability of the political system to adapt its capacities to the changing national and international environment. Such a suggestion is unexceptionable; a political system, for example, must be able to organise the extraction of resources needed to fund its changing activities, or create symbols which encourage the populace to grant it legitimacy under changing circumstances, if it is to survive. Almond and Powell, and some other theorists, do not, however, rest content with a model of political change that is universally applicable, in time and space, if somewhat truistic.. In so far as the notion of a traditional society is at all useful, one could – using Almond and Powell's broadest notion of adaptation – conceive of modernity which, for example, rested on the creation of new forms of traditional organisation. If every society that is not predominantly modern is also predominantly traditional, then indeed this must have happened innumerable times in world history. However, the elaboration of the mechanisms of adaptation that Almond and Powell offer, makes it clear that they are

concerned only with the modernising phase of political change. The model they offer therefore warrants further examination. (Almond and Powell, 1966).

Given the reasons discussed earlier in this chapter for the rise in the theories and models of political development, it is hardly surprising that interest should focus on questions of modernisation. Modernisation was the avowed objective of most of the governments of the new states, an objective looked upon benevolently by the United States – the home of the modern – anxious to maintain or expand its own influence and foster viable political systems after its own image as a buffer against revolution. Most political scientists concerned with political development were American and, as critics were to point out, they not only took up modernisation as a process that should be studied and conceptualised in an objective manner, but often seemed in their enthusiasm to have assumed rather than demonstrated that modernisation was indeed taking place.

The concept of modernisation, itself dependent on the demonstration of substantive distinctions between traditional and modern societies and political systems, is also central to various models of political development by Almond and Powell, Feenberg, Beck, Apter, Parsons, etc. According to them, both the process of political development and its ultimate goal may be subsumed under the concepts of structural differentiation, subsystem autonomy and cultural secularisation. (Apter, 1965). They argue that the political modernisation process results when the existing structure of the political system is unable to cope with the problem or challenge which confronts it without further structural differentiation.

The political modernisation process

Contemporary society is in transition as a consequence of processes of democratisation and the effects of technological accessibility. These processes are said to aggravate a new stage in the political arena in which the general idea of the modern society is being redefined. This phase of political modernisation is a combination of debates on post-traditional and modernity. Some modernist theorists assert that contemporary societies show a new or intensified degree of political, economic and cultural life being strongly influenced by advances in technological

developments and other related developments at global level. Modernism proclaims multicultural and multiethnic societies and promotes the politics of difference, linking the local and the global societies in which identity is not unitary or essential, but fluid and shifting, fed by multiple sources and taking multiple forms. (Ray, 1987). Contemporary modernisation theorists understand change as an accumulation of and within modernity, in which aspects of technology and globalisation are put at the forefront. It seems as though there is no way to overcome the impetus of technology, but at the same time individuals have to enjoy and live with these consequences of modernity. Modern society is seen as a society that assumes to be at a stage of high or radicalised democracy. Essential here is the unintentional and unplanned transition from traditional society to modern industrial democratic society. This transformation to a modern democratic society is understood to be at a phase of development in which the combination of individual, social, economic and natural aspects, created by the momentum of technological innovation, increasingly supports the social and political issues prevalent in a democratic society. As political processes become modernised, society as a whole too can no longer rely upon traditional institutions, and the less it can rely on traditional securities, the more it seeks reliance on technology. (Kumar, 1995).

The concept of modernisation in the technological era

Over the last century society has witnessed a revolution in information and communication technologies that has moved much of the public discourse and agenda setting from the individual and community level to the mass level. As communication technologies and their use by people continue to evolve, there are indications that this trend is now reversing, with some notable globalisation exceptions. With computer-mediated communications, people are reclaiming their communications power from mass institutions. (Clift, 1997).

Studies in the theories of modernisation and technology have made great progress in recent years; they have, however, remained different in the nature and role they have played in society's economic and political sphere. The relationship between the two is somewhat complex, such that it is incomprehensible to make sense out of modernity without an adequate account of the technological advancements that make it possible, and that it is also difficult to understand how the technologies can impact on society without a reasoning of the larger society in which they develop.

Modernisation is premised on the key notion of rationalisation to explain the uniqueness of modern societies. Rationalisation refers to the generalisation of technical rationality as a cultural form, specifically the introduction of calculation and control into social processes with a consequent increase in efficiency. (Feenberg, 1986). But rationalisation also reduces the normative and qualitative richness of the traditional society, exposing social reality to technical manipulation. It depends on a broad pattern of modern development, which is described as the “differentiation” of society. The notion of this differentiation in society has common applications in the separation of real political issues like property and political power, religion and the state, etc. Modernity as a theory relies on the key notion of rationalisation to explain the uniqueness of modern societies.

Technology’s influence in the modernisation process

In the past years, the subject of modernity has been recaptured in the humanities and social sciences, and has gained increased attention. What is striking in the existing literature on modernity is the ambivalent role played by technology in its analyses. Technology is often depicted as the engine of processes of modernisation and as one of the principal icons of modernity. It is the main motor-force of social change that is considered to be economic, more particularly technological change; and as such economic change is alleged to determine the most significant changes in social relations, values, or ideology, and political structure. (Nwabuzor and Mueller, 1985).

The role of technology in the modernisation process involves a complex relationship between its adaptations and how it is applied as an engine of the modernisation process. In terms of its adaptation, specifically the use of the Internet technology, technology seems to be a strong artefact for fast-tracking the modernisation process as it encourages mass interaction around the world due to its public openness and non-proprietary nature, in that there is nobody who can claim to own the protocols. Shapiro (1999:14) suggests that technology has been used to modernise societies, either from the traditional or authoritarian to modern democratic societies.

Democracy in the post-traditional societies in the late twentieth century was characterised by two major trends. The first being the transitions of traditional societies, mostly from authoritarian rule to democratic political system, which Huntington (1991) refers to as the Third Wave of the democratisation process. The

second trend has been referred to as the crisis experienced by Western democracy as a result of the lack of political participation and mostly the domination of democratic processes by special interests in political systems. It is argued that technology impacts on these trends in ways favourable to democracy. Technology has also played a role beyond enhancing the modernisation process within the context of national democracy by facilitating transnational networking, which scholars refer to as the globalisation of democracy.

Huntington (1991) defines democratisation as the transition from authoritarianism to democracy. Democratic transitions involve two processes. The first is the non-democratic government that abdicates or is overthrown, and a democratic government is installed through free and fair elections. The second is rather a broader modernisation process that involves creating a democratic political culture. The latter process commonly commences before a democratic government is inaugurated, fast-tracking the democratisation process, and usually continues after the installation of a democratic government. The following are examples of how advancements in information technology play a role in the modernisation process and consequently in the democratisation process.

The role of information technology in modernising the democratisation process

The Internet has been cited as one of the most powerful artefacts that have been significant in influencing the democratisation process, particularly because of its capacity to be used as a mass media instrument. Originally designed around 1969, it has the potential to enhance opportunities for participation within existing political forums. Many commentators have pointed to the Internet's potential to create entirely new political spaces or to update those historical spaces that have been lost as a consequence of the increased complexity of social and political life. Thus, some have suggested that the Internet offers the potential to re-enact direct forms of democratic engagement amongst citizens through the medium of electronic 'town hall' meetings and even the recreation of something similar to an ancient Athenian public sphere. For those optimistic of the Internet's potential to re-engage citizens in face-to-face, or at least keyboard-to-keyboard, political deliberation, a number of high-profile experiments in the United States are repeatedly cited as examples of the way in which this aspect of communicative technology might develop. (Feenberg, 1986).

For instance, since 1995, the government in Korea has strongly pushed the construction of a National Information Superhighway and is putting its utmost efforts into moving towards an information society. With the wide provision of personal computers, which plausibly can be connected to online services or the Internet in Korea, people are getting plenty of domestic and international information. Information technology has enhanced the possibility that people can communicate with unknown persons around the world, exchange their ideas and experiences, and even develop their own curiosity about new information. The advancement of information technology has also led people to wish for better services and quality of life, and enjoy the rights of free expression.

Information technology and services augment the opportunities for developing public participation in, and awareness of, the political process. The online services played an important role in promoting openness of government. On the basis of a nation-wide information infrastructure, the Korean government at both central and local levels has been actively experimenting with electronic democracy to hear citizen's views on government policy and planning, government activities, and social issues. Public organisations have also been launching electronic democracy projects in many forms. Most of the projects are still in the infant stages of development. However, much attention must consistently be given to the creation of an enhanced information system which will enable the public to engage in an online dialogue with politicians and government officials and participate in government decision-making processes. (Lee and Cho, 1996).

In South Africa the government is setting up a government-wide call centre. It has phased in an electronic system, an e-government gateway, in which a directory of government services will be available. The government gateway project aims to enable the different government computer systems to communicate in order to fast-track service delivery and make services available around the clock. This is done in order to ensure that government goes to the people so that it sharply improves the quality of the outcomes of public expenditures intended to raise the standard of living. Recently the government initiated a Programme of Action which allows the public to track and comment on the government's progress. The Programme of Action is available in five 'clusters' by theme: 'Economic, Investment and Employment', 'Governance and Administration', 'International Relations, Peace and Security',

'Justice, Crime Prevention and Security', and 'Social'. The information on the implementation of the programme is made available every two months after progress reports have been submitted by clusters to Cabinet. The posting of information online forms part of the efforts to realise transparent governance in actual practice, and constitutes an element of the people's contract for a better life. (Brrows, 2003).

There is no doubt that all of the examples in the literature of attempts to re-engage communities in the politics of their locality, point to a number of ways in which information technology can lead to a genuine growth of social capital and the enhancement of local democratic participation. Today's technology can electronically support virtually every aspect of democracy so that, should the need arise for government to achieve more and more sophisticated levels of electronic democracy (e-democracy), focus needs to be driven towards sophisticated levels of e-government, such as online citizen services, which should include a companion progression to more and more sophisticated levels of e-democracy within and beyond its national borders.

Modernisation of democracy through the use of information technologies

Information technology, in particular the Internet, was originally designed around 1969 to allow the exchange of packets of bytes between computers; for a long time it remained restricted to the exchange of scientific data between scientists and secure information within the US government. In the 1990s it became a popular means of communication. In 1993 the US government opened the network to the industry, and the creation of the Hypertext Mark-Up Language (HTML) laid the basis for universal accessibility. Since then its growth has been phenomenal. A survey towards the end of 1999 suggested that 259 million people were now Internet users. Of these 111 million were in the United States, six times as many as the next largest figure, which was for Japan. The survey predicted that the figures would rise to around 490 million by the end of the year 2002. Another survey claimed that over 28 million people visited the Worldwide Web every day and confirmed that it was now spreading rapidly throughout the world and outside the US. As a means of communication it has the potential to revolutionise political activity as it offers the possibility of direct two-way interaction between the citizens and politicians. This has led to predictions that it will completely revolutionise government and democracy, even that the outcome will be a

new wave of democratisation worldwide, as authoritarian regimes find it difficult to survive and as established democracies are transformed. (Ferdinand, 2000).

The impact of the Internet has not been in politics only; it has also impacted greatly on business and society. It has already transformed marketing, procurement and recruitment functions of corporations in the United States. Now the impact is spreading to other parts of the world, partly through the socializing role of multinational corporations. At the same time the Internet has created opportunities for a whole host of new companies, principally dealing with information technology. Whilst making use of the Internet a core business function certainly requires the acquisition of technical skills, in other respects it may reduce the costs of entry into the marketplace for new companies. New companies may, for example, be spared many of the start-up costs of acquiring premises because they can deal directly with clients or customers. (Strommer-Galley, 2000).

The initial benefit of the Internet was its ability to reduce the costs of government administration. It has considerably speeded up communication with colleagues and clients. It has also reduced the costs of transmitting data. And business commentators predict that one of its chief effects will be to reduce the number of intermediaries between the original providers of goods and services, and the final consumers. This 'disintermediation' will challenge the traditional economic functions of wholesalers and retailers, agents, and so on. At least in theory it offers the prospect of more direct selling and more convenient buying. The more futuristically minded suggest a world with fewer large shops as people shop through the Internet, with fewer large offices, as individuals work from home, and fewer publishers, as writers, composers and performers distribute their creations directly through the Internet. They even suggest that the Internet will create a new paradigm of economics. (Ferdinand, 2000.)

Internet usage by people has increased; the Internet not only provides information services for others, it has become an increasing source of reference and has also modernised the education system as well as transforming other agencies that need to process large amounts of information. As a result, the institutions as well as individuals will be able to achieve much more from such usage. For example, the government of Finland has taken to the Internet for internal communication, and for diplomacy too. Previously the Finnish Foreign Ministry was unable to afford a

presence in a large number of countries or a large research staff. It did not have sufficient information about diplomatic issues in many parts of the world to be able to make a constructive contribution to developments. Now that it can rely much more on the Internet to keep abreast of what is happening around the world, it feels capable of a much more significant role in international diplomacy. (Ferdinand, 2000).

Given the modernisation process, the one kind of innovation that the Internet might bring to politics has been managerial expertise and improved service delivery. It has been linked with the assumption that most government departments, even in established democracies, are too dominated by outdated and out-of-touch bureaucracies. This viewpoint is expressed both by individuals and by companies that have a great deal of contact with government agencies. Whether it is welfare claims, or taxation, or planning applications, the experience of those outside the government was that traditionally the bureaucracy seemed to run their affairs primarily for their own benefit and to avoid embarrassment to the party in power, rather than for the good of the public.

Those who argue along these lines believe that the new technology will also open up the processes of administration to outside observers much more effectively than before. In so doing administration will become more transparent, and more amenable to democratic pressures. This will lead to a virtuous circle of increasing transparency leading to greater efficiency and then to greater democracy. This impetus has lain behind many of the proposals for reform at both the national and local levels, namely simply bringing administration closer to the people.

Others wishing to apply benefits to government through applications of the Internet have focused on local rather than central government. In many western countries, local government has suffered from popular apathy and/or official neglect. The Internet has offered an opportunity for improving local government services, and also possibly a new way for ordinary citizens to participate more directly in the decisions that will affect their wellbeing. In Europe there has also been an increasing interest in using the Internet to (re)create a new sense of community, especially at the local level. The European Commission has actively encouraged the formation of new networks of local authorities in various countries, which have achieved a pioneering success, for example the Civic Community network.

Technology and transformation in governments

Governments are usually traditionally orientated and move slowly due to the nature of their organisations and the duty to take all interests of society into consideration when undertaking change. For the moment a difference in cultures is occurring and there is a wide gap between what individuals and groups are doing online and what governments are currently capable of doing online, especially in their relationships with the public. The challenge of governments in a few years to come will be to set out mechanisms on how to embrace more of the public into the decision-making process. More importantly, governments, especially the elected bodies, need to take a leadership role in engaging the public in wide debate on how, or if, information and communication technologies can and should change the current dynamics of democracy. For a while many might argue that being online is essential for politicians to continue to get elected, yet the evidence does not point to this being a deciding factor at this time. The debate is a fluid one. There is a need for society to become partners in a debate on the nature of democracy in its very changed world, which will then lead to ways and means whereby information and communication technologies can be strategic tools for the democratic process. Governments are concerned about the decline in public approval of their institutions. There are tools available that can help reverse this attitude – it is now a question of how extensively these tools can be used to effect this change. As is evidenced in this section, it is becoming increasingly important to engage the citizen. Tools for consultation are still run from the top down but, if done properly, the goals of an interactive government and an interactive citizenry can be reached.

Democracy as practised now by many countries, is an evolving concept. The principles and practice of democratic ideals vary from jurisdiction to jurisdiction, but underpinning all democracies are the underlying tenets of liberal democracy as evolved in the past two to three hundred years. There is representative democracy, and many electoral and legislative forms of this type of democracy, participatory democracy (practised in some jurisdictions, such as the town hall meetings tradition in the United States), and direct democracy (the closest example of this today being the practice of decisions of national importance by a referendum amongst the electorate). (Riley and Riley, 2003).

The following are but a few examples of governments that already exploit this e-democracy as technology to gather inputs from citizens and business to determine a course of action that could take society into a new form of democracy, which would reflect a wider voice of the public:

In Queensland, Australia, the website (www.qld.gov.au) gives citizens an impressive array of opportunities to interact with government. The “Get Involved With Government” choice links citizens to their representatives, to Queensland agencies, and to Parliament. The ‘Queensland Agencies’ link gives citizens background information on an issue, current law or proposed legislation, and invites direct citizen comments which go to the committee and then eventually to Parliament to help formulate policies and standards on a variety of legislative issues. The ‘Queensland Parliament’ link empowers a citizen to make a formal, direct request to Parliament in the form of an e-petition with the object of “persuading Parliament to take some particular action”. Citizens can also review existing e-petitions and add their own signatures in a show of support, or express their objections. The site also surveys users about the e-petition process itself – a built-in quality control and improvement mechanism.

Likewise, the Scottish Parliament was an early innovator in e-petitioning. Citizens can create an e-petition or comment on or add their support to an existing e-petition – all electronically (www.scottish.parliament.uk/e-petitions/index.htm). The International Teledemocracy Centre, founded in 1999 by Scotland’s Napier University and BT Scotland, aims to develop and apply advanced information and communication technology to enhance and support the democratic decision-making process. Their mission includes:

- Promoting the application of information and communications technologies (ICT) by governments and parliaments worldwide in order that elected members and supporting staff can conduct their business more effectively and efficiently.
- Demonstrating how technology can contribute to more openness and accessibility in government.
- Encouraging and assisting the public, voluntary organisations and business to participate in government through the use of technology. (Caldow, 2003).

In 2001 the European Commission adopted an “Interactive Policy Making” (IPM) project to improve the European Union’s governance. Through its website, “Your Voice in Europe” (<http://europa.eu.int/yourvoice>), the IPM collects and analyses citizen and business input to evaluate existing EU policies and to solicit consultations on new initiatives. The purpose is to make EU policy-making more transparent, comprehensive and effective, giving stakeholders an active role in the policy-making process. (Caldow, 2003).

To some extent, the same variable of organisational transformation has penetrated government. It began with internal organisation, but then gradually spread more widely to include government's relations with outsiders, whether businesses or citizens. Certainly part of the impetus for change came from businesses that had begun to adapt to the new technology and expected government to do the same. But in addition the US government recognised from early on the potential for the Internet both to increase the efficiency of its administration and also to reduce its costs. The government spends \$25-billion a year on welfare, \$27-billion on food stamps, ideas where to get job training, and the skills of the workforce further behind. It is an opportunity to use the power of information technology to fight the war on crime, to deliver social benefits to the needy; it is a secure and efficient manner while eliminating fraud and cheating; improves health care delivery, helps to find missing children, and to improve on privacy protection for all citizens – in short, to completely show how government delivers its services to its customers. (Ferdinand, 2000).

This possibility of enhanced efficiency through increased coherence government policies has attracted countries from around the world. Tony Blair’s government in Britain, for example, has been much attracted by opportunities afforded by the Internet to provide 'joined up' government. A large part of the rationale for the 'third wave', for instance, rests upon the possibility of uncovering resources that can be diverted to the pool members of society, not by increasing taxes on the rich or public owners of industry, but because of the savings that can be achieved through increased efficiency. It was no coincidence that Demos, one of the think-tanks associated with New Labour (Ferdinand, 2000), has devoted quite a lot of attention to new technology, government and democracy.

In East Asia, the Malaysian government of Prime Minister Mahath Mohammed proclaimed the ambition of making the country as advanced as any in the West by the year 2020 on the basis of information technology.

Singapore set out a programme for putting all the population on information technology by the year 2000. And even a country such as China, whose leaders are suspicious of the impact of the Internet on their people and who prevent complete, free interaction with people abroad through it, has become converted to this ambition of putting China on line. Beijing announced that 1999 was the year when Chinese government was put "online." Even non-significantly, in addition to the efficiency advantages that attracted the Chinese government, and the perceived need to provide an IT environment that would invigorate Chinese businesses so that they could compete with Western counterparts, the official announcement also pointed to the increasing 'transparency' that going online would bring to the administration of any government. (Ferdinand, 2000).

The Chinese word "tou-mingdu" was the same as that used to translate "glasnost" before the collapse of the Soviet Union. This was probably not directed so much at increasing popular control over administration, as was the case in the Former Soviet Union, as at increasing the control of the centre over the periphery in China. The stubborn persistence of obscurity and deceit practised by lower-level officials in their dealings with Beijing in the post-Mao era no doubt explains the enthusiasm of the leadership there for the new technology. Nevertheless, greater transparency was also explicitly linked with democratisation, and would certainly be a precondition for it. (Bray, 2000).

There is a general movement towards easing accessibility to information both in the news media and by governments. News agencies are increasing the speed at which and the scale on which they provide information, while giving citizens greater control over the information they want. In the United States, the National Information Infrastructure (NII) Agenda for Action makes provision for easy and equitable access to government information, while in Italy a new law on the need for transparency underlies the creation of a civic network. (Bryan Tsagarousianou and Tambini, 1998). Government and the news media often work together by broadcasting the

deliberations of government bodies, such as the C-SPAN channel in the United States and Parliament Online in South Africa (Ferdinand, 2000).

In Amsterdam, the Netherlands, a project was launched in 1994 by an independent political-cultural centre, De Balie, and a group of former computer activists, the Hacktic Network Foundation (now called XS4ALL). A virtual city was constructed where information providers have different theme-based squares, for example an environmental square, a news square, a health square, a book square and a gay square. Each of these squares has eight buildings occupied by information providers and citizens can build “houses” (homepages containing personal or other information) between the squares. In the public spaces of the squares citizens can have discussions. The project aims to use the city metaphor, a true-life frame, to:

- initiate and stimulate public debate between citizens and between citizens and local government in electronic discussion groups;
- create a platform for distributing local government, public and administrative information;
- assist/support citizens and civic groups to post their information electronically;
- stimulate citizens’ rights and obligations on the Electronic Highway and to look after the interests of consumers;
- provide opportunities for and connection between projects and information providers both nationally and internationally;
- develop instruments which would enable users to obtain access to information services; and
- maintain and expand contact with international community networks. (Francissen and Brants 1998).

The Amsterdam Digital City was such a success in terms of people registering as “inhabitants” and visitors, that there are today some 70 digital cities in the Netherlands. Despite the non-committal nature of discussion groups and the often racist or other bigoted contribution, the digital cities have become an Athenian-style

agora where people come to buy things as well as exchange ideas. (Francissen and Brants 1998 in Pretorius, 2001.)

E-democracy

Webster's defines democracy as "a government in which the supreme power is vested in the people and exercised by them directly or indirectly through a system of representation". Putting an "e" in front of democracy means nothing more than using information technology tools to facilitate, improve and ultimately extend the exercise of democracy.

There are many interpretations of what constitutes e-democracy. This is primarily as a result of the fact that the concept is at the beginning stage and as such there is much confusion about what it encompasses and how to define it clearly.

Steven Clift is an acknowledged expert and leader in the worldwide e-democracy movement. He describes e-democracy as referring to "how the Internet can be used to enhance a democratic process and provide increased opportunities for individuals and communities to interact with government and for the government to seek input from the community" (democracy online <http://www.dowire.org>). Characteristics of the Internet which he feels support e-democracy are that it provides opportunity to participate in debates as they happen, participation is less limited by geography, disability or networks, and it facilitates the access to information and provision of input by individuals and groups who previously had not been included in these debates. For instance, in Scotland an organisation that specialises in e-democracy, the International Teledemocracy Centre, states its goal as "to strengthen democracy through the use of innovative ICT to deliver improved democratic decision-making processes, thereby increasing citizen participation – specifically through the use of electronic consultation and electronic petitions". (Riley and Riley, 2003).

E-democracy has both a tactical side and a strategic side. On the tactical side, information technology has advanced communication and the access to information is arguably better than in any other known medium. But something even more fundamental is at hand. The underlying core principle of democracy is an informed and engaged citizenry. Most governments get passing marks for "informing" citizens via digital communication. But the vast majority have a long way to go to "actively engage" citizens or to effectively exert global influence using digital media. These

elements comprise the most overlooked dimension of e-democracy – the strategic side. How can a government use digital media to both actively engage citizens and advance its public policies to the world community? Engaging your “own” citizens or constituents through digital media includes enhancing active participation in the law-making, policy-making, and legislative processes, all of which are influenced by a variety of forces, public opinion, debate, lobbyists, special interest groups, consultation with constituents, portfolio committee hearings, and expert testimony. The regulatory process, subsequent to enactment of law, follows many of the same communicative and collaborative patterns as law making. It should be noted that the ability to leverage digital technology by political parties, campaigns and candidates is also part of the equation. Voter registration, election or referenda voting, and on-going communication between constituents and their elected representatives, are equally integral to e-democracy. (Caldow, 2003).

Political mobilisation and action coordination using information technology

Another benefit of information technology is the ability of users to mobilise society in order to overcome the limitations of both time and space in their communicative strategies through the near-instant delivery of information to an almost limited number of end-users. Political mobilisation and action coordination as espoused by interest and pressure groups garner support through the use of information technology to force authorities to make decisions as prescribed by their demand. This use of technology is another way of entrenching political decision-making in the modern democratic political system. Near-instantaneous communication technology like the Internet makes it possible to put pressure on decision-makers to act promptly. Having direct access to democracy in the information era could also be a risky business as voters may at times make quick decisions about complex issues without having regard to their situations. In the political sphere, this has opened up intriguing possibilities for organisations seeking to mobilise and coordinate political action where previously the ability to effect such mobilisation and coordination in any systematic fashion required the use of mass-based support and the high of the print and broadcast media. The Internet offers a means to realise such activities without a significant drain on the organisation’s resources.

In the US, within African American communities, the most prominent example of the use of information technology in aid of political mobilisation is perhaps that of the Nation of Islam and its organisation of the 1995 Million Man March. The event was the largest single political mobilisation of African Americans in history and made extensive use of the Internet to advertise its aims, coordinate the activities of organisers and disseminate information on arrangements to participants. These activities were structured through both a subscription-based electronic mailing list and the Nation's dedicated website for the event. While there is no analysis of the precise effect of the Internet's use in this instance, it is clear that the Nation of Islam itself has subsequently sought to expand its use of new communications technologies in the more recent development of its political strategy. The Nation is now at the forefront of implementing innovative technologies in the cause of political communication and education. Using audio and video streaming technologies, as well as more standard text-based information services, the Nation has an array of websites dedicated to different aspects of its work – including an online version of the organisation's Final Call newspaper; a health education website; a national student association website; an online study centre and a web page dedicated to links forged within the Islamic and African diasporas. In addition, the Nation of Islam has recently sought to exploit the potential of the Internet as a medium for political communication through a strategic link-up with America Online's Black Voices Internet site. This site, in conjunction with the Final Call Online, has featured live interactive 'chat' forums engaging Nation of Islam Ministers in debates with the wider public. (Lekhi, 2000).

The example of the Nation of Islam's enthusiastic and other interest and pressure groups' embrace of the use of information technologies as an integral part of their political strategy indicates the power of this new medium as an independent mechanism through which to channel the message of those on the political platform. And to the extent that it is effective in articulating its political programme to an increasingly sympathetic audience, these experiences offer a useful insight into at least one possible direction that might be taken by those who seek to exploit information technology's potential as integral tool of political mobilisation and communication.(Lekhi, 2000).

Information technology has made it easier for groups to organise on a local, national and global scale. Lobbying is more egalitarian because it is cheaper to mobilise

support for a movement. (Wright 1995:42). It is thus easier for those groups usually marginalised in the political process to convey their sentiments to their representatives.

The use of Internet technology by the pro and anti-democratic movements

Internet¹ is usually seen as the new medium with great potential for enhancing societal citizenship and democracy. (Chroust, 2000). Since the onset of the Third Wave of democratisation, rebel movements have used the information and communication technology to overthrow or counter non-democratic governments. Electronic media, like fax machines and video cassettes, were used in the mid-1980s in the Philippine revolution to spread disguised Western and Japanese news content to oust the Marcos regime, and in Panama the News Center in Washington D.C. used Apple computers to translate Western newspapers when President Noriega closed down independent radio stations and newspapers in 1987. These translated articles were laid out to look like news clips and faxed to businesses and corporations where they were photocopied and distributed by sympathetic distributors against the Noriega regime. (Ganley, 1991). However, the 1989 pro-democracy movement in China remains one of the best examples of how Internet technology was used to counter non-democratic governments during the early stages of the information revolution. Students made extensive use of video and audiocassette recording, photocopying, faxing and telephoning, and, for the first time, a vast computer network was employed to further their cause. An academic network linking US, Canadian and Mexican universities was connected to another academic network in Western Europe and a network in Japan and the Pacific basin. After the successful inter-connectivity it then appeared on the bulletin boards so that the Chinese students across the United States, Europe and Asia could post their outcries against the Chinese government. This technology also served as an organisational platform where pro-democracy supporters set up telephone, fax and letter-writing brigades. These were used to supply and coordinate news and messages, exchange Chinese fax numbers, keep lists of the dead and wounded of Tiananmen Square, make arrangements to lobby Washington, mobilise international public opinion, and arrange to get equipment for communication to protesters.

¹ While reference is made to the Internet in this chapter, it should also be noted that the Internet incorporates a broad range of information and communication technologies which may include computing and telecommunications.

(Bumbaugh 1990). The coverage of the Tiananmen Square events by television and radio both in China and abroad added to the effective mobilisation of public opinion and support for the pro-democracy movement.

In his research on silent revolutions, covering 43 societies in four continents, Ronald Inglehart writes that modernisation is characterised by an interlink process of industrialisation, urbanisation, mass communication and, following Max Webber, by rationalisation of all societies' spheres with a dissolution of traditional ties. Modernisation is also marked by the increasing significance of non-materialistic needs, such as demands for political participation or for the protection of natural resources. (Inglehart, 1997).

There are also other examples, like the Free Vietnam Alliance, and the Cambodian pro-democracy, where the Internet is used as a medium to discuss prohibited subjects such as corruption and military or government misconduct, to inform and mobilise public opinion both domestically and abroad, and to organise campaigns against the government. (Eng, 1998). In some cases the Internet is not so much used as a tool for insurgency, but more to focus attention on low-intensity, regional conflicts between people and their government. In Chiapas (Mexico) the Zapatista movement does not have any hope of overthrowing the Mexican government, just as women whose human rights were grossly violated in Afghanistan could not overthrow the Taliban even by mobilisation through the Internet (Afghanistan was a feudal agrarian society with few industrial production enterprises and public services and in 1994 the Taliban marked the revenge of the traditional village against the modern city). Their Internet activities can, however, draw attention to local conditions and problems and if they mount enough international pressure, their governments may be forced to address their problems. (Lutz, 1999).

The neo-Nazis also use advanced technology in their internal and external communications to react to the challenges of a second wave of modernisation; they attack the process of globalisation, worldwide 'dollar-imperialism' and the threat of racial inundation, while at the same time they demand the protection of natural resources against interest of profit and the equal participation of women in the national struggle. (Chroust, 2000).

The Internet has several distinct characteristics that make it suitable for dissident purposes. Firstly, it is possible to hide the identity of the dissident. In the case of Kosovo, Anonymizer (a US IT Company affiliated with human rights organisations) set up the Kosovo Privacy Project, which allowed Serbians, Kosovans and others reporting on the situation in Kosovo to download tools to hide their identity when e-mailing, accessing information or joining discussion groups. Secondly, the Internet has all the audio-visual qualities of television, radio and newspapers combined. For example, in Belgrade an independent radio station's transmitter was linked to a British Broadcasting Corporation (BBC) satellite and transmissions were re-sent from there all over the world, including to 35 other independent Serbian local radio stations. Thirdly, encryption technology, which can be downloaded for free from the Internet, makes it difficult for dissident messages to be intercepted. In the case of Belgrade, tunnel encryption was used to hide the radio channel, making it invisible from the outside. Fourthly, key to the Internet's ability to further dissident causes is the fact that it is not mass media in the traditional sense of "one-to-many" like newspapers, television and radio, but "many-to-many". It allowed friends and family to report on their situation from Kosovo to relatives and acquaintances abroad. These means of communication are often seen as more credible information sources than Western media reports. (Time International, 1999).

Cumulatively these characteristics of the Internet make it a difficult medium to bring under government control. Governments can try to block access to certain sites (for example, the Chinese government has blocked access to such sites as Human Rights Watch, the *New York Times* and *Playboy*) or to require anybody who signs up with an Internet Service Provider (ISP) to register with government security agencies. In China unregistered Internet cafes are shut down and monitoring equipment is installed on all of China's major sites. (Pomfret, 2000). Similarly, in Burma (Myanmar) unauthorised possession of a computer with network capability is punishable by as many as 15 years' imprisonment. These efforts are, however, not insurmountable challenges. It is for example still possible to access prohibited sites periodically as the dozens to hundreds of 'hits' received from China each week indicate. Furthermore, Chinese Internet surfers reportedly get around the electronic barriers by linking up to computers outside of China. (Dobson, 1998).

Conclusion

The understanding of modernity and technology have both presented intriguing debates in social sciences and made strides in political discourse. This chapter has demonstrated how they overlap in their concerns, since it is imperative to understand modernity in order to have regard to an adequate account of the technological developments that make it possible. For how can one study specific technologies without an understanding of the larger society in which they develop?

The concept of modernity relies on the key notion of rationalisation to explain the uniqueness of modern societies. Rationalisation, as the generalisation of technical rationality, reduces the normative and qualitative wealth of the traditional social society, exposing its reality to technical manipulation. Rationalisation depends on a broad pattern of modern developments in technology.

Technology indicates the social complexity of the multiple actors involved with its creation, and the consequent richness of the values in other social phenomena.

Over the last years there has been a transformation in communications that has moved much of the public discourse and agenda setting for society at large. With these information and communication technologies people are reclaiming their communications power and are geared toward building citizen-based efforts that work to ensure that the shift toward communication increases their capacity for participation in democracy, and that the strategically organised use of information technology by citizen-based efforts makes an important contribution to improve democracy. To begin with, information technology holds the potential to raise awareness about political process, of which the ultimate benefit could be a more democratic society – a society where more people are able to hear and listen to each other, have a public voice in agenda setting, and have an increased ability to contribute toward the resolution of public problems. It is generally held that if parliaments and other elected bodies do not institute reforms to develop e-democracy mechanisms there will be severe political consequences, such as the non-election of political candidates seeking office who do not use online technologies to deal with the

voters. These views are based on the belief that the technology-inclined society expects its leaders to communicate with them in this new generation's medium of use.

These arguments assume that there are a host of citizens arming themselves with the tools to have a direct influence on legislative and policy development, and who also have the will, resources and desire to engage in the emerging e-democracy process. Citizen-based electronic democracy (e-democracy) has been able to create the online public spaces for interaction among citizens and organised interests that are for the most part only focused on using electronic communication to further their own goals. In a simple sense, there is a creation of an open and on-going arena for public expression, development of opinion, and accountability.

This chapter has illustrated how e-democracy in the context of information and communication technology is explored as a subset of the greater, and more important, philosophical topic of democracy itself. It set the support for an appraisal of whether or not e-democracy can be an extension of representative and liberal democracy, consequent to the modernisation process as practised in most countries today. It is evident that e-democracy practices, such as online consultations, enhance the modernisation process in the current system whereby the policy governs society, and continues to have limited and controlled inputs from the citizen, as such presenting a new form of democracy. These are pressing issues for modernised governments as the new technologies are contributing to the creation of faster communications, the sharing of information and knowledge, and the emergence of new forms of modern societal cultures. It has also been demonstrated that the political mobilisation and action coordination by members of the society and of pro and anti-political movements as networked communities have quickly evolved through the Internet. They are increasingly using the new technologies to organise themselves so that their voices can be heard, and to develop tools to attempt to influence government policy and programmes at political level.

As modernisation is not static, there are different schools of thought as to whether information and communication technologies will change the nature of democracy, or

if it will simply result in an extension of the democracy we now practise and understand.

The important issue at hand is that there should be a vigorous debate and discussion about the nature of democracy and how technologies can be used to produce a more engaged and interactive society. To make significant changes that would draw the public more widely into the process requires commitment and change of attitude. Cost factors also come to bear on this, as well as the question of how to engage people for their input and opinion. This raises an even more fundamental question of whether the public wants to be more engaged in government, or do they simply want the opportunity to make their views known? And if governments do engage the public more frequently into public debate over issues of the day, how often do they do this? What mechanisms will be available to facilitate this process?

The challenge of governments in years to come will be to set out mechanisms on how to embrace more of the public into the decision-making process. More importantly, governments, especially the elected representatives, need to take a leadership role in engaging the public in wide debate on how information and communication technology can change the current dynamics of democracy. There is a need for society to become partners in an issue on the nature of modern democracy, which will then show the way to how the information and communication technologies can be strategic tools for the democratic process. For instance, governments are concerned about the decline in public participation in the democratic political process. Officials in the United States, Canada, and the United Kingdom are seeking ways to combat voter apathy, especially because of the declining engagement amongst young people. Some argue that this is rather a political problem, and that there will not be significant shifts to new forms of democracy or participation by the citizenry because of information and communication technologies. They suggest instead that the new information and communication technologies will serve only to strengthen existing democratic institutions, but not dramatically change the legislative bodies of public sector institutions. There are tools available that can help reverse this attitude – it is now a question of how extensively these tools can be used to effect this change.

There is a suggestion that the evolution of e-democracy could take society into a new form of democracy, which would reflect a wider voice of the public. But there is no clear vision of what such a democracy would entail, and how it would differ from current practices or reflect the overall society.

In the current system of democracy, elected officials, and the institutions adopted from this system, have been governing as usual in the interests of society. So the question is: will information and communication technologies and the tools that continue to be developed enable people to have access to more information and to communicate better with government? This is often a negative if there is too much information or a lack of organisation or critical skills to assess the importance of the information that can then be turned into knowledge. Both these abilities could be a result of the rapid modernisation of societies as a result of the emergence of these information and communication technologies.

Technology is one of the mediums and a driver of the modernisation process, bringing in new and important trends in society to the extent that they are driven by new ideas, conceptual constructs that contain innovation, and creativity. It facilitates change, its access and usage result in enlightening evolutions because societies organise and administer themselves, but they are never the driver of ideas, only the facilitator. Original ideas come from the mind of one person or from collective debate which then drives philosophical, cultural, societal, organisational, and administrative change. Thus the use of information and communication technologies for the purposes of e-democracy principles, as articulated to date, is only the beginning, and simply a driver on the road to possible new forms of democracy. It is how it is being used as a medium and the way in which society frames the debate that will result in these new forms and an extension of the current structures of democracy.

It is apparent that technology is having some impact on both governments and society, which will bring society to a possible new level of a system of democracy that will reflect its increasingly changing culture, built on the strength of the forms of democracy that have been developed over the past years.

Lastly, when the modernisation process has taken effect and society being at least democratised, a democratic political system must ensure that democracy functions as expected. In order for it to function properly, society must have access to information technology. The advantages of the technology include the fact that information can be accessed from almost anywhere, communications between citizens and the government can be made easier, and that both citizens and the government can enjoy cost advantages if the new technology is employed correctly. More extensive use of government information is possible, without limiting benefits to any one member of society.

Information technology gives the authorities a very powerful tool to strengthen the rule of law. Information technology can – and will – affect democracy in a political system. It is important to note that the benefits of information technology in reinforcing democracy depend, to a great extent, on what facilities citizens have, i.e. computer literacy and access to computers. An increased amount of governmental information available through the new media will not reinforce democracy if there is neither common computer literacy nor easy access to computers for each and every citizen. Instead, the gap between those who have and those who do not have good access to information will increase. Authorities must guard against this in an effort to provide equal access to information technology. Information technology should be able to give citizens an equally better chance to exercise their rights as information provides the basis for decision-making by voting. Information technology will enable citizens to get closer to the ideal of an informed choice. A democratic state should attempt to guarantee all its citizens full and equal access to such technology and the options it offers.

CHAPTER FIVE

INFORMATION TECHNOLOGY AS AN IMPERATIVE FOR SECURING DEMOCRACY IN SOUTH AFRICA

Introduction

The turn of the century has seen many nation states transcending to post-Fordist societies. Information technology (IT) particularly has been diffusing to large numbers of nations all over the world and is now cutting edge of socio-economic development. It has come to be seen not only as a developmental issue in itself, but also as a necessary component of all other developmental programmes.

The ominous characteristic of modern information technology threats to democracy is that they change the proverbial convention of national security embedded in democratic political systems. National security no longer refers simply to the conduct of wars among nations, but rather to the protection of its citizens, interests and property from outside threats of any kind, thus the protection of democracy.

Technology, as in other areas, is a double-edged sword. While it greatly empowers those who would or might threaten South Africa, it also empowers South Africa in the effort to defend itself and harm its opponents. For instance, while technological advances may put missile technology in the hands of rogue states, they may also enable South Africa to defend itself against missile attacks.

There is a need to maintain a balance between threat and opportunity. The nature of threats to South African security and the available means to contend with them are changing with lightning speed, and it is vital to remain conscious of these changes and their implications.

The South African democratic political system no longer views national security as predominantly a military and police problem but rather as incorporating political,

economic, social and environmental concerns. Of paramount concern is the security of its people. Security is thus an all-encompassing condition in which individual citizens live in freedom, peace and safety, where society participates fully in the process of governance and enjoys the protection of fundamental rights; have access to resources and the basic necessities of life; and inhabit an environment that is not detrimental to their health and wellbeing. The objectives of security policy therefore encompass the consolidation of democracy and political stability. Stability and development are regarded as inextricably linked and mutually reinforcing. (White Paper on Defence, 1996).

The development of technology has been inextricably linked to national security concerns. Nations' efforts to arm and defend themselves against others have often driven them to engage in scientific research and development, in the hope of making use of the resulting technologies. Computers were first used to direct artillery shells against moving targets. The Internet was created by the Pentagon to safeguard vital communication in case of nuclear attack. Advances in most forms of technology have been carried out in the name of national defence.

The genie of technology is difficult to contain once released, and others can soon turn advances made by a nation against it in their own defence. A country may, for instance, create the atomic bomb as deterrent, but other countries may copy its efforts, thus threatening its security. The Americans, for instance, created the Internet but must now face the possibility that rogue states or even individuals could use it against them.

The expansions in personal electronic media along with the exploitation of computer-telecommunications convergence have paved the way for the creation of a worldwide web of networked computers. Expansion of cyberspace into virtually all spheres of human activity and the growing number of Internet users worldwide exacerbated the concept of information technology, which has changed the world. The nature of these changes is, however, contentious with conflicting explanations of the impact of the information technology revolution and the relationship between technology and national security, which invariably underlie the character of threats and vulnerabilities in a democratic society. In this respect it is deserving to review the nature and character of national security as presented by the challenges in information

technology. Given the national security aspects and its relationship with information technology, it is imperative to note that, other things being equal, democracy is usually prevalent where threats and vulnerabilities are minimal. This study investigates and departs from a self-constructed hypothesis that advance in information technology may enhance political stability in a democratic political system, and that where stability is maintained, threats and vulnerabilities are minimised and thus consequently a perennial national security can be enhanced. Therefore the absence of threats and vulnerabilities also reduces the high level of insecurity in a democratic political system.

The nature and scope of information technology²

Information technology (IT) is the term that describes the disciplines encompassing systems analysis, programming, telecommunications and multimedia (combining audio, text and video information) applications. It came into common use in the late 1980s, supplanting other terms such as electronic data processing, management information system, information resources management, data communication, etc. (<http://govt.ghana.gov.gh/story.asp?ID=68.02/07/19>). The term could also be credited to former US Vice President Al Gore, who coined the phrase in the early 1990s as a piece of political rhetoric to capture the imagination of the US electorate. (Tsagarousianou, Tambini and Bryan, 1998). Information technology is the concept that is generally used to refer to the use of computer, electronics, and telecommunications equipment for processing and distributing information in a digital form. Martin 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. (Martin, 1988).

Information technology is deeply seated in computing, telecommunications and microelectronics technologies and its distribution from the Worldwide Web network, from individual to industry services, which includes television broadcast and electronic mail service. According to the United States Commission on National

² The terms information technology (IT) and information and communication technology (ICT) are inextricably bound and are used interchangeably in most literature resources. However for the purpose of consistency in this study, the term IT will be used throughout, unless otherwise specified.

Security in the 21st Century, the entire world will be linked by 2025, so that from any stationary or mobile station it will be physically possible to send and receive near-instantaneous voice, video and other serial electronic signals to any other stations. (USCNS, 1999).

To have a comprehensive approach as to how these technological capacities could have an influence on national security, it is important to perhaps outline developments in these areas, i.e. information, communication and technologies (ICT).

The development of ICT has undergone several stages, encompassing to capture, store, process, transport and display information. Eventual constraints upon the distance, speed, volume and reliability of information handling have progressively been reduced. The current stage in the development of information and communication technologies is marked by the substitution of more powerful, reliable and flexible digital systems. The technical foundations of this process lie in the innovation of a common language of microelectronics for both computing and, later, telecommunications. (Schiller and Fregoso, 1991). With the development of digital switches and digital transmission facilities came the transition from analogue to digital networks. The process accelerated, and by the late 1980s most of the office telephone switches in the advanced industrial market economies had been digitised.

Information and communication technologies (ICTs) encompass 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.

There is the general view held by many scholars that the basis for the current information revolution has been the advent of the radio or television, or even computers. However, the basis was the magnitude of transformation of the microchip, and its impact of microelectronics on computers and on telecommunication devices has been compact, cheap, reliable and disposable (Martin 1988). Microelectronics has been the basis for the developments both in computing and in telecommunications. Bankes and Builder (1992) maintain that it was the developments in solid-state electronics that brought all of these devices, i.e. telegraph,

telephone, radio, television, and electronic computers, into practical form that could be mass-produced and distributed to individuals throughout the world.

The developments in information and communication technologies did not occur separately from one another. Digitisation meant that all the media became translatable into each other (Brand in Saxby 1990) and this has been fundamental to the information revolution. Convergence, that is the ease of interaction between information and communication technologies, occurs at different levels and in different directions. Martin (1988) asserts that convergence is not only the marriage of two technologies but also the erosion of functional barriers as between data processing and communications as well as the vertical integration of industries. As voice (traditionally the terrain of telecommunications), data (computing), text (publishing and library services) and video (broadcasting) are translatable into one another, service suppliers become more interrelated. (Cowie 1989).

The information technology is not only about developing the broader scope for ICT but the fact that it has been diffusible to societies. The scope of information and communication media that are available for personal use and to an extent controllable by individuals, has expanded tremendously from TV sets and citizen band radios in the 1940s to desktop and laptop computers, personal fax machines, handheld video cameras, cellular telephones, cable television and satellite uplinks in the 1990s. (Ganley 1991).

These expansions in personal electronic media along with the exploitation of computer-telecommunications convergence have paved the way for the creation of a worldwide web of networked computers. In the late 1960s the US Department of Defence embarked on a research project that would be the precursor of the Internet, as it is known today. A decentralised computer network was established to link several research sites, universities and other institutions conducting experiments to maintain military communication in the event of a nuclear attack. Because the Internet was never linked to any critical military application or system and was burdened with security classifications, black budgets, or secret technical specifications, Chapman (in Pretorius, 2001) suggests that it is precisely the research character of the Internet that explains why it was so easily absorbed by the civilian sector and commercial enterprises.

The spread of modems and networked computing in 1990 brought the Internet to average citizens and commercial enterprises. A wide range of interactions became possible in cyberspace, such as browsing information stored on other computers and searching databases, exchanging electronic mail, participating in discussion groups on a multitude of topics, and increasingly engaging in e-business. (Kitchin, 1998). Expansion of cyberspace into virtually all spheres of human activity and the growing number of Internet users worldwide exacerbated the concept of information revolution that has changed the world.

The information technology (IT) sector is unique because it represents a scientific discipline and industry in its own right, as well as cutting across all other sectors. Even a cursory glance at the other sectors reveals the all-pervasive role of IT at the close of the 20th century. The IT sector is also unique in its pace of change and the rapid convergence of 'traditionally' distinct areas of human endeavour - broadcasting, print media and telecommunications. Indeed, it is almost impossible to construct a definition of IT that will last longer than about six months. The boundaries shift continually. While other manufacturers and energy suppliers are presently the largest global corporate players, new IT conglomerates are challenging this position. (Hamelink, 1997).

The nature of these changes is contentious however. Conflicting explanations of the impact of the information technology revolution can be traced to different theoretical approaches towards the relationship between technology and national security, which invariably underlie the character of threats and vulnerabilities in a democratic society. The democratic South Africa cannot be discounted from developments in information and communication technologies that did not occur separately from one another. The country's exposure to this digitisation means it is also party to fundamentals in the information technology.

Information technology in South Africa

The South African democratic political system operates in very challenging circumstances as a result of dynamic social, economic and technological developments. One of the challenges it faces is the challenge of advances in information technology that can expand or impede democracy. Information technology can make it easier for people to follow up on bureaucratic decisions, party politics, economic policies, welfare agenda, legislation, etc., to express their will and keep check and balances on the government, and can also mobilise and rally support for specific interest. ICT can make policy-making a more participatory approach. Numerous failures of democracy in some African states have been cited as being directly linked to the inability of some African parliamentary democracies to generate enduring popular support among their populace, which is seen as incomprehensible and distant. (Lyons and Lyons, 1999).

The technology as panacea approach misses key elements of the circumstances facing some African states. A case presented in this regard is the World Bank's effort in which US\$6,5m has been spent since 1995 on establishing a long-distance learning capacity that will obviate the need for local teachers, libraries, and even paper. Yet an established fact is that the sporadic delivery of electricity power in (South) Africa creates obstacles to the Internet's reliability and utility. (Alden, 2001).

In order to have a clear focus on the South African environment it is also important to have a global overview of ICT circumstances that influence the socio-economic and political perspectives that are a potential for the conflict.

The nature of global conflict has changed during the past century. The bloody battles of the First and Second World Wars were followed by the Cold War in which the tensions shifted from a military to a political nature. A more recent shift is that the world is currently embroiled in a global economic battle. One of its consequences is that economic security will become an increasingly important part of national security. (Pistorius, 2001). Economic changes also affect productivity output as influenced by advances in information technology.

The new mode of production, which is centred around information technology and instantaneous worldwide electronic communication, has become dominant in the era

of multinational capitalism. (Louw, 1994). South Africa took interest in strengthening its information and communications capabilities. It is understood that the technologies that had lifted the advanced industrial countries to exceptional economic and material wealth could be used to accomplish the same results in South Africa as an emerging economy.

Perspective on information technology and democratisation

Looking at the accounts and lessons from other spheres it is interesting to note that most developing countries' policies were concerned with the availability of technological products, rather than with the more complex problems of the associated political, economic and cultural integration of such products. In South Africa a different approach was followed, and ample attention was given to meeting the infrastructure needs for an industrious adaptation of technology. Policies regarding technology choice were identified, as well as problems in implementation, as the democratic nature often requires over-stretched public consultation on alternatives.

Policy-making was characterised by an emphasis more on the national system of innovation as a framework of policy and policies set out in the White Paper than on the promotion of effective distribution of available knowledge as a critical function in this context. (White Paper on Science and Technology, 1996).

Another critical issue to draw from developing countries is that in these countries, where mostly the transferred technology increased considerably in volume such that it usually consisted of end-products rather than of technology as such, much of the transfer took place as intra-firm movements, that the conditions under which transfer took place were often disadvantageous, and that much of the technology was inappropriate, obsolete, over-priced, or all of these together. (Hamelink, 1997).

The introduction of IT, such as telephony, television and satellite communications, in developing countries, began to show a specific pattern of social benefits in the 1970s. Various studies suggested that the primary beneficiaries were the companies that provided the equipment, like the telephone companies, banking consortia providing the financial resources, and local administrative leaders who used the new technology.

Often unforeseen negative secondary effects occurred, such as serious balance of payment problems associated with the capital intensity of the new technologies. (Clippinger, 1976). In the same period employment and economic growth were covered by the acquisition and adaptation of manufacturing technology, which brought rapid growth in employment and incomes, particularly in the Republic of Korea, Malaysia and Singapore. The industrial revolution was triggered by technological change, and most economists argue that technological progress plays a pivotal role in sustained long-term economic growth. Cross-country studies suggest that technological change accounts for a large portion of differences in growth rates. (UNDP, 2001).

During the 1980s these countries took a stand to share the expectation within industrial nations that innovations in telecommunications and computer technologies could markedly improve industrial performance and increase economic productivity. There was a common belief among them that ICTs in fact enable developing economies to leapfrog over industrialisation into a post-industrial society. With this hope, developing countries began to launch policies and programmes to acquire a share in international satellite communications and trans-border data flow networks.

There was also anxiety concerning the possibility that ICTs might imply serious social risks. People were concerned about issues like the potential for cultural colonialism, the replacement of jobs by machines, and the erosion of individual privacy, national sovereignty, hence national security as such. Towards the end of the 1980s these fears seemed to have abated, and the general view on the relation between ICTs and national security entered a third and current phase. This phase is driven by a very strong fear of being left behind and being cut off from the emerging global digital highway. Therefore the "digital divide" is on to create and broaden ICT links. (Hamelink, 1997).

The current levels of IT amongst South African citizens tend to be weak and proportionate to levels of income, education, race and gender. The use of ICTs in South Africa presents a challenge that should be viewed as an important agent for change in overcoming social problems and closing the information gap.

The advance rate of information technology has influenced the social, economic and cultural changes, which have stretched the resources of the strongest economic sectors.

As South Africa has adopted a National System of Innovation (NSI), many argue that technological innovations, particularly in the information and communications technology (ICT) sector, are the main drivers of these changes. Some authors refer to an emerging 'knowledge society' as the fundamental cause. The operational meaning of information and communications technology covers digital technologies facilitating the acquisition, processing, presentation, management and communication of information. These technologies include the microelectronics, computer and telecommunications industries, etc. The ICT sector is dominated by the rich countries and a few large, international corporations, while on the other hand small entrepreneurs with the right niche products are able to enjoy rapid growth with reasonably modest start-up costs. Over half of the growing worldwide information processing market is related to software production. Growth areas include software packages and systems integration services.

South Africa is the 20th largest country market for ICT products and services, accounting for 0,6% of worldwide revenues. 60% of PCs are connected to networks, which compares favourably with OECD norms. In the Financial Services sector there are 74 PCs per 100 employees; with around 24 in Wholesale and Retail; 17 in Manufacturing, and 7 in Government. (IMD, 2002).

Over 95% of hardware revenues by distributors are from imported products and components. South Africa contains a third of all main lines and 85% of all cellular subscribers in Africa. Telkom, 70% state-owned, is the 28th largest telecommunications operator in the world. Its expansion is being financed on the international bond markets with the intention of reaching undersubscribed peri-urban and rural areas and becoming the primary international African hub for telecommunications, computing media and international services.

South Africa is regarded as the largest global system for mobile communications (GSM) market outside of Europe, and the fourth fastest growing GSM market in the world. By 1997, 20% of the country's telephone volume were mobile units. In 1993/4 the telecommunications industry was estimated to have a turnover of roughly R3-billion, employing some 7 200 people. ICT professional services had a turnover of R2,3-billion in 1995, but little of this was spent on cutting edge research and development. (IMD, 2002).

The Industrial Revolution produced a social pact among governments, workers and employers, which sustained growth in capitalist economies for over a century and spawned competing ideologies to the right and left. That balance is now being challenged by a shift to new ICT-mediated modes of producing goods and services. The new paradigm is enabled by ICTs, while simultaneously driving the development of new ICTs.

Distance and time are no longer limiting factors in production. Companies locate operations based on local labour skills and costs, taxation and incentive arrangements. Concentration on 'core business' provokes outsourcing and the creation of 'virtual business entities'.

Within the economic perspective, the ICT deployment challenges the bureaucratic/industrial organisational model. For instance, the "7 x 24 working" is replacing the working week with part-time, more flexible hours and shifts to short-term flexible contracts. The service sector is becoming dominant in the marketplace. Labour market flexibility may reinforce insecurity and isolation in the industrialised world and lead to less tolerance of different conditions and value systems.

The information technology industry resounds with great expectations for a profitable all-digital future and an exponential increase in consumer purchases of digital devices. Chipmakers such as Intel, in particular, in 2001 spent \$7,3-billion on capital investment to help build manufacturing capacity and increase manufacturing efficiency. They expect enormous growth in the market for digital consumer electronics: digital set-top boxes and decoders for satellite and cable television; video-

game consoles; digital videodiscs and small-size dishes for direct digital broadcast television. (Intel, 2002).

There is a clear indication in most literature that in hardware, the most important trends of the recent past have been increasing speed, miniaturisation, more efficient energy use, greater capacity, and lower costs. These tendencies may continue. But in addition there may well be completely new developments, such as the optical computer that processes information through light waves instead of electrical pulses. Universal digital fibre optic networks may combine with wireless networks to expand communications capacity enormously. Meanwhile, one of the latest developments in digital convergence is the symbiosis of television sets and personal computers that creates new forms of interactive television, a recent example being with DSTV interactive, making the television act as a personal computer to be able to shop, send e-mail and use the TV. (DSTV, 2002).

ICTs are dominant in the global market. Trade in ICT products and services was worth over \$1 trillion in 1995. On the one hand the G7 countries and a few large, international corporates dominate the ICT sector, while on the other hand small entrepreneurs with the right niche products are able to enjoy rapid growth with reasonably modest start-up costs. The trend amongst the major world economic players is to extend their markets into developing countries.

The world competitiveness yearbook ranked South Africa's investment in telecommunication at number 4 out of 47 countries, where 1,165% of the GDP was spent on telecommunications with 118 people per 1 000 number of mainlines per inhabitants of the country in 1999. The number of mobile telephone subscribers in 2001 was 234,2 per 1 000 inhabitants. (IMD, 2002).

Challenges and disparities in information technology

Concern about the information gap between rich and poor, and rural and urban communities, is well founded. There seems to be a wide-ranging perception in the scientific literature and in public policy statements that the ICT gap between the haves and the have-nots in South Africa is widening, and that this hinders the integration of the country into the global information society.

The hype and fervour about the digital divide makes it difficult to gain an overall understanding of the problem, the different approaches to solutions, and, what is really making it difficult, the fact that there are multiple definitions of the "digital divide", conflicting reports of whether it is growing or shrinking, and a range of opinions on the key factors affecting it. What is clear is that the disparity between the "haves" and the "have-nots" is growing, and that the potential impact on society, whether good or bad, will be exacerbated by technology. In fact, the digital divide is a complex problem that manifests itself in different ways in different countries. It presents both practical and policy challenges. Moreover, it is apparent that solutions that work in one country cannot simply be transplanted to another country's environment. Solutions must be based on an understanding of local needs and conditions. (Bridges, 2002).

The infusion of ICT in South Africa paints the existing landscape of poverty, past discrimination and division onto the new canvas of technology use. Because ICT can reward those who know how to use it with increased income and cultural and political advantages, the resulting digital divide shows up in increasingly stark contrast. Therefore, ICT disparities usually exacerbate existing disparities based on location (such as urban-rural), gender, ethnicity, physical disability, age, and, especially, income level, and between "rich" and "poor" communities.

The gravity of the ICT gap in South Africa can be presented by posing the question whether communication technology is leading to globalisation or polarisation? Current access to ICT runs along fault lines of society, dividing the educated from the illiterate, men from women, rich from poor, young from old, urban from rural. (UNDP, 1999.) This is clearly confirmed by the situation where only 11 percent of

black/African families have telephones in their homes, compared with 43,6 percent of Coloureds, 77,2 percent of Asian/Indians, and 89 percent of whites. (Cape Times, 7 Sep 1999:3).

The widening gap in information technology capacity raises serious questions about whether the poorer communities will be able to overcome the financial obstacles that hamper their access to information technologies.

Since reducing the IT gap requires a major financial effort, one central concern is whether the foreign and local business communities are ready to provide the massive investments needed for the technology innovation and the upgrading and expansion of networks in South Africa. To understand the magnitude of the challenge, it is useful to remember that the world competitiveness yearbook 2002 has ranked South Africa 39 out of 49 countries, with the number of Internet users per 1 000 people being 67,53, compared to 267,96, and the number of computers per 1 000 people being 79, compared to the 309 of the 49 countries ranked. (IMD, 2002).

Total reliance on international initiatives and foreign investment poses some serious concern, while being self-sufficient requires massive capital investment. For instance, South Africa's telecommunication investment of 1,165 percent of the GDP is hardly sufficient to compete globally and enhance socio-economic development. These international initiatives coincide with continuing concern about the appropriateness of the technologies being transferred and the capacity of recipient countries to gain control over them. In fact, there is at present no convincing evidence that the owners of advanced technologies will change their attitudes and policies towards the international transfer of technology. Throughout the past decades, the prevailing international policies in this field have erected formidable obstacles to the reduction of North-South technology gaps. There is no indication that the current restrictive business practices, constraints on the ownership of knowledge, and rules on intellectual property rights that are adverse to developing country interests are radically changing. And, in this case, there are no realistic prospects that the relations between ICT-rich and ICT-poor communities will change in the near future.

Furthermore, the key actors in international ICT policy-making have expressed a clear preference for leaving the construction of the global information infrastructure to "the forces of the free market", and there is room for doubt as to whether the institutional arrangements of a corporate-capitalist market economy allow for the development of an equitable information society. At any rate, it is important to think carefully about whether, given the realities of the existing international economic order, there can be any serious reduction in existing ICT disparities. It may well be an illusion to think that ICT-poor countries can "catch up" or keep pace with advances in the most technologically advanced societies. In the North the rate of technological development is very high and is supported by enormous resources. This is certainly not to say that poor countries should not try to upgrade their ICT systems. But they should not do so in the unrealistic expectation that those who are ahead will wait for them. The situation may improve for poorer countries, but the information divide between North and South is not likely to go away. (UNISRID, 2001).

South Africa, having taken on the concerns of the "digital divide", through President Thabo Mbeki's initiatives in October 2001 organised the first meeting of the International Presidential Advisory Council on Information and Communication Technology, where global corporate and other leaders in the ICT environment met to advise on the complex, dynamic and exciting area of human activity. The first task of the Council is to close the digital gap that already exists between the world and South Africa. (Mbeki, 2001.) There is a general belief that, without adequate access to the system, South Africa cannot hope to be economically competitive. Therefore the "digital rush" is on to create and broaden links with electronic networks in the fields of trade, finance, transport and science. Such a position is inspired by recognition of the obvious benefits that digital information and communication technologies have to offer in a number of ways.

There is also the preponderance of educational problems in South Africa. Education facilities, for example, could be improved by using ICTs to facilitate distance learning and development through the use of online library access. In this regard, there are very promising pilot projects in schools that have been linked electronically for the provision of a host of online services. Electronic networking has also been used to improve the quality of health services, since ICTs permit remote access to the best diagnostic and healing practices and, in the process, cut costs. (Durant, 1996). Digital

technologies for remote resource sensing can provide early warning to sites vulnerable to seismic disturbances, and they can identify suitable land for crop cultivation.

South Africa is in an extremely precarious position with regard to international competitiveness. According to Pistorius (2001), the country's sustained poor performance in the competitiveness domain is a national threat. The growing ICT demand in South Africa finds expression in waiting lists for telephone connections, growing use of cellular systems and rapidly expanding numbers of Internet users. To meet this demand, consideration of information and communications technologies is increasingly becoming an integral part of national development agendas. The planned increase in telephone lines in South Africa has presented challenges, which resulted in Telkom experiencing continued growth in data and multimedia revenues largely from the corporate sector. During the 2000/2001 financial year Telkom installed approximately 2,1 million lines, taking the total to 5 million fixed lines in the country. According to BMI-TechnKnowledge and IDC, it is estimated that revenue from the provision of telecommunication services has reached R48-billion, approximately US\$4bn, and it is expected to grow at a rate of 10,5% per annum. With the approval of the second national operator (SNO) and as South Africa's approach to the gradual liberalisation of the telecommunication industry, it has undertaken to sell a portion of its share in Telkom in an initial public offering (IPO). (SNO, 2001).

This is expected to be achieved largely through a massive inflow of foreign capital. And, to encourage the latter, countries are deregulating and opening their markets for equipment manufacturers and service providers. A rapidly increasing number of developing countries are scheduling the privatisation of their telephone companies.

Looking at this phenomenon, South Africa has over the past five years inaugurated its cellular networks, of which the cellular industry has been described as an economic miracle generating more than R15-billion worth of economic activity. The growth in this market has been spectacular, with a current subscriber base of over 8 million (Vodacom 55% and MTN 45%) and extensive infrastructure rollout. The high growth

in cellular phone use by both high and low-income communities has seen a third cellular operator (Cell C) being licensed in 2001. (SNO, 2001).

A holistic approach which aims for real access to technology is needed that will be effective and sustainable so that people can put it to use to improve their lives. Improving the lives of people through the diffusion of ICT may raise societal concern, which may not be overlooked in attempting to bridge the digital divide, particularly when concerns become issues of national security.

Balancing the discourse on democracy and information technology

Information technology is important not only because of its value in advancing science and technology but because it has very laterally changed almost every aspect of life in an astoundingly short period of time. The ways in which society works, governs, educates, shops, entertains, communicates and maintains aspects of national security are dramatically different from those of the last century. Information technology has democratised nation states and has also shaped the strategic environment in political systems. It has dramatically increased the interconnectedness of people around communities, societies and the world.

The implementation of information technologies has now made it possible to monitor millions of people in their daily activities around the clock, to store information about their misdemeanours forever, and to re-create their experiences through information manipulation.

The ethical challenges posed by information technologies are rooted in conventional questions such as privacy and intellectual property, which are more pressing in the context of information and communication technologies. With more information available there will also be more information that people would prefer to have censored. Although this has always been the case to some extent, the total velocity and flexibility of information transmission now make border controls less realistic than ever before.

Information technology also obscures dividing lines between the mass media and the private sphere. In fact, this convenient division between regulatory domains is disappearing. Private e-mail can be broadcast to a million receivers, most of whom never asked to receive the message. In addition, information technologies have made the manipulation of data, images and sound so easy that it is possible to use and reuse all sorts of materials without consulting the initial author-owner. Rules against piracy activities cannot always be legally enforced, and a large grey area of contested intellectual ownership emerges. It is precisely for this reason that issues of security are necessary, and where the line can be drawn with regard to the protection of privacy.

An additional threat to privacy involves the use of medical and biological information. The collection of sensitive personal data through diagnostic techniques like genetic screening is becoming a reality; and these techniques can generate information about future diseases. The potential for the exclusion of "high-risk" persons from employment or health insurance is great under such circumstances. A real prospect looms that firms may sell genetic profiles to insurers and employers. The violation of privacy will follow the spread of advanced digital technology around the world. Admittedly, people have very different conceptions of privacy. The protection of privacy is important not only for individual citizens but also for nations. Information technology creates transparent societies and "glass-house" countries that are very vulnerable to external forces which can undermine their sovereignty. (De Vries, 1990).

Not only does information technology magnify security concerns, it also raises completely new security issues that are intimately related to specific features of these new technologies. Questions arise, for example, in connection with its reliability at a time when it is depended upon. Information technology involves risks. If the technology is tampered with, airline passengers may die in a crash, patients may be seriously injured, companies may go bust, or enemy forces may gain advantage. Should the information technology fail and cause great social and political harm, the responsibility of the different actors involved must be defined, e.g. hardware manufacturers, software designers, and users,. This becomes especially complex, however, when in the course of events electronic agents, smart robots, or other

intelligent software makes decisions, or when decisions are based on the information provided by expert systems. Increased vulnerability to technology failure in many aspects of life is reinforced by the unreliability of digital computers. Forester and Morrison (1990) argue that computers are inherently unreliable as "they are prone to catastrophic failure; and secondly, their very complexity ensures that they cannot be thoroughly tested before use".

National security issues are raised by the possibility of combining human beings and electronic systems in cybernetic organisms. The dividing lines between humans and non-human systems begin to blur, and questions arise about the moral quality of this new existence. (Schroeder, 1994). What are the implications of creating software robots that might permit an information resurrection of the dead? What enormous power does this bestow upon those who can create such personality constructs? And how can this power be socially controlled? To what extent can the information technology power be polarised? (Schroeder, 1994).

Edward Luttwak (1998) maintains that during the cold war local and regional conflicts were often instigated or at least encouraged and materially supported by the rival great powers. Now by contrast it is the absence of the functioning great powers that is the cause of the world's inability to cope with violent disorders that persist even in the absence of instigation, encouragement or military support by the great powers. The result is that not only aggressive small powers, such as Serbia or even Burundi, not only an armed secessionist of all kinds, but even mere bands can now impose their will or simply rampage from without in today's world, even when there is neither the danger of great power wars nor the relative tranquillity once imposed by each great power within its own space of influence. (Luttwak, 1998). IT has changed South Africa as an emerging economy in fundamental ways. Its mechanisms, both powerfully revolutionary and subtly insidious, will continue to change the landscape of communication, commerce, national security and community, for years to come.

The relevance of information technology in defence research and development to sustain democracy in South Africa

The South African defence industrial complex in 1995 achieved a sales turnover of R678 million with direct contribution to the economy. (NRTA, 1998.) The defence industry in general is a repository of technology and its technology strategy should be seen in the context of the National System of Innovation (NSI) that the development and application of science and technology in South Africa should be central to the success of the Growth and Development Strategy as it seeks to address the needs of all South Africans in the maintenance of political, constitutional, social and economic changes introduced by the government. The NSI as an enabling framework for science and technology is intended to support the government's Growth and Development Strategy. This is imperative as it will be central to the empowerment of all South Africans as they seek to achieve social, political, economic and environmental goals. The development of innovative ideas, products, institutional arrangements and processes will enable South Africa to address the needs and aspirations of its citizens. This is particularly important within the context of the demands of global economic competitiveness, sustainable development and equity considerations related to the divided society of the past apartheid system. (White Paper on Science and Technology, 1996).

The preservation of a strong technology base is a requisite of the defence strategy and must serve to maintain the capability to detect threats, being aware of trends in military technology and their implications for the defence. The technology base should be able to produce technology demonstrators that can rapidly be turned into military technology if necessary, be capable of providing expert advice for procurement purposes, provide test and evaluation services, and support upgrade and maintenance activities.

The essential concern of defence technology in South Africa has been whether sufficient spin-offs can occur for the Defence Research and Development budget to have a positive effect on high-technology development in the civilian sector. The spin-off paradigm focuses on the military products, processes and organisational innovations, including national technology infrastructures and firms that transform

and enhance the civilian economy. However, there are also instances of "spin-on" technologies, that is technologies developed in the civil sector that have found military applications.

There is increasing predominance of dual-use technologies in the defence arena, where performance requirements for commercial markets have caught up with military specifications, and the increasing development costs can now be supported as easily by the volume of sales of consumer products as by the guaranteed markets of military procurement. Product life cycles in competitive markets are considerably shorter than those for military systems. In this sense, the civilian economy has proved itself an even more voracious consumer of technology-intensive products than the military.

It is clear, therefore, that the future of the South African defence industry cannot be seen as distinct from that of its civilian manufacturing counterpart and that dual-use concepts should be understood and applied. The view that defence technology should be phased out in favour of civilian technology, or converted into it, is not tenable. Instead, the defence industry must make special efforts to leverage spin-offs in the civilian sector and to develop relationships with civilian institutions in the NSI to promote spin-ons. It is via this partnership route that the defence industry will achieve its rightful place in the mind of the South African public. (White Paper on Science and Technology, 1996).

Information and communication technologies will not by themselves change existing institutional settings. This will need processes of political decision-making that are guided by the genuine aspiration to bring about sustainable and democratic social development. The UNESCO World Science Report warns that the use of ICTs within conventional social and institutional frameworks may not only hamper the realisation of possible benefits, but may also reinforce the possible social risks (UNESCO, 1996).

Conclusion

The arguments presented in the preceding sections suggest that a number of issues require extensive research conducted on national security and information technology. The main purpose of further study and debate would be to provide policy makers with analytical perspectives and empirical data that create a better match between technological potential and preferred futures. It is assumed that these futures should be both sustainable and democratic.

The first area could be concerned with the design of democratic and pro-active policies and programmes that make it possible to realise the socio-economic development potential of information technologies. Among other things, this entails studying the roles that public and private sectors should play in the design and execution of these policies and programmes; the forms of public intervention that are conducive to shaping technological change in accordance with desirable social goals; and the establishment of new and more democratic relations between producers and consumers of ICTs, so that technological progress becomes much more responsive to social needs.

A second area of concern is centred around the definition of those social and institutional changes that are required to maximise the social benefits and to minimise the social risks associated with the adoption and deployment of information technologies. This entails considering various ways of adjusting the organisational structures that are relevant for economic productivity, political participation, and cultural diversity in line with preferred social scenarios; and the cultural appropriateness of educational methods and training materials required for the realisation of the technological potential. Again it is important to discuss the design and adoption of information technologies that strengthen sustainable national security. This involves creating information technologies that reduce the threat and vulnerabilities, and encouraging environmentally sustainable applications of IT.

The future of information technology and national security is compounded by uncertainty – no one knows how the technological advancement will continue to unfold. The goal for the future will be to somehow bridge the theoretical possibilities with technological capability. Research focused on the goal of ubiquitous information

technology will be concerned with a number of important technological obstacles, such as how society could enjoy the benefits of information technology without nation states being too worried about its impact on national security, and society that is ready for a pervasive system that surrounds its communities and monitors their day-to-day activities as there is a worry that ubiquitous networks will present new and emerging challenges to personal privacy which may destabilise security.

Some scientists suggest that the most powerful 21st century technologies, for example robotics, genetic engineering, and nanotechnology, could threaten to make humans an endangered species. Bill Joy predicts that as technology advances, humans will increasingly delegate responsibility to intelligent machines able to make their own decisions and, referring to the writings of Theodore Kaczynski, known as the Unibomber, wonders whether these same machines might not reduce humans to "the status of domestic animals". (Joy, 2000).

Information technology is shaping the strategic environment in which a conflict may take place. For instance, revolutions in military affairs are the dependent variable driven by mostly the political, economic, social and ethical dimensions of the information technology. Given that IT has contributed to the dramatic increase in the interconnectedness of the South African society and people around the world, it is imperative that there should be good entrepreneurship, and government policy that encourages and supports equity, development initiatives and sufficient funding to finance them. The major problem in the South African situation, particularly in deep rural areas, is that without basic electrical and telecommunications infrastructure programmes and universal service initiatives by government, information and communication technology companies will have little incentive to develop new products to meet the needs of people who cannot use or afford their existing services. And, government policies will become ineffective without ground-level programmes to take advantage of them.

Finally, information technology could in future greatly benefit society if its advancement is harmonious with the needs of the people.

CHAPTER SIX

SOUTH AFRICA WITHIN THE CONTEXT OF A DEMOCRATIC POLITICAL SYSTEM

Introduction

This chapter explores the need for, and development of, a model for the analysis of the democratic political system within the context of South Africa. A core approach is advanced which allows for the realisation of a democratic political system as well as other imperatives that motivate and affect democracy and the existence of links that exert their influence within a political system.

In this chapter the three components of the core approaches, namely democracy, political system and South African democracy, are expanded and examined separately. This part of the chapter will look at the elements that exist in a political system and later at what constitutes a political system to be democratic as a whole, together with its subsystems as its analytical component. It will also explore the political processes as subsystems. It is therefore necessary to explain the political system and processes in assessing how far these elements can be linked in upholding democracy.

Explaining and defining democracy

The origin of the term democracy can be traced back to ancient Greece. The word democracy is derived from the Greek word *kratos*, meaning power, or rule. The word therefore means “rule by the *demos*”, the *demos* referring to the “the people”, although the Greeks originally used this to mean “the poor” or “the many”. (Heywood, 1997). Democracy in essence means to designate a government where the people share in directing the activities of the state, as distinct from governments controlled by a single class, select group, or autocrat. The definition of democracy has been expanded, however, to describe a philosophy that insists on the right and the

capacity of a people, acting either directly or through representatives, to control their institutions for their own purposes. Such a philosophy places a high value on the equality of individuals and would free people as far as possible from restraints not self-imposed. It insists that necessary restraints be imposed only by the consent of the majority and that they conform to the principle of equality.

Democracy is an expression often used to describe Western democratic political systems, such as Australia, the United States, Britain, New Zealand, Canada and other nations. It refers to political systems in which there are attempts to:

- defend and increase civil liberties against the encroachment of governments, institutions and powerful forces in society
- restrict or regulate government intervention in political, economic and moral matters affecting the citizenry
- increase the scope for religious, political and intellectual freedom of citizens
- question the demands made by vested interest groups seeking special privileges
- develop a society open to talent and which rewards citizens on merit, rather than on rank, privilege or status
- frame rules that maximise the wellbeing of all or most citizens.

It is generally agreed that liberal democracies are based on four main principles:

- A belief in the individual, based on the idea that the individual is both moral and rational.
- A belief in reason and progress, based on the belief that growth and development are the natural conditions of mankind, with politics the art of compromise.
- A consensual theory of society, based on the belief that society is a kind of mutual benefit association, based on the desire for order and cooperation, rather than disorder and conflict.
- A suspicion of concentrated forms of power, whether by individuals, groups or governments.

Accordingly, liberal democracies are organised in such a way as to define and

limit power in order to promote legitimate government within a framework of justice and freedom:

Power: Efforts are made to define and limit power, usually by means of a written constitution. Checks and balances are instituted, such as the separation of legislative, executive and judicial power. There are conventions of behaviour and an equitable legal system to complement the political system.

Legitimacy: The notion of a legitimate government with a mandate/authority to rule is crucial. Governments require a high degree of popular support, derived from an electoral system that allows for popular, free and frequent elections with the highest possible franchise.

Justice: This is achieved by the full implementation of the equitable things already mentioned so that citizens live in a climate where representative democracy prevails, tempered by constitutionalism, free elections and restraints of power, so that all citizens are treated equally and accorded dignity and respect.

Freedom: For freedom to exist there must be the freedom to make decisions, to learn from them and to accept responsibility for them. There must be the capacity to choose between alternatives and the freedom to do what the law does not forbid. Prohibitions should exist for the general good and there should be respect for political and civil liberties. Liberal democracies often experience disputation about the appropriate role of government in economic matters, some groups arguing for a totally free market, whilst others support varying degrees of regulation and intervention.

A democratic political system

Democratic political systems have been varied, from those of the Greek-political system to the more contemporary complex structures, with common structures to every democracy, freedom of opinion, expression, press and organisation, as well as institutions whereby the people decide on behalf of others through an election in which voters have a free choice, an independent court system and a respected legal system, and minimal violence in a political system. Freedom and equality – the two-pronged approach to democracy – are inextricably bound and there cannot be much of one without the other. Freedom can be assured in a democracy, and the need for political rights is inseparable. (Diamond, Linz and Lipset, 1988)

Democracy means popular control and, to that effect, the then President of America once defined democracy as "government of the people by the people". Government of the people means government on behalf of the people, government by the people means representative government, and government for the people implies that government should be carried by the persons responsible in that nature. It is the responsibility and nature of the government that it is encompassed within different components, legislature, executive and judiciary, in which the distribution of these components concretises the degree of democracy. (Held and Pollit 1993)

Essential characteristics of the political system

Aristotle (384-322 BC) maintained that man is by nature a political animal. The essence in this notion is that of social existence as to politics, by implication, two or more human beings interacting with one another are invariably involved in a political relationship, hence human beings, as they try to define their position in a given society, try to extort personal security from available resources and also try to influence their fellow men to accept their point of view, they find themselves engaging in politics. Thus the only way to maximise one's individual capabilities and to attain the highest form of social life was through political interaction with others in an institutionalised setting in which a political system is able to provide an environment for conversion to take place. (Rodee, Christol, Anderson and Green 1983)

From the above it is clear that there is a need to analyse so as to avoid an oversimplified assumption. Consequently, before any conclusion can be drawn it is important that the environment in a political system should be taken into consideration so as to validate the fact that an analysis of all factors is significant in a political system. The central concept in this discussion is that the political system and its components, like the political processes, exist as subsystem.

The notion of the political system derives from the recognition that the purpose of government is to make and implement decisions for society. The process of decision-making involves the process of allocating goods and services to members of the society, and the allocation of values as policy-making is concerned with values and authority because the political system needs to be acceptable to the society for the

implementation of its policies.

Political system as an analytical concept suggests that the authoritative allocation of values goes through a series of phases that arise from the fact that the political system is the mechanism by which policies are decided. It is this idea of policy making which implies the existence of a succession of phases. It is in this that policies will first be initiated, elaborated and then implemented (input – conversion – output).

Conversely stated, the political system converts demands and support in the form of input, which corresponds to the initiation phase as output, and the conversion process takes place in between, i.e. in the main or core. (Easton 1969 and Almond and Coleman 1960).

The inputs are the responses of all kinds exercised on the system which is activated by way of the demands and which can then elaborate on decisions which will become outputs and be presented to society.

The sequence, input, conversion and output could be divided. The input can be described as having an articulation of demands as an activity consisting of ideas that are presented for discussion and in due course for decision, and the aggregation of demands as an activity which consists in bringing these demands together in a bundle, like policy guidelines to decrease problems by reducing inconsistencies.

Various activities correspond in the output phase, in which rule-making or initiating is the most general, and the first aspect of the conversion process – the rule implementation details, rule-making and rule adjudication – takes place when there is a conflict over rules. These phases, which are called functions, suggest that there is a sequence in which there is articulation and aggregation of demands, rule-making, rule implementation and rule adjudicating, in which they are generally referred to as institutions to describe components of the political system. (Almond and Powell 1966)

Succinctly stated, a political system is a system that deals with political matters, being a structure with interdependent parts which, like any system, has activities that are interrelated and which all define the inner boundary of the system. It is an attempt to

view the political arena in the organised form of a system, hence it possesses the input, conversion and output functions. In any given political system, it is taken that the inputs in particular circumstances are public interests and demands of various types, be it substantive inputs which are more of demands, and support or functional inputs which constitute the expression or articulation of various interest. Citizens may link themselves to the government as active participants or by way of input as to taking part in the work of an organisation. Demands do not always seek change but they do seek government action. (Easton, 1979)

Demand and support are marked out as inputs to the decision-making system; they are essential to the system because they feed definite information into the main or core system. The core or main of the political system is the democratic decision-making representatives or mechanism; they convert input into output. Government is the decision-making instrument that receives inputs and emits outputs since it constitutes the formal government structures. Output from the democratic decision-making mechanism is public policy, which is understood to be laws and government proclamations that are made, enforced or adjudicated. (Hanekom, 1987)

In the political system demands and support of input do actively give one an understanding of the manner in which the environment influences the workings of the system. Demands combine a broad scope of subjects and activities that are transmitted to the system. Without ignoring the importance of support in the input, one would consider demand, in that the flowing into a system constitutes one of the major sources of stress behaving on its important variables.

A demand may be defined as an expression of opinion that an authoritative allocation with regard to a particular subject matter should or should not be made by those responsible for doing so. As such a demand may be quite narrow, specific and simple in nature, as when grievances and discontents relevant to a given experience are directly expressed. For example, exposure of corruption in government may give rise to a demand for control. Broad pleas for better government without specification of the exact steps to be taken represent a highly generalised demand. (Easton, 1975).

Demands have a built-in direction towards the authorities. Directionality of demands

is important as demands are specified and produce accepted binding decisions. They may be expressed or implied.

Every political system function in an environment and certain characteristics of its particular environment contribute materially towards determining both its form of government and its policy output. In a political system the form of government can be understood only against the background of the environment in which it operates. It is generally assumed that a democratic government is likely not to survive in a nation whose people are bound to non-democratic modes of thought and behaviour; hence it is important to give meaning to a democratic political system, and even though the form of democratic political systems has been varied, there are common aspects prevalent to the existence of democratic political systems. (Ranney 1975).

Description of a democratic political system

Ever since the time of Plato and Aristotle, most political scientists have sought to discover universally valid descriptive statements that accurately describe and explain political systems and processes. A general characteristic, which tends to suggest that a political system is democratic, or non-democratic, constitutes a standard principle. It is standard because it explains the way in which the government that runs the country has decided to frame the political system, and as such the manner in which the government runs the country is based on the recognition that government itself constitutes a system, i.e. a political system, because it is engaged in an activity in which a number of elements are interrelated, through which policies are initiated, developed and implemented. (Easton, 1969) These elements include structures that are established by the constitution.

Essential elements of a democratic political system

The political system is composed of sets of institutions, organisations or groups, some of which are set up by a constitution as political processes, and many of which are not. These components and elements together form the framework within which decisions are taken. It is only by understanding how these institutions, organisations and groups can allocate values in a society that these elements and components can exist within a political system. Hence it is essential to describe these elements and components to be able to obtain a detailed picture of what a democratic political system is.

A democratic political system is more than a set of constitutional rules and procedures that determine how a government functions. In a democracy, government is only one element coexisting in a social fabric of many and varied institutions, political parties, organisations, and associations. This diversity in a political system is referred to as pluralism, and it assumes that the many organised groups and institutions in a democratic society do not depend upon government for their existence, legitimacy, or authority.

The following are what most authors would consider to be reasonable, essential elements of democracy:

- Sovereignty of the people.
- Government based upon consent of the governed.
- Majority rule.
- Minority rights.
- Guarantee of basic human rights.
- Free and fair elections.
- Equality before the law.
- Due process of law.
- Constitutional limits on government.
- Social, economic, and political pluralism.
- Values of tolerance, pragmatism, cooperation, and compromise.

Many organisations operate in a democratic society, some local, some national. Many of them serve a mediating role between individuals and the complex social and governmental institutions of which they are a part, filling roles not given to the government and offering individuals opportunities to exercise their rights and responsibilities as citizens of a democracy.

In an undemocratic society, virtually all such organisations would be controlled, licensed, watched, or otherwise accountable to the government. In a democracy, the powers of the government are, by law, clearly defined and sharply limited. As a result, private organisations are free of government control; in fact, many of them lobby the government and seek to hold it accountable for its actions. Other groups, concerned with the arts, the practice of religious faith, scholarly research, or other interests, may choose to have little or no contact with the government at all. In this scope of democratic political system, citizens can explore the possibilities of freedom and the responsibilities of self-government, unpressured by the potentially heavy hand of the state.

The character of a political process in a democratic political system

It is understandable that within a political system the political process is based and concentrates on the organisation and operation of institution which makes the law, enforces it, and settles controversies arising from different interests and various interpretations of the law.

Political process, being generally accepted, implies a recognition that legislatures, executives, and the judiciary do not operate independently of either one another or of the other political organisation in society; they include political parties and interest groups which together with the more formal institutions of government, constitute the political system, which implies that politics involves citizens' attitude and interests, group organisations, and implementation, interpretation of law and policies. It is in the attitudes and interests that different elements and components necessary in achieving a democratic political system are discussed below. (Sainsbury, 1988 and Rodee et al., 1983)

Democratic political process refers to a set of requirements that applies to the institutions and that makes it possible for the citizens to participate in political decision-making processes within a political system. In absolute terms, support for democratic efficacies is widespread. One becomes content at significant levels of endorsement of democratic elections, rights and liberties, political equality and democratic forms to be prevalent in most countries. Most of the criteria used to determine conditions for democratic political process correlate, which leads one to postulate the existence of a general underlying dimension of democratic efficacies. Various conditions of the democratic political system go naturally hand in glove; it is therefore necessary to effectuate a functional meaning of democracy. The triad of democracy, freedom, and equality are inextricably bound in approach and functional meaning. There cannot be much of any one without the other; only in a democracy can freedoms be assured. The demand for political rights is also inseparable from the call for freedom. Again broad political participation is the best evidence of equality in a democratic political system. (Nwabuzor and Mueller, 1987).

It is for this reason that Montesquieu (1689-755) presented and argued that all

functions of the political system could be encompassed within the separation of power that is basically a reflection of what happens in the political world. It is fairly a clear description of the proper function of the government in any democracy where liberty is best assured by the distribution of these different functions among separate institutions of government. (Renwick, 1980).

Given this perspective, from Montesquieu's presentation of the political process, they do not operate and function independently from one another or of the other political organisation in society; primarily, they include political parties, interest and pressure groups, which together with formal institutions of the state constitute the democratic political system, which means that politics, complex as it is, involves citizens' attitudes and interests measured by the public opinion for the formulation, implementation and interpretation of policies. (Maidment and McGrew, 1986).

The effect of public opinion in a political system

The wide acceptance of the democratic thinking led to the idealisation of the role of public opinion in the democratic political system, as to the public being interested in making the laws of the country, the public having the right to know, deliberating and reaching national consensus. Rationally conceived, individual opinions would be held unvaryingly throughout the social order. Having reached consensus as to the democratic political process, the public would make its will known at the polls and in one way or the other, the will or views of the majority would be enacted into law, and continued surveillance and constant criticism would ensure the maintenance of an enlightened public opinion and consequently a public policy will be based upon the environment in which there is demand for democracy and justice.(Budge, 1994).

In any given society, when responding to the challenges of the environment in which one finds oneself, it is one method by which an individual adjusts to the demands of day-to-day life. It is rare that a day passes that an individual does not express his or her views either for or against many subjects. Taking no account of particular case or exception, it is believed that opinions are the end product of the interrelationships between a person's values, beliefs and attitudes, which do not exist in isolation but among others members of the public. (Rose-Ackerman 1978).

As such the public cannot be regarded as a conglomerate and undifferentiated mass of people. Essentially, a public is a segment of society comprising many different types of publics which may be identified by a specific geographic base, such as political system, nation, country, city, peri-urban or rural, and may share common interests. Most authors maintain that "public opinion" is the expression of all those members of a group who give attention in any way to a given issue. Public opinion represents the collectivity of individual opinions of a designated public, thus each issue has its own public. (Dye 1978).

The foundation of an individual's opinion rests upon his or her value systems that represent the objective one wishes to achieve. It is through one's attitude that the belief system finds expression. They structure and focus on beliefs, serving as a frame of reference to guide our thinking and behaviour in a political system.

Political behaviourism in a democratic political system

Naturally men have developed methods by which they can resolve disputes among themselves and agree upon goals, which they wish to pursue by cooperative action. The existence of a common procedure for resolving disputes and reaching common decisions is an important requirement in any political system. Such agreements can be reached by surrendering the right to decide to one person or by fighting to determine whose will shall be reached by either arriving at an agreed view, consensus or by accepting the decision that commands majority support in different situations involving different types of issues. One may wish to insist on a unanimous vote or approval by more than a simple majority. (Elcock, 1976).

A variation upon this decision procedure is for the public to elect representatives who will make decisions for them and who they will hold periodically accountable for their decision by requiring the representatives to submit to re-elect at regular intervals. Thus, a political decision procedure involves discussions and debates followed by a decision which is broadly acceptable to all parties, or is at least not so unacceptable to any party that members decide to oppose it to the point of disrupting the system. This led to the in-depth study of behaviouralism, which most social

scientists found to be more meaningful in reaching a national political decision. (Lindsay, 1992).

The reason why behaviouralism has developed in politics is that it has been the growth of other social sciences. The main reason has been a reaction against the traditional approaches to politics, legalistic study of formal political institutions and a normative and speculative political theory. (Stadler, 1987).

Political institutions are traditionally observed by examining the contents of a country's constitution and law, and interpreting them, rather than by considering how political actors conduct themselves in the context of constitutional law. Of importance is that appearance does not necessarily bear much relationship to reality, the crux is what are individuals' attitudes and informal relationships, rather than the formal structure of power. (Held and Pollit, 1986).

The behaviouralists wanted to see how people carry on with their activity, whatever the formal rules of the constitution and the law might say, and they sought to do so by looking for objectives and indisputable facts which could be analysed systematically. It is given that in any political system political behaviour does affect facts, which are objectives and can be verified by anyone who wishes to check them. There is no question of reality being determined by the observer's viewpoint or ideology. (Lindsay, 1992).

Political behaviour may affect politics in any political system; it raises issues of central importance and it also enables us to answer questions such as the nature of consent, the operation of representatives in government and the extent to which public officials will execute policies as having a bearing on the political socialisation of communities which make up their political culture, the political attitudes, values, feelings, information and skills possessed by the political community, and in political life, on the basis of protecting their interests. (Nwabuzor and Mueller, 1987).

Political culture as a variable in the political system

The characteristics of political socialisation and a close group of opinion, attitudes and beliefs that make up a society are in turn part of the society's political culture and

are important variables in helping to answer some fundamental and enduring questions as to what accounts for a society's political stability or instability. The answer is partly in terms of the extent to which the actual conduct of politics and the moral tendency of citizens coincide with the norms of behaviour prescribed by the political system. (Jaros, 1973).

Some centuries ago, one author declared that, since force is always on the side of the governed, the governors have no support but opinion. When minority groups command the means to destroy millions of people, one may, to qualify this, in a political system, say it is still relevant to say that the people of a country can render it ungovernable, more especially when their grievances are not being investigated so as to institute correctional measures. (Parry and Moran, 1994).

If that being the case, one can safely say that the political system depends on the support of the people. Stable government can be assured only if it is able to retain that support, thus increasing an understanding of the link between the structure of a society and the attitudes of its members on the one hand and the political process on the other. If people are used to running their private lives democratically, they will expect the political system to be run on the same lines and will be able to accept the problems and responsibilities that go with such a system, coping with the continual presentation of contradictory proposals. (Parekh, 1992).

Fundamentally the political culture of any society is made up of the political attitudes, values, feelings, information and skills possessed by the members of the political community. It is reflected in a nation's ideology, in attitudes towards political leaders, in the duties of citizenship, in the conduct and style of political activity, in what is considered to be political or not. (Almond and Verba, 1963).

Basic aspects to any political culture would involve the cognitive knowledge and beliefs people have regarding the various characteristics of the political system: How much do South African citizens know about their national political structure? Does their knowledge begin and end with President Mandela? Do Americans living in South Africa understand the way of doing things in the South African political system or are they more informed regarding the US? This has an effect in that it involves

people's feelings about various characteristics of the political system. For instance, do the people of Rwanda feel loyalty or patriotism towards the regime in Rwanda? Do most South Africans feel admiration for the personality of President Mandela? Lastly, it is also evaluative, in that this involves judgements and opinions regarding the political system and occasionally involves a combination of values or standards with information, i.e. cognitive aspect and affective feeling aspect. How do citizens evaluate their government's performance?. Their judgements are likely to rest on the leading members of the regime as well as on certain values or moral criteria. Thus the cognitive and effective orientations are important aspects in evaluating the cultural way of a political system by integrating the various political substructures, components or elements. Taking it from the history of South Africa, it is necessary to transform the political culture so that it fits the evolving democratic political system. (Almond and Powel, 1966).

Members of a political community can never share the same orientation towards the political system, importantly so for the stability of any political system, that there should be common assumptions and beliefs that will be shared so that the political culture can evolve into relatively political toleration at all angles. Political toleration should be able to resolve dividing issues as in any political system, outputs, as policies, which are popular with some section of the citizens, are bound to be extremely unpopular with others; and the result will be political strife and instability, which will render the executive institutions ineffective.

Political tolerance as an imperative in a political system

A democratic political system requires relatively moderate tension among its contending political forces. And political moderation is facilitated by the process capacity to resolve key dividing issues before new ones arise. For instance, if the issues of religion, self-determinism and the role of the traditional leaders are allowed to accumulate, they reinforce each other and the more reinforced and correlated the sources of cleavage, the less the isolation from heterogeneous political stimuli; the more background factors pile up in one direction, the greater the chance that the group or individuals will have an extremist perception. These two relationships are joined by the fact that parties reflecting accumulated and unresolved issues will

further seek to isolate their followers from conflicting stimuli. (Macridis, 1983).

Within these relationships, similarly, peoples working in isolation are likely to find the world outside their settlement and their business strange, intimidating or at best irrelevant, and will therefore tend to be apathetic towards the political system or alienated from it. Generally toleration depends on the extent to which people mix with a varied selection of their fellows and on their level of affluence, which can include a societal level and the amount of education available. Education should also give a person a deeper understanding of his own views and position in life, besides giving him more information about other people's background. He will become more tolerant of others who have origins, beliefs, attitudes or accents different from his own.

Education is often, not always, an important determinant of levels of toleration. In Germany and Italy, both problematic in terms of the congruence of their political system within the attitudes of their people, education made little difference to the low levels of allegiance to the political system.

Political attitudes, not ignoring toleration, are linked with other attitudes and these are formed by the social activity groups of which the citizen is a member. Opinions and group membership are either superimposed one upon another, presenting the individual with a series of competitive views of the world which support and strengthen one another, or cross-cutting, presenting a variety of different and possibly incompatible views. This latter collection of attitudes and affiliation is more likely to lead to toleration, since it will accustom citizens to dealing with and reconciling different points of view within their own minds. Superimposed opinions or membership will confirm the individual's rightness of existing convictions. Hence the degree of exposure of an individual, a group, or society to either superimposed or cross-cutting opinions or activities will have important consequences for his or their level of toleration.

A particular interesting set of social institutions, from the point of view of the creation of political tolerance or dogmatic political attitudes, is the churches. Most churches are authoritarian structures and their members tend to be associated with one party or

another – social groups and organisations clearly have a considerable influence upon political attitude and the extent to which the citizen is exposed to diverse or consistent opinion will help to determine the strength of his party self-image and the extent to which he is prepared to tolerate the opposition being active and winning power. Thus they have a large role in determining whether conflict in a given society is of intolerance and is sufficient to render the political system unworkable.

A meaningful democratic political system will also be impossible if there are insufficient expressed differences of opinion to give rise to a political debate about which members of society can care sufficiently to involve themselves in or at least to give it a reasonable share of their attention. (Gibson, Duch and Tedin, 1992).

It is therefore imperative that in any political system there has to be a level of political toleration that will in effect help either to facilitate or deepen democracy. It suffices to mention that there are certain conditions necessary for attaining a meaningful democratic political system.

The South African democratic political system

South Africa's National Party apartheid regime can be mapped out back before 1948 when it came into power. The 1910 apartheid Constitution of South Africa provided for an all-white government and gave a continued system of discrimination and oppression. A number of discriminatory measures were taken during this time, including the enactment of the 1913 Land Act which effectively deprived African people of their land. This was also the time of the birth of the African National Congress (ANC), which provided the largest mass-based forum for the freedom struggle in South Africa. The struggle for freedom reached its height in the 1970s and 1980s, when State repression and internal opposition intensified and international attention was focused on the plight of South Africans. One of the significant developments in this period was the adoption of the 1983 Constitution, which unsuccessfully attempted to restructure racial and political arrangements while keeping power in the hands of the white minority. It created a tri-cameral parliament that sought to co-opt Coloureds and Indians into the national parliament in separate houses. The African majority were excluded from this political system and were

relegated to black local authorities in their townships and the so-called 'independent' homelands and self-governing territories. While South Africa was isolated from the international community, this period also saw the rise of the United Democratic Front, a mass-based umbrella body, which identified itself with the African National Congress in exile.

The beginning of 1990 saw the unbanning of the ANC and the release of political prisoners. In 1993 the ANC, as the chief negotiator on behalf of the liberation movement, the government and other political parties came together to negotiate South Africa's transition to democracy. A number of organisations and structures that formed the broad liberation movement worked together in developing policy positions and determining priorities for a new South Africa democratic political system.

One of the priorities for the new South African democratic political system was to have a constitution. An interim constitution was implemented and then later the final Constitution. One of the most important reasons for the success of the process of drafting the final Constitution was the use of technology. The Constitutional Assembly's public awareness and education campaign strategy used several ICT platforms to engage the public in its campaigns. The campaigns were designed to educate the public on constitutionalism and basic rights, as well as to elicit the views of the public on the content of the new Constitution. The use of technology involved several strategies which were used during the campaign and whereby thousands of public meetings were held, covering nearly every town and village in South Africa, both to educate and allow people to give feedback and make submissions. These meetings were advertised widely, especially through television and radio.

Participatory workshops were organised. Members of the Constitutional Assembly participated extensively in this campaign, and travelled across the country, to townships, informal settlements, rural villages, churches, schools, etc. to consult with the public about the constitution-making process. The media technology was also used extensively; over 10 million people a week listened to the Constitutional Assembly's show on the radio in one of the official languages, and an estimated 160 000 people received a copy of the newsletter "Constitutional Talk", also published in the 11 official languages, each fortnight. In addition, an Internet site was launched, providing information on the constitution-writing process. Through the use of ICT a Constitutional Talk Line was set up to enable people to make submissions

over the telephone. Members of the public could make submissions in their own languages, and approximately 2,5 million written submissions were made. Public meetings were held with many organisations representing a number of diverse interest groups.

After the 1994 general elections and during the negotiation process, South Africa experienced a diverse compelling political system. There was first the politics of transitional arrangements, which brought a lot of uncertainty, tension and mistrust between different negotiating parties, and at that time there was ongoing violence in the country. Many concessions had to be made which were based on the will to make the political negotiations work. These involved some form of persuasion in politics, as the need to win the public support became essential together with the international community that played a vital role throughout the negotiation process. For all intents and purposes, it was important to build a transitional facet into changing from a shun-orientated apartheid status quo to the new political system, which was a good way of ensuring democratic political consensus.

The intensity of the political reform process increased, particularly after the April 1994 elections and those of 1999. South Africa assumed a new political order when the general election gave birth to a democratic, popular and legitimate government.

South Africa's new political system qualifies as a genuine democracy. It has now run two largely peaceful national elections, in 1994 and 1999 respectively, judged to be free and fair. It has the Constitution that encapsulates features like the National Council of Provinces, a range of independent watchdog agencies and commissions, like the Office of the Public Protector, Youth Commission, Gender Commission, Human Rights Commission, the Equality Court, etc. guaranteeing a wide range of classic political rights as well as an array of socio-economic rights, all guarded by a relatively strong Constitutional Court. A constitution and elected representative institutions do not necessarily complete the democratic picture. No matter how well designed its political institutions and processes are, in order to sustain and consolidate democracy there is a need for society to support the democratic sustenance practices.

The South African political system should be understood in the realm of a sovereign

state that makes formal provision for the entitlement of every citizen to citizenship and franchise. The legislative and executive organs of the State at all levels of government are bound by the application of fundamental human rights, which apply to all the laws in force and all the administrative decisions and acts. Every citizen has the right of equality before the law and to protection of the law, and to human dignity, freedom and security. The South African political system is characterised by far-reaching administrative, social and political changes that have left virtually no governmental structure unaffected

Conclusion

The 1994 elections in South Africa presented a new democracy that delivered not only a universal right to vote but also formal equality before the law, channels for citizens' participation in governance, and institutions strengthening democracy. The second democratic elections in 1999 took place amidst large-scale societal transformation and reform and presented the first major opportunity to determine the extent of the impact of technology in a democratic South Africa.

South Africa made the transition from a minority-ruled country to an inclusive majoritarian democracy in 1994. A special feature of this transition was that it was pact-driven, i.e. negotiated between and among the major political stakeholders at the time, namely the National Party government and the African National Congress. The pact-driven phase commenced with FW De Klerk's "reform speech" of February 1990. From that point onward, apartheid legislation was systematically scrapped, while the major political role-players engaged in multiparty negotiations on a new constitutional order. This process was completed in 1993 when an interim constitution was adopted that led to the introduction of democratic rule in 1994 under the political leadership of the ANC, which had won the elections of April 1994. Then a final constitution was negotiated, under which the ANC won by a landslide. The principle of the constitution when interpreted makes provision for characteristics of liberal democracy. (Breytenbach, 2000).

South Africa's two constitutions drafted during the nineties, that is the Interim Constitution of 1993 and the final Constitution of the Republic, adopted in 1996, are

fully-fledged "liberal democratic" constitutions as presented by Breytenbach (2000).

He also presents salient features, as follows:

- The supremacy of the constitution, making South Africa a typical "rechtstaat", with an independent judiciary, Bill of Rights and Constitutional Court;
- Although the head of state is the President, South Africa does not have a typical presidential system. Instead, South Africa has a parliamentary - really Westminster system, where the Executive is formed only after elections and represents the strongest party in parliament and is therefore accountable to parliament, as in the UK parliamentary system;
- Unlike the UK/ British system, South Africa's electoral system is not based on geographical constituencies as basis for representation in parliament. It is based instead on the typical, continental, European system of Proportional Representation (PR) based on party lists;
- Division (in the Constitution) of functional areas of concurrent and exclusive competencies between national and provincial powers. The central level has stronger exclusive powers than provinces; it also takes precedence over provincial powers in the case of concurrent powers, making centralisation stronger than provincialisation. This suggests that South Africa has a hybrid system ("regionalism") between federalism and unitarism (very much like Canada);
- Elections at all three levels of government – national, provincial and local – every 5 years, and equal and full participation for all adult citizens in public institutions where citizens normally participate in liberal democracies. So, institutionally, the system provides for "contestation" and "participation" which is a typical "polyarchy" (in Dahl's terms), otherwise known as "plural" system.

But is it "plural" (or "liberal") in all respects?

Polyarchy and pluralism and a liberal constitution, Breytenbach (2000), in South Africa are the product of two major forces: a pact-driven negotiated settlement

between the former NP government and the ANC. The negotiated settlement made for a pact-driven process emphasising shared rule during the transition.

The word transition literally means the passage from one condition or stage of development to another. Transitions are said to exist for a particular duration, usually medium to long term. Transitions from authoritarian rule to democracy are usually referred to as transformations. In transformation the passage from one condition or stage of development should be interpreted as structural change affecting especially the political, social and economic spheres of state and society, and resulting in a fundamental change or the relations of power, which existed prior to the transition. In this respect, transition resembles managed revolutions over time. (Roux, 2000).

Transitions may take on many forms, in some instances present in one and the same country as in South Africa. South Africa faces the daunting challenge of having to manage the passage from one condition to another on three levels: politics, society and economics. South Africa is trying to get through its transition under very difficult economic circumstances. The Nedcor/Mutual scenario-team (1990), after having studied a variety of transitions, become convinced that South Africa's transition is probably more far-reaching than any other which has been attempted. It was stated by the team that "poor social conditions, poor economic performance, and violence could well disrupt the transition or create a situation in which a new government would find it impossible to govern successfully" (Nedcor/Old Mutual, 1992:14), thereby creating "political instability".

O'Donnell and Schmitter (1986:7) in Roux (2000) display three stages that form part of South Africa's transition:

Liberalisation, where the incumbent government cedes power to, and recognises additional rights of, citizens.

Democratisation, where the loser of an election cedes power to the winner while at the same time government acknowledges and respects the full rights and obligations of citizenship.

Socialisation, where democracy is consolidated into a way of life which has broad support among the populace. (Nedcor/Old Mutual Scenarios, 1992).

The Nedcor/Old Mutual scenarios also described a successful transition as one where a stable democracy becomes entrenched; where rising incomes earned are experienced; where a reasonable distribution of incomes takes place; and stable social fabric is in existence. Roger Southall (indicator SA, 16(1), 1998) refers to six factors, as identified by *Przeworski et al*, which can be used to determine whether or not democracy will survive, i.e. the existence of democracy itself; parliamentary, as opposed to presidential democracy; the level of economic development; positive economic performance; narrowing income inequality; and a favourable international climate. (Roux, 2000).

It is within the context of South Africa's level of economic development and positive economic performance that technology could have an impact on democracy. It is given that South Africa is in a more fortunate position as it has mostly relatively well-developed infrastructure, good financial and banking institutions, a functioning bureaucracy, efficient security forces and, importantly, a private sector and entrepreneurial class which are both the envy of many entrenched first-world democracies. These beneficial issues can only strengthen long-term development if they are maintained and properly managed. In any democratisation process elections are a mere event; they are an essential, but not sufficient, condition for the consolidation of democracy, for "stability and development". Given the transition in South Africa, this period of a democratic political system also provides an opportunity to examine whether advances in technology can enhance democracy in South Africa so as to validate the claim that political stability and development can consolidate democracy.

Political stability and sustainability of a democratic political system cannot be taken for granted. Robert Dahl, in Muthien, Khosa and Magubane (2000), points out that the number of democracies increased from 21 in 1950 to 51 in 1996, and that 30 countries achieved democratic status between 1993 and 1996. However, between 1900 and 1985, non-democratic regimes replaced democratic regimes 52 times.

Democracy in South Africa has delivered the franchise to the disenfranchised majority. It also put in place the key pillars of democratic constitution, i.e. a functioning multiparty parliamentary system; a strong sense of constitutionalism and the rule of law; mechanisms of accountability; a professional civil service functioning

on the basis of constitutional values; mechanisms for civil participation in government; and an integrated and highly developed economic infrastructure. The democratic political system meets the requirements as an indisputable democracy. It has also run two national elections, which were judged to be free and fair. It has the Constitution that encapsulates features like the National Council of Provinces, a range of independent watchdog agencies and commissions, guaranteeing a wide range of classic political rights as well as an array of socio-economic rights, all guarded by a relatively strong Constitutional Court. A constitution and elected representative institutions do not necessarily complete the democratic picture. Despite how well designed its political institutions and processes are, in order to sustain and consolidate democracy there is a need to determine the level of democratic sustenance (Idasa, 2000) by assessing the effectiveness of transformational public policies in a democratic political system.

An important aspect of transformation in South Africa during the first term of office of the democratic state was the democratisation of public policy-making, particularly the science and technology policy. The new political environment introduced processes and practices that differed radically from those that marked policy-making during the apartheid era. In particular a more transparent public and answerable policy-making process replaced the previously semi-secretive, technocratic, authoritarian mode of policy-making.

The most significant example of this new political culture was demonstrated by the number of inputs received during the discussions on the Science and Technology Green Paper. Popular participation in the policy-making was made possible by encouraging the citizenry to make submissions, resulting in many written submissions.

This new policy-making approach created opportunities for a greater and more active role of communities on issues of governance. It also proved the desire for transformation of the relationship between technology and political democracy.

CHAPTER SEVEN

SOUTH AFRICAN DEMOCRATIC POLITICS OF TECHNOLOGY

Introduction

Technology and democracy are two interrelated variables in the South African political system. The relationship between technology and democracy in South Africa is an essential component of government's strategy for growth and economic development in creating a better life for all. The advent of democracy in South Africa has seen initiatives taken by government to review and reform the country's technology approach. In 1996 the government published South Africa's Science and Technology Policy, which envisages a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture.

The South African government's technology approach highlights concerns about improving the wellbeing of society. Such concerns inversely question the certainty of whether technology can support democracy. In view of these concerns, the scope for assessment, monitoring and evaluating the impact of technology has grown enormously in response to the demand for democratisation and the increasing challenges for the provision of goods and services in meeting the basic need.

Technology is one of the main drivers of economic growth and prosperity [in a democratic political system]. (Pistorius, 1996). It is also widely recognised as being one of the most important contributors to competitiveness, whether at international level, national level, or organisational level. Numerous studies have been performed to investigate the effect that technology has on [society's] productivity, and one can safely say that there is general consensus that technology can, in principle, contribute significantly to [national] productivity.

The purpose of this chapter is not, however, to expand or elaborate on technology itself. It is to put the role of technology in perspective vis-a- vis the extent to which

South Africa as a political system is playing a role in creating a conducive and enabling environment for political decision-making in terms of the science and technology policy in order to support an endeavour to enhance democratisation. In other words, the role of technology is investigated to determine whether political decisions on science and technology policy have any influence on democracy in South Africa. In order to do so, however, it is necessary that the concept of technology and democracy be considered in context and not interpreted narrowly. It will be shown that technological advance is one of the central aspects that can enhance democracy in a political system.

A general overview of technology approach

There is abundant literature available on technology policy. Since early in the 1980s technology approach in developing countries centred around the concept of "appropriate technology" where there was a need to move away from capital intensive technologies towards more labour-intensive technologies which were more suited for local environment. (Chang and Cheema, 1999). The debate around the concept went through transformation and was more about why some countries were more successful than others in absorbing imported technologies. There is a common understanding that there is a need for a technological capability in order for countries to be successful in choosing their approach to technology. It is also emphasised that there is a need for investments in building technological capability, and that policy actions have an important role to play in the process of supporting a particular policy decision. (Fransman and King, 1984).

There is a more advanced understanding, especially as presented by Nelson and Winter (1982), and also by Freeman (1982), which emphasises the importance of institutional and policy factors in the evolutionary nature of technological process. (Dosi et al (eds.), 1988) These developments in technological evolution culminated in the introduction of the concept of "national systems of innovation", and emphasised the importance of institutional factors, and the inter-relationship between the constituent parts of the institutional complex, in the determination of technological progress. (Lundvall, 1992, and Nelson (ed.), 1993).

The concept of a national system of innovation is also embedded in the South African science and technology policy which seeks to harness the diverse aspects of science and technology through the various institutions where they are developed, practised and utilised.

The above theoretical concept influenced, and was also influenced by, the literature on technology policy, which produced a new breed of theoretically sophisticated and empirically well-grounded literature that may demand a clearly focused policy execution. (Lall & Teubal, 1998).

South Africa, having adopted this concept, may have difficulty in generating a socially desirable degree of technological progress and the type of policies that may be necessary to resolve this problem of having a clearly defined policy execution. The reason for this problem can be related in two areas that have been relatively ignored in the existing literature, namely the political and the institutional aspects of technology policy design and implementation.

It would be wrong to suggest that those who have contributed to the debate on technology policy in developing countries have completely neglected these two aspects. However, it would not be too much of an exaggeration to say that most literature has paid relatively little attention to the political aspect of technology policy design and implementation. Likewise, it would be wrong to suggest that institutional factors have been neglected in most literature, especially given the numerous writings on national systems of innovation. However, it would be fair to say that far more attention has been paid in the literature to the institutions related to knowledge generation and diffusion (e.g. the educational system, linkages between firms and research institutions), rather than to those directly related to policy design and implementation (e.g. bureaucracy, industry association).

In determining the impact of technology on democracy, this study puts emphasis on the analysis of the political and institutional aspects of technology policy design and implementation in South Africa.

South Africa's technology policy approach

The technological skills and the ability of a nation to improve are important to its overall development and have led governments to adopt more comprehensive and forthright policies with regard to technology. The purpose of a national (science and) technology policy is defined by UNESCO (1990:9) as "...the development and fruitful use of national scientific and technological resources in order to promote the advancement of knowledge, encourage innovation, increase productivity and to attain the objectives of the country's economic, social and cultural development more quickly and surely". Much emphasis is on the structure in terms of methods and legislation. (Kaplan, 1995). In South Africa's context technology policy has three principal concerns, which are:

- to enhance capacities for invention and innovation;
- to ensure access to international technology; and
- to enhance the diffusion of new and appropriate technologies and technological best practices.

The democratisation process in South Africa has seen the transformation of the science and technology community. The transformation involved that the government departments, in particular the Department of Arts, Culture, Science and Technology (DACTS), had to restructure and transform their structures and implement policies and programmes. In January 1996 DACTS published a Green Paper on Science and Technology. This was the result of consultation with stakeholders in the science and technology community. A further process of consultation culminated in the publication of the White Paper on Science and Technology in September 1996.

The above process took account of , among other things, the results of two studies of the science and technology policies of five decentralised states, viz. Belgium, Canada, Germany, India, and the USA, in which the HSRC (Prinsloo and Pienaar, 1993) investigated the functioning and implementation of science and technology policy. The study noted that:

- In countries where the private sector involvement in science and technology was less than that of the government, the country's science and technology system was generally inadequate. All five countries display systematic and concerted efforts to encourage the private sector to invest more in science and technology research so as to achieve a higher level of technological advancement.
- The creation of a solid and effective education system to provide the required number and quality of scientists and technologists is a *sine qua non* of science and technology development.
- There is a trend to a greater centralisation of science and technology policy. This trend is mainly the result of worldwide recession and thus economic constraints, and brings with it the risk of the politicisation of science and technology policy, generally regarded as undesirable.
- Financial constraints are compelling industrialised nations to actively increase the pace of international scientific and technological collaboration.

The Council for Scientific and Industrial Research (CSIR) commissioned a study of science and technology policies in sixteen countries (CSIR, 1991). The sample included the USA and Canada, countries in Eastern and Western Europe, the former USSR, some Pacific Rim countries, and Botswana and Kenya. In the process a number of policy instruments were identified that directly affected science and technology. These instruments all have a direct influence on science and technology policies and ultimately on economic prosperity and development in general. From a national economic development perspective, the study also highlighted the fundamental importance of the following aspects:

- Distinction between technology and science, and the fact that competence in the former may not be dependent on, or even related to, competence in the latter. Indeed it is possible in the short term for a country to be competent in utilising and adapting technology development elsewhere without itself having a strong science base.
- The strategic capacity to manage technology effectively at the level of overall economy as well as that of the individual (and sometimes at sectoral and

regional levels). The most successful economies are those that use technology best across a broad spread of industries – as exemplified by Japan and the former West Germany.

- An efficiently functioning national innovation system properly connected with outside systems, and in which the science, technology, market and finance "pole" interact readily with one another. (The market refers not just to regular commercial markets, but also to all applications opportunities in sectors such as health, education, environment, and national security where commercial markets may not exist.)
- The role of government in exercising overall leadership, in creating a macro-economic and regulatory framework conducive to technological innovation, and in affecting, within the overall pattern of resource allocation, the appropriate volume and quality of investment in education and training in physical infrastructure. In some cases government can become the driving force for innovation in a particular industry at a particular time.
- The role of the private sector in identifying and responding to applications opportunities and, especially in the case of large companies, in participating in the policy process. The private sector is usually, but by no means always, the principal engine of the technological innovation process.
- A rapport between government and the private sector, which allows each to play its role appropriate to evolving circumstance of the industry in question.

Developments towards formulating the South African science and technology policy began by re-examining its science and technology policy with the publication of a report in 1992 entitled "Towards a science and technology policy for a democratic South Africa", which was sponsored by the International Development Research Centre (IDRC), Canada. Its findings were that:

- There was a crisis in the educational system at all levels and this crisis was at its worse when it affected the teaching of mathematics, science and engineering.
- South Africa should see itself as a participant in joint ventures in S & T on the continent of Africa, but not as an automatic leader.

- In various individual institutions in South Africa R&D funds tended to be allocated for inappropriate activities.
- There was vacuum in leadership on issues dealing with science and technology at ministerial level.

The government's policy approach was intended to meet the challenges of stimulating development and overcoming the biases and entrenched ideas prevalent about the nature of science and technology, while on the other hand it was also the government's role to promote and develop the science and technology sectors. The process of implementing government's policy approach included numerous programmes, *inter alia*:

- The formation of the National S&T Forum (NSTF) composed of members from all sectors, including business, acting as an advisory to the Minister of Arts, Culture, Science and Technology.
- Appointment of the National Science and Technology Council from government and private sector.
- The commissioning of the National Research and Technology Audit for South Africa in late 1995, as a national stocktaking exercise of all science and technology skills and capabilities resident in South Africa, taking January 1996 as the base date.
- In 1996 the government established the Academy of Science of South Africa, its purpose being to ensure that leading scientists, acting in concert and across all disciplines, can promote the advancement of science and technology and provide effective advice, and can facilitate appropriate action in relation to the collective needs, threats, opportunities, and challenges of all South Africans. (Document circulated by the Facilitating Committee, 28 Nov. 1992).
- A National Research and Technology Foresight programme was completed in 2000.
- Establishment of the National Advisory Council on Innovation (NACI), whose role will be to support the Minister of Arts, Culture, Science and Technology.
- The review of the science councils and related institutions (SETI) in South Africa was completed.

- The tabling of the White Paper on Science and Technology, preparing for the 21st century (SA Department of Arts, Culture, Science and Technology, 1996).

The White Paper on Science and Technology saw the promotion of the effective distribution of available knowledge as a critical function of a national system of innovation; a well-functioning process of technology diffusion which could boost progress in South Africa through appropriate combinations of domestic and imported technologies. But it was expected that this in turn would be highly dependent on the ability of South African firms to absorb such technologies (DACTS, 2000-2001).

The White Paper on Science and Technology

As discussed earlier in this chapter, the White Paper on Science and Technology presents a salient feature, which is its most important aspect. It deals with the concept of “National System of Innovation (NSI)”, which is concerned with ensuring a sufficient supply of new knowledge and new technologies, as well as supporting and promoting the attainment of national objectives. (DACTS, 1996). The concept of a national system of innovation is an important basis for policy formulation. The use of this concept as a framework for policy was influenced by the 1994 Report of the Auditor General of Canada, which highlights South Africa’s courage which she would like to see spread through the science and technology policy. (DACTS, 1996). The government introduced a new view of the role and status of the sciences, engineering and technology in the context of socio-economic development. Many countries have accepted that technological change is the primary source of economic growth, which means that economic and science and technology policies have to recognise that innovation and technology diffusion are central concerns as they are the agents driving that technological change.

The national system of innovation is described as a set of functioning institutions, organisations and policies that interact constructively in the pursuit of a common set of social and economic goals and objectives.

There are three key interests that the government described in the White Paper:

- to ensure that South Africa has in place a set of institutions, organisations and policies which give effect to the various functions of a national system of innovation;
- to ensure that there is a constructive set of interactions among those institutions, organisations and policies; and
- to ensure that there is a set of goals and objectives which are consonant with an articulated vision of the future which is being sought.

The White Paper is the result of five basic requirements that are in line with a vision for innovation in South Africa intended to achieve excellence in serving the national objectives. These basic requirements are priority areas that a sound science and technology policy needed to cover:

- Promoting competitiveness and creating employment.
- Enhancing the quality of life.
- Developing human resources.
- Working towards environmental sustainability.
- Promoting an information society.

There are also crucially important dimensions of science and technology that inform South Africa's strategies:

- The importance of knowledge generation.
- The role of the human sciences in innovation.
- Finance, management and performance.
- Promoting competitiveness and creation of employment.

Promoting competitiveness and creating employment

These are the most important requirements that recognise that, in the face of the

growing globalisation of the world economy, technological innovation and support for South African enterprises need to be encouraged; that business is the driving force behind the economy, and that government must provide the leadership, incentives and support that the business sector needs to meet the new challenges posed by highly competitive markets. This will involve developing a shared vision of South African innovation, and its support structure for creating and sustaining micro-enterprises and small businesses will require a strong technology component. Public investment in R&D needs to be redistributed away from the support of activities within the government's own facilities and towards more comprehensive support of R&D executed in the private sector.

This long-term need must be seen in the light of the government's current responsibilities, namely to take a lead in pre-competitive research, until a culture develops in the private sector where such research is seen as a business imperative where entry barriers relating to equipment and human resources are high in areas where the activity is considered to be a service which the government has a duty to provide, and in areas of public good in which, to achieve the greatest benefit, the research results and technology transfer need to be placed in the public sector.

A prime objective of the NSI is to enhance the rate and quality of technology transfer and diffusion from the science, engineering and technology (SET) sector by the provision of quality human resources, effective hard technology transfer mechanisms and the creation of more effective and efficient users of technology in the business and governmental sectors.

The development of entrepreneurship needs to be fostered throughout South African society, particularly among those historically excluded from the formal economic sector, and this entrepreneurship needs to be linked to the promotion of innovation. Government, via the Growth and Development Strategy and the Macroeconomic Strategy, is seeking to achieve an annual economic growth rate of 6%. In a country which is currently under-investing in science and technology and innovation, this target will require a greater than 6% per annum growth rate in the national investment in these activities. In particular, those sectors destined for export growth will not achieve their targets if this investment does not occur (DACTS, 2000-2001).

Enhancing quality of life

The means must be established to ensure that the governmental research portfolio gives due attention to those areas of R&D with the capacity to affect quality of life, and specifically in domains where market failure is high, such as environmental sustainability, provision of health care, meeting basic needs at community level, reducing the total cost of infrastructure provision and providing safety and security to all who live and work in South Africa.

It is imperative for the government to ensure that an appropriate portion of the money it spends on science is utilised in these areas. Urban and rural communities need to be assisted and encouraged to adopt social and technological innovations to assist them in decision-making and to enhance their ability to make informed choices.

Developing human resources

In line with a dynamic vision for innovation-assisted economic growth, greater equalisation of income and economic opportunities need to be facilitated and the legacy of apartheid-based disempowerment of individuals and institutions needs to be addressed within a national system of innovation.

The lifelong processes of scientific and technical education, training and learning among the workforce and among South Africans in general need to be promoted as an essential response to the forces created by the dynamic changes of the global economy. This is a necessary response to enable those made redundant in one circumstance by these changes to continue making an active and creative contribution to the economy, their own wellbeing and that of society.

New approaches to education and training need to be developed that will equip researchers to work more effectively in an innovative society. This will require new curricula and training programmes that are comprehensive, holistic and flexible, rather than narrowly discipline-based. Education and training in an innovative society should not trap people within constraining specialities, but enable them to participate and adopt a problem-solving approach to social and economic issues within and across discipline boundaries.

Working towards environmental sustainability

South Africa's economic growth must be reconciled with considerations of environmental impact, resource constraints and conservation, and must further be determined by human needs and safety. Sound regulatory mechanisms are necessary to ensure that the positive aspects of technology introduction, transfer and diffusion are maximised and the negative aspects minimised.

Environmental research, monitoring and control require ongoing support and encouragement, as do the development and improved availability of environmental technologies. Economic and environmental efficiencies are interrelated, thus innovative practice needs to include environmental management. It is important that South African enterprises are able to adopt and implement best-practice technologies for environmental management and waste minimisation.

A national strategy is required to implement the terms of agreement on environmental sustainability adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1994 (Agenda 21), and specifically to develop an understanding of the problems of climatic change, desertification and loss of biodiversity.

Promoting an information society

Development of the South African vision of the information society is necessary and should seek to ensure that the advantages offered by the information revolution reach down to every level of society and achieve as best a balance between individuals and social groups, communities and societies as is practically possible. The vision would seek to ensure that there is the creation of an equitable information order nationally, regionally and internationally. It should take into account the potential of communities at various levels to cooperate, to bridge differences, to work for mutual upliftment and meeting basic needs, and to redress the social imbalances of underdevelopment. The development of such a perspective would aim to ensure that the information revolution benefits society as a whole.

The potential of information technology (IT) needs to be captured to serve people issues such as supporting education, providing household services and enabling social

development. As a developing country, South Africa needs to determine what should be done to prevent it from being marginalised by the accelerating rate of innovation in information technology. How can she participate globally without merely throwing open her markets to foreign products, thus increasing her dependency on the developed world? How can she empower herself with a capacity for technology innovation?

The importance of knowledge generation

The wellbeing of scientific activity in South Africa is intimately linked to material factors. There is a clear trend worldwide for curiosity-driven research to increase as a function of national per capita income. There is also a danger of adopting too economic a viewpoint. Currently though, there is a need to recognise the importance of the knowledge-generating function of research, particularly in the higher education sector. Human curiosity and the ability to recognise unexpected discovery account for much of scientific progress. Basic enquiry, as opposed to a formula-driven approach, is absolutely essential, particularly at the universities and technikons. It is important that fundamental research activity not to be regarded as impractical, because it is the preserver of standards without which, in the long term, the applied sciences will also die. Scientific endeavour is not purely utilitarian in its objectives and has important associated cultural and social values.

The role of the human sciences in innovation

The importance of the human sciences in South African society needs to be documented. The four important roles in the context of innovation that need to be highlighted are human resources in understanding the social processes and problems as a source of social innovation, in facilitating appropriate technological change within society and within the economy, in providing the basis of policy analysis, and as a source of new knowledge and informed critique of the transformation of South African society and its economy.

Finance, management and performance

The limitations imposed on research, technology development and technology transfer by the fiscal problems of the day need to be addressed. This will require a co-ordinated approach, which recognises in general the less wasteful nature of a simpler fiscal policy, while appreciating the absolute necessity of encouraging innovation in the private sector.

There is also a need to identify a framework to promote linkages between universities, science, engineering and technology institutions (SETIs) and the private sector, with a view to sharing risks, resources and insights with respect to pre-competitive research. There is also a need to meet the internal challenges of governing a healthy science and technology system. This includes managing the problems of big science, fundamental research and service-oriented science and their relationship with technology development, infrastructure, the provision of basic needs and human resource development. It also includes the comprehensive measurement of the inputs and outputs of science and technology research and development, and its impact on the goals of national policy objectives, both in science and technology and in other fields.

International cooperation, interaction and institutional arrangements

Since 1993 South Africa has on a regular basis entered into bilateral agreements with foreign countries in the fields of science and technology, as well as agreements that include cooperation in science and technology. A policy framework to guide South Africa's participation and cooperation was to formalise and promote bilateral co-operation so as to derive maximum benefit from such interaction. The policy framework proceeds from the basic view that science and technology cooperation is crucial in the age of globalisation and that its impact on South Africa's democracy would be positive for the development of science and technology human resources, socio-economic development and the optimisation of financial and other resources for research and development.

By the end of 1993 bilateral scientific and technological agreements had been concluded with most countries in the world. Science and technology cooperation with these countries are being pursued in a wide range of fields that include material science, manufacturing technology, biotechnology, information technology and

systems, sustainable management of the environment, exploitation of natural resources and minerals, medical research, and public health, engineering science and advancement of technologies, water supply projects, agriculture, mathematics and science education, amongst others.

International cooperation, in science and technology, is enhanced by the funding of lead programmes that reflect national priorities. South Africa identified five priority fields:

Biotechnology – food production, agriculture, health;

Development of new materials and manufacturing;

Information technology and systems and the information society;

The sustainable management of environmental issues and of natural resources; and

Mapping and exploitation of natural resources and minerals.

The first, multilateral, meeting of the European Commission-South African Joint Science and Technology Cooperation Committee was held in Brussels on 3 June 1998. Co-operative ventures were highlighted and included the participation of South African scientists in projects under the Fifth Framework Programme, and the involvement of European researchers in South African science and technology programmes. Multilateral and multinational cooperation was promoted as well, inter alia with UNESCO in the areas pertaining to regional policy development and co-operation in science and technology within the context of the Southern African Development Community (SADC). Science and technology cooperation was also under discussion at the Summit of the Non-Aligned Movement (NAM) held in Durban from 29 to 3 September 1998. South Africa has been afforded observer status in the Committee for Scientific and Technological Policy of the Organisation for Economic Cooperation and Development (OECD). Observer status gives South Africa access to a considerable pool of expertise in S&T policy development, implementation and evaluation.

Institutional arrangements: In support of the NSI the following institutional initiatives were undertaken by government: the National Advisory Council on Innovation Act no 55 of 1997 (NACI Act), in terms of which the Council would advise the Minister on issues of science and technology policy. The members of the Council comprise

individuals from industry, academia and science councils. The human resources capacity has clearly been identified as one of the key constraints in South Africa's goal of establishing a truly democratic country based on equity and human rights (DACTS, 2001-2002).

The National Research Foundation (NRF) was established, which will promote research through funding, human resource development and the provision of the necessary research facilities in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby to contribute to the improvement of the quality of life of all the people of South Africa. It was created by bringing together institutions and programmes that dealt with scientific human resource development along interdisciplinary structures. It is believed that the most important innovations occur at the confluence of and interface between disciplines.

With regard to the funding of the science councils, over the past years the government has been able to redirect and redistribute approximately 49% of the Parliamentary research grant funding to science councils, approximately 10% of which has been re-directed to the broader science and technology community. The framework within which science councils secure funding, both from the state and private sources, is set out in terms of a three-stream funding approach in the White Paper on Science and Technology, September 1996. This approach was later incorporated into the Financing and Reporting System (FRS) for science councils and was adopted by Cabinet in April 1998. In addition, the Ministers Committee on Science and Technology, chaired by the Deputy President, accepted the phasing in of the proposed approach of the White Paper. In terms of this, councils receive support for core responsibilities and have to compete for support of programmes that could be undertaken by other research bodies with the same competency. (White Paper 1996.)

In terms of the funding framework, the science councils can access parliamentary grant funding for their mandated core activities. The framework requires that the core activities for funding be identified and subjected to a medium term, cyclical review by the peer-research and technology development and user/stakeholder communities, while at the same time the institution is subjected to a management efficiency

assessment.

Competitive funding

The White Paper on Science and Technology states: "A national system of innovation benefits from knowledge practitioners being located in multiple knowledge generating sites and institutions such as higher education institutions, government and civil society research organisations, private sector think tanks and laboratories." (White Paper 1996.) A major initiative introduced through the White Paper is the establishment of the Innovation Fund. It promotes large-scale projects, involving participation from throughout the National System of Innovation, and focuses attention on the major themes of competitiveness, quality of life and environmental sustainability.

The third stream of funding from the public takes the form of "contract income". Government departments from time to time put out to tender projects that are essential for the fulfilment of their organisational objectives but for which they do not require long-term capacity. The nature of the contracts is typically short term with a highly specific performance contract, and the performance capability is not confined to the science council community. Science councils therefore have to compete for this source of funding and are expected to adopt a "full-cost-recovery" approach when tendering.

The White Paper emphasises the need for policy instruments to give effect to the concept of innovation. The Innovation Fund offers a new lead in encouraging and enabling longer-term solutions to problems that are serious enough to impede socio-economic development or that affect our ability to compete in products and services.

The principle objectives of the Innovation Fund are to permit a reallocation of resources from the historical patterns of government science towards the key issues of competitiveness, quality of life, environmental sustainability and the harnessing of information technology, to increase the extent to which funds for the activities of government science, engineering and technology institutions are obtained via competitiveness processes, and to promote increased networking and cross-sectoral

collaboration within South Africa's national system of innovation.

An annual call is made for proposals to be submitted for support from the Fund. The proposals must involve projects that generate products/processes for commercialisation or new methodologies for development programmes orientated towards service delivery (DACTS, 2000-2001).

The Innovation Fund was first piloted in the area of Crime Prevention in 1997/98 after it was officially launched with a limited amount of R30-million in 1998/99 in support of the three focal areas of crime prevention, promotion of an information society and value-adding for products and processes. An amount of R10-million was used for the pilot programme. The end results of some of those projects were very useful. For example, in KwaZulu-Natal the police utilised entomology techniques to provide an accurate time of death of a badly decomposing corpse that was found in a sugar-cane field. The accurate time of the crime was vital to the police in solving the case.

In the second term the Innovation Fund has been increased to an amount of R75-million. The thrust areas for round two are the promotion of an information society, biotechnology; and advanced technology for materials and manufacturing(DACTS, 2000-2001).

The South African technology approach also ensured that, in addition to making funding resources available, the government also makes provision for institutional support, which will enhance democracy. Such enhancement should be through the involvement of these institutions that have been created by government, which are also intended to enhance South Africa's democratic aspirations.

Enhancing democracy through technological involvement

Technology diffusion programme: The South African Government expressed a strong commitment towards strengthening the capacity and capability of the small, medium and micro enterprises (SMME) sector to contribute to higher economic growth rates. Access to technology and an innovative mindset are crucial for small and medium

enterprises to become more competitive and to shape out niche areas. One of the concerns expressed in the White Paper was the poor capacity of small, medium and micro enterprises in technology assimilation. Efforts to promote a culture of research and development through other programmes such as the Innovation Fund will be bolstered if the market has the technically absorptive capacity for application of research results.

Technology stations programme (TSP): The government has established a TSP involving a shared-use cooperative arrangement with technikons, in terms of which the technikon's facilities are used for the diffusion of technology through demonstration and other stimulation techniques. For management of the programme, a Technology Advisor works with the technikon, with shared-use aspects as regards the equipment and arrangements for students to acquire hands-on experience in the selected SMME sector. The following technikons were selected in SMME sector specific areas: The Technikon Free State for metal works/value-adding; Mangosuthu/North West for chemicals, and Technikon Pretoria for electronics.

The German experience in technology transfer programmes was drawn on to refine the TSP concept and operational framework. It is anticipated that the German Economic Co-operative Development Programme will be making technical assistance available during the life of the pilot TSPs.

Innovation centre, technology demonstration centre & technology incubator: As part of its wider strategy of technology diffusion, government has secured support from the European Union (EU) for testing the feasibility, sustainability and replicability of SMME-targeted technology transfer models such as Innovation Centres, Technology Demonstration Centres and Incubators. The Innovation Centre will be established with the focus on optimising and commercialising newly developed technologies.

The Technology Demonstration Centre will be established in a particular manufacturing area. It will accommodate the dual purpose of training students in the practical applications of courses for which they are registered and providing SMMEs with levied access to equipment in cases where they intend moving into new markets and need to do market testing first.

The Technology Incubator will provide a protected environment for an industry-focused cluster of new technology-based start-up entrepreneurs and enterprises. Tenant enterprises will be nurtured for a definite period by way of easier access to technical assistance and training and support services such as assistance with market development. In addition, communal facilities will mean lower overheads, which in turn will improve cash flow in these enterprises.

CAD/CAM/CAE facility: An initiative in this area involves providing seeding support to a pilot computer-aided design/computer-aided manufacturing/computer-aided engineering (CAD/CAM/CAE) facility established by the “Make-it South Africa” initiative. This will enable the development of technical expertise, infrastructure and capacity for rapid prototyping. As a follow-up of the workshop, a market survey was conducted amongst a number of companies within the South African automotive industry in response to a question as to what the companies perceived in 1997. Companies in the automotive industry identified the CAD/CAM as their most urgent technology requirement.

The CAD/CAM/CAE facility will provide a range of services, aimed at addressing the needs of the South African manufacturing and design industry. In particular, through the establishment of a number of regional resource centres, the initiative will focus on assisting the industry to develop world-class computerised product design, engineering and manufacturing expertise. A “hub” operation is located at the CSIR Manufacturing Excellence Centre. Regional outreach centres are located at: Technikon Witwatersrand; Eastern Cape Technikon or Port Elizabeth Technikon; and Mangosuthu Technikon.

Establishment of a satellite laser ranging (SLR) system: The National Aeronautics and Space Administration (NASA) in the United States offered to provide an SLR system to South Africa, including initial training support and ongoing maintenance. South Africa will have to provide and fund the personnel to operate the SLR station (approximately R1-million per annum). It was decided to accept the offer of NASA and the SLR system will be established at the Hartebeesthoek Radio Astronomical Observatory National. An SLR is used, inter alia, for mapping changes in global ocean levels. Such data are vital in following the potential effects of global climatic

change and for long-term weather predictions (e.g. with regard to El Niño events).

Southern African large telescope (SALT): To fully exploit our advantage of being in the Southern hemisphere, the building of a new large telescope was commenced at Sutherland. Owing to substantial developments in the field of astronomy, South Africa's capacity, previously on the forefront, is lagging behind. The government committed R50-million over 5 years to the establishment of a 10-m class Hobby-Eberly telescope. A further R50-million will be raised internationally. Both South Africans and international researchers from the Northern Hemisphere will utilise the facility.

Pro-active approach to international S&T cooperation: With a view to effectively targeting specific countries or regions for possible S&T cooperation, a survey was initiated in 1998 to establish the potential for such cooperation. An understanding of the S&T strengths and weaknesses of these countries or regions will be of assistance in making strategic decisions on new areas of cooperation or redirecting areas of cooperation.

Automotive manufacturing initiative: In 1997 a workshop on the automotive engineering sector was held with South Africa and international partners, industry, institutions from research, technology transfer and automotive manufacturing companies from Germany.

Public understanding of science, engineering and technology (PUSET): The public understanding of science, engineering and technology (PUSET) is identified in the White Paper on Science and Technology as a fundamental requirement and a key thrust for establishing a successful National System of Innovation in South Africa. To kick-start the programme for public understanding of science, engineering and technology, the government declared 1998 the Year of Science and Technology. This involved running a major national awareness campaign involving all stakeholders in order to generate the nation's interest in science, engineering and technology.

The Year of Science and Technology: This project was an initiative of the Parliamentary Portfolio Committee on Science and Technology, Language, Arts and

Culture. The year was launched on 5 February 1998 and on this day the then Deputy President, Mr Thabo Mbeki, accepted patronage of the project. A focus week of activities in a particular month was dedicated to each of the nine provinces, during which close to 200 000 learners, teachers, families and individuals were reached. These activities were kick-started in the Western Cape and concluded in Gauteng. Various stakeholders, science councils, the Science Councils Communication Forum and embassies formed partnerships and assisted the Department of Science and Technology to realise the Vision of the Year, which was to create a special period during which much of the attention of the nation and the media focused on science and technology.

The Department of Arts, Culture, Science and Technology, in addition to provincial activities funded four major initiatives to celebrate the Year of Science and Technology. These ranged from television and radio programmes to the conference on Women in Science and Technology, the second national conference on Puset and the science journalism awards. Details of the above initiatives were captured in TV and radio programmes. A major publicity and promotional campaign was also undertaken through radio programmes on science and technology in partnership with the SABC. The main focus was on community radio stations, while others were also taken on board. The aim of these programmes was to reach the wider community, especially women, rural communities and people previously excluded from science, engineering and technology activities.

South Africa's involvement in technology saw her taking initiatives towards the Conference on Women in Science and Technology in September 1998. The purpose of the conference was to create an enabling environment for women in the science and technology fields, to contribute to the promotion and improvement in terms of access, communication, knowledge transfer, training and quality of life, and to raise awareness and public understanding of gender issues with regard to science, engineering and technology. Commissions on Agriculture, Business, Education, Energy, and Health also focused on issues of access, training, knowledge transfer and quality of life. The outcomes of the conference informed the Department to develop a policy framework on gender issues in science, engineering and technology programmes and opportunities that raise awareness and promote the role of women,

and to develop a framework and guidelines for implementation. The main recommendations arising from the Conference focused on policy, strategy and programme development.

The South African Science Journalism Awards 1998 were another area of involvement. These awards are in recognition of the pivotal role of the mass media in promoting public awareness, understanding and appreciation of science, engineering and technology, and are presented to those journalists who have made outstanding contributions to this field. Awards in seven categories were presented to journalists on 12 March 1999 for excellence in science, engineering and technology reporting during 1998. This initiative is in keeping with the vision of the Year of Science and Technology to engage the media in science and technology activities.

The *Foundation for Education, Science and Technology (FEST)* is an organisation created to render a vital service to scientific societies by publishing research results in sixteen widely distributed journals. It contributes in many ways to the goals of PUNSET. It does so by popularising science and technology, especially in disadvantaged communities, and providing enriching educational material in support of science education. FEST initiated a process of establishing a comprehensive national science centre at the existing Museum of Science and Technology, where enhancing courses are offered for science teachers in the classroom and laboratory practice.

Conclusion

It is evident that the South African technology approach departs from the premise that knowledge and development of capacity in science, engineering and technology are central to promoting social, environmental and economic well-being in a democratic political system. The vision, the role and contribution of science and technology in achieving South Africa's national democratic objectives remain priorities. (DACTS, 1996.) An analysis of the White Paper has highlighted sensible standards for government and society to consider when investing in technology to meet basic needs, develop human resources, build the economy and democratise the state and society. The broad technology policy approach as outlined, presents a clearly defined vision

for a democratic South Africa. Given the imperatives of the White Paper and in order to achieve any objective in the approach, it is imperative that South Africa should ensure that democratic values are prevalent and that citizens have access to technology with a view to the provision, availability and accessibility of basic services such as health, education, water, housing, etc. Through technology the availability and accessibility of these basic services will give South Africa a basic ground to consolidate its democracy.

CHAPTER EIGHT

CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter deliberates on the framework of technology in a democratic society. The study drew closely on relevant literature review with emphasis on and relevance to the South African democratic political system, as well as on the experience of other countries, with specific lessons to be learned.

In the final analysis, it is necessary to return to the initial research problem and research objectives as formulated. The aim of the study was to evaluate the plausibility, viability and feasibility of technology as an approach to enhance democracy. This aim underpinned three research objectives, namely (1) to review the technology policy as an approach to a democratic political system by contextualising it within the framework of other approaches to democratic politics of technology, (2) tracing the theoretical origins of the democratic itself, and (3) outlining it as a phenomenon in world politics. Secondly, it aimed to examine the claim that technology enhances democracy in a political system. Thirdly, it endeavoured to assess claims, by authors of technology and democracy texts, that there are causal relations between technology and democracy and between democracy and political stability, applying deductive logic to reach a conclusion about the correlation between technology and democracy. Fourthly, the study aimed to recommend ways in which technology should be employed to harness the political stability and direct it towards concretising democracy in South Africa. The latter objective is normative in nature inasmuch as it goes beyond an examination of what is likely to occur in the technological advancements in order to prescribe concrete steps that would enhance the probability of sustainable democracy.

The study adopted the working definition of technology as the systematic application of knowledge to resources to produce goods or services. (Stilwell, 1994).

Since the first democratic elections in 1994, South Africa has simultaneously been faced with a number of challenges and opportunities. South Africa undertook the transformation of a divided society and opened the economy to global competition. The rapidly unfolding global agenda has provided opportunities for direct foreign investment and technology transfer; it has at the same time introduced challenges coupled with open markets and trade barriers. Advanced microelectronics-based information and communication technologies (ICTs) are at the centre of current social and economic transformation in South Africa. The costs of the ICTs are continuing to fall. As their capabilities increase, they are being applied throughout all sectors of the economy and society. The increasing spread of ICT opens up new opportunities for South Africa to harness these technologies and services to serve their development goals. In addition to its current transformation, South Africa also has to face a transition from an industrial society to one that is knowledge-based.

During the industrial revolution, technological developments and industries emerged. The main elements of these technology developments included energy, chemicals, manufacturing and communications. The impact of these technologies in shaping the South African socio-economy is such that doubts have been articulated with regard to the notion of “digital divide”, that is the comparison between the “wired” and “non-wired” communities and the comparison between the poor who may not afford technology at all and the affluent communities. It is possible that an echelon of highly mobile knowledge workers who share a global work ethic and perhaps even “global” values will overlay large numbers of marginalised working class. However, technology does not stand still and many rural communities may be able to seize the opportunities that these technologies present and be able to “leapfrog” into the future.

As far as technology is concerned, any definitive claim whether it is utopian or a Luddite when it comes to democracy, can only succumb to technological determinism. Based on the evaluation of the relationship between technology and democracy, though, there is reason to believe that advances in technology provide favourable opportunities for democracy. There are two sides to this argument. Firstly, social movements and groups devoted to progressive issues and social change use technology to improve democracy. Technology does not only divide the haves

and the have-nots, but also is important to facilitate democratic transitions by creating a more open political culture. Furthermore, technology is increasingly in use to overcome the crisis in socio-economic development in South Africa, primarily as a result of a lack of infrastructure. Creating public spheres where citizens can deliberate on public issues and communicate with their political representatives and make inputs directly to parliament does this. The phenomenon of public spheres is replicated at a national level where the civil society engages in deliberation and acts to influence the outcome of national issues.

The other side of the argument is that new advances in technology can be distinguished from the media that preceded it as it is relatively cheap, easy to use, difficult to control and interactive. For example, the Internet user can be both a sender and receiver of information; the information era provides unprecedented opportunities for participatory media forms and democratic uses of IT. The threats posed by state and corporate control and use of IT are duly noted as challenges to democracy in the information era. However, there have been substantial societal movements to expose and counter this. The Internet also provides unique ways to inform and mobilise civil society, which should be of some consolation for political economists concerned about the expansion of global capitalism in the information era. Another challenge to democracy in the information era is the extent to which the digital divide in and between countries can be closed. This is one of the key concerns for striking a balance between state, market and societal control of IT, where the state and society emphasise equality of access, while the market emphasises efficient development of technology and production.

The way in which IT impacts on democracy has a direct and important bearing on the research problem of the study, inasmuch as the second postulate of the propositional logical deductive model states that the information revolution is likely to enhance democracy. Establishing the probability that IT will provide favourable opportunities for democratisation, the quality of democracy and the globalisation of democracy, is thus an essential step in inferring that the democratic peace is more likely to exist in the information era. But, the research problem also probes a normative objective, namely to propose ways in which IT should be employed to enhance world peace. In this respect the challenges for democracy in the information era as identified here, should be key concerns if the democratic peace is to be a plausible, viable and feasible approach to world peace in the information era.

Technology is ubiquitous within South Africa's democratic political system. It has both benefits and disadvantages, and this poses a difficult choice for society and government in policy approach. The social dichotomy of this nature raises the need for further inquiry as to the reasoning and application to technology as the systematic application of knowledge to resources in addressing democratic imperatives.

The review of the literature demonstrated that technology could influence a democratic political system. It is evident that technology can shape challenges in the political, social, military and economic environment of the political system. The review of the literature further made it clear that technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

It addressed the important question of whether technologies are substantively democratic, and whether technology policy decisions are compatible with perpetuating a democratic political system. The review investigated and appraised democratic theories and analysed approaches and challenges of technology in democratic politics, which could be applied in South Africa. Specifically the focus examined the character and crisis in technology and considered what theoretical and practical resources were available for democratisation in South Africa.

In essence, if democracy is impacted by technology by way of a systematic application of knowledge to resources to produce goods and services, it will enhance stability and equality. Therefore, it can shape challenges in the environment of a democratic political system by maintaining stability and order. It will also deliver material prosperity, and foster democratic rule.

It is evident that the South African technology approach departs from the premise that knowledge and development of capacity in technology are central to promoting social, environmental and economic well-being in a democratic political system. The vision, the role and contribution of science and technology in achieving SA's national democratic objectives remain priorities. (DACTS, 1996). The White Paper highlighted some practical values for government and society to consider when they invest in technology to meet basic needs, develop human resources, build the economy and democratise the state and society. The broad technology policy

approach, as outlined, presents a new vision for the twenty-first century. Given the imperatives of the White Paper and in order to achieve any objective in the approach, it is imperative that South Africa should ensure that democratic values are prevalent and that citizens have access to technology with a view to the provision, availability and accessibility of basic services such as health, education, water, and housing. Through technology the availability and accessibility of these basic services will give South Africa a basic ground to consolidate its democracy, as it is a process preconditioned by stability and equality. It is a process that will improve the stability of democracy through the creation of capabilities by the systematic application of knowledge to resources in order to produce goods and services.

The arguments presented in the preceding sections suggest that a number of issues require extensive research conducted on national security and information technology. The main purpose of further study and debate would be to provide policy makers with analytical perspectives and empirical data that create a better match between technological potential and preferred futures. It is assumed that these futures should be both sustainable and democratic.

The first area could be concerned with the design of democratic and pro-active policies and programmes that make it possible to realise the socio-economic development potential of information technologies. This mainly entails studying the roles that public and private sectors should play in the design and execution of these policies and programmes; the forms of public intervention that are conducive to shaping technological change in accordance with desirable social goals, and the establishment of new and more democratic relations between producers and consumers of ICTs, so that technological progress becomes much more responsive to social needs.

A second area of concern is centred around the definition of those social and institutional changes that are required to maximise the social benefits and to minimise the social risks associated with the adoption and deployment of information technologies. This entails considering various ways of adjusting the organisational structures that are relevant for economic productivity, political participation and cultural diversity in line with preferred social scenarios; and the cultural

appropriateness of educational methods and training materials required for the realisation of the technological potential. Again, it is important to discuss the design and adoption of information technologies that strengthen sustainable national security. This involves creating information technologies that reduce the threat and vulnerabilities and encourage environmentally sustainable applications of IT.

The future of information technology and national security is compounded by uncertainty - no one knows how the technological advancement will continue to unfold. The goal for the future will be to somehow bridge the theoretical possibilities with technological capability. Research focused on the goal of ubiquitous information technology will be concerned with a number of important technological obstacles, such as how society could enjoy the benefits of information technology without nation states being too worried about its impact on national security, and society that is ready for a pervasive system that surrounds its communities and monitors their day-to-day activities as there is a worry that ubiquitous networks will present new and emerging challenges to personal privacy, which may destabilise security.

It has been suggested by some scientists like Bill Joy (2000) that the most powerful 21st century technologies could threaten to make humans an endangered species. He predicts that as technology advances, humans will increasingly delegate responsibility to intelligent machines able to make their own decisions and, referring to the writings of Theodore Kaczynski, known as the Unibomber, he wonders whether these same machines might not reduce humans to "the status of domestic animals". (Joy, 2000).

Information technology is shaping the strategic environment in which a conflict may take place, where it would be driven by mostly the political, economic, social and ethical dimensions of the information technology. The fact that IT has contributed increasingly to the interconnectedness of people and states around the world is an indication that there should be leadership in government policy that encourages and supports equity, development initiatives and sufficient funding to finance such initiatives. The major problem, especially in deep rural areas without basic electrical and telecommunications infrastructure programmes and universal service initiatives by government, is that information and communication technology companies will have little incentive to develop new products to meet the needs of people who cannot

use or afford their existing services. And government policies will become useless without ground-level programmes to take advantage of them.

Finally, technology could in future greatly benefit society if its advancement is harmonious with national democratic imperatives and if it is intended to serve the needs of the people.

The Impact of Technology on a
Democratic Political System in South Africa

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**UNIVERSITY OF PRETORIA
ABSTRACT**

**THE IMPACT OF TECHNOLOGY ON A DEMOCRATIC POLITICAL
SYSTEM IN SOUTH AFRICA**

by EP Mokgobu

The democratisation process in South Africa has subjected the country to the global effects of the challenges that culminated in a nation that is facing the demands for socioeconomic needs coupled with technological advancement. Advances in technology in the global arena present both opportunities and threats to the South African democracy and its concomitant socioeconomic imperatives.

The democratisation process in South Africa is consequential to the inextricably bound relationship between technology, modernisation and democracy. This triad pattern precipitates the South African democratic political system.

Advances in technology are also imperative for human and national security, but the intensity of pervasiveness may have serious ramifications for the appraisal for political stability in a democratic South Africa.

Technology is one of the major sources underpinning and strengthening democracy in a political system. However, technology also affects the daily life of the ordinary citizen, depending on the manner in which decisions are made to implement a technology policy. The South African government through its technology approach has an action plan for growth, which aims to set the economy on a more competitive footing. The action plan engages major technological projects to benefit the broader society but overlooks a major factor in the "democratic theory of technology", namely the imperative that communities be consulted about technology decisions. These efforts are concerned exclusively with democratic procedures in making policy decisions about technologies.

The South African government in 1996 reformed its technology policy approach so as to ensure that democratic values are prevalent and that citizens have access to technology. This policy approach raises concern about improving the democratic and the socioeconomic wellbeing of society, while inversely there is the uncertainty whether advances in technology can support and enhance the intended policy approach in the democratisation process in South Africa.

This problem of whether technologies are substantively democratic, that is whether technology policy decisions are compatible with perpetuating a democratic political system, resulted in the need to investigate and appraise democratic theories and further critically analyse approaches and challenges in democratic politics of technology within the South African democratic political system.

The study looks at the role and magnitude of technology in a democratic South Africa. It presents and argues the hypothesis that “*greater advance in technology tends to enhance the democratisation process in a political system*”. Much of the argument is devoted to providing evidence that technology influences both human and national security and as such demonstrates how technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

Technology is ubiquitous within South Africa’s democratic political system and it may be considered a boon or bane. It encompasses both benefits and disadvantages such that it poses complex options for a democratic political system in both its approach and implementation within a policy framework. The social dichotomy of this policy framework raises the need for further inquiry as to the reasoning and application of technology in addressing socioeconomic imperatives for concretising democracy, thus creating “a better life for all”. The democratic imperatives within the policy framework dictate an analysis to the ventured hypothesis that “advances in technology will enhance democracy in a political system”, and it is in this regard that

South Africa is used as an archetype to disembark at a logical deduction to validate this hypothesis in the study.

**UNIVERSITEIT VAN PRETORIA
OPSOMMING**

**THE IMPACT OF TECHNOLOGY ON A DEMOCRATIC POLITICAL
SYSTEM IN SOUTH AFRICA**

by EP Mokgobu

Die proses van demokratisering in Suid-Afrika het die land onderwerp aan die wêreldwye uitwerking van die uitdagings wat uitloop het op 'n nasie wat voor die eise van sosioekonomiese behoeftes en gepaardgaande tegnologiese vordering staan. Vordering op die gebied van die tegnologie in die wêreldarena hou sowel geleenthede as bedreigings in vir Suid-Afrika se demokrasie en sy bygaande sosioekonomiese imperatiewe.

Die demokratiseringsproses in Suid-Afrika vloei voort uit die noue verband tussen tegnologie, modernisering en demokrasie. Hierdie drietal presipiteer die Suid-Afrikaanse demokratiese politieke stelsel.

Vordering op die gebied van tegnologie is ook noodsaaklik vir menslike en nasionale sekerhied, maar die intensiteit van die verspreiding daarvan kan ernstige vertakkinge meebring vir die beoordeling vir politieke stabiliteit in 'n demokratiese Suid-Afrika.

Tegnologie is een van die hoofbronne wat demokrasie in 'n politieke stelsel steun en versterk. Tegnologie raak egter ook die daaglikse lewe van die gewone burger, afhangende van die wyse waarop besluite geneem word vir die implementering van 'n tegnologiebeleid. Met sy benadering tot tegnologie het die Suid-Afrikaanse regering 'n plan van aksie vir groei, wat daarop gemik is om die ekonomie meer mededingend te maak. Die plan van aksie span groot tegnologiese projekte in om tot voordeel van die breër gemeenskap te strek maar misken 'n groot faktor in die "demokratiese teorie van tegnologie", naamlik die noodsaaklikheid dat gemeenskappe oor tegnologiebesluite geraadpleeg moet word. Hierdie pogings is uitsluitlik gemoeid met demokratiese prosedures om beleidsbesluite oor tegnologieë te maak.

In 1996 het die Suid-Afrikaanse regering sy tegnologiebeleidsbenadering hersien ten einde te verseker dat demokratiese waardes oorheersend is en burgers toegang tot tegnologie het. Hierdie beleidsbenadering wek egter kommer oor die verbetering van die demokratiese en sosioekonomiese welvaart van die gemeenskap, terwyl aan die ander kant onsekerheid bestaan of, in die demokratiseringsproses in Suid-Afrika, vordering op die gebied van tegnologie die beoogde beleidsbenadering kan ondersteun en verbeter.

Hierdie probleem, naamlik of tegnologieë substansieel demokraties is, dit wil sê of besluite oor tegnologiebeleid versoenbaar is met die voortbestaan van 'n demokratiese politieke stelsel, het gelei tot die behoefte om demokratiese teorieë te ondersoek en te takseer, en verder om benaderings en uitdagings in die demokratiese politiek van tegnologie in die Suid-Afrikaanse demokratiese politieke stelsel krities te analiseer.

Die studie bekyk die rol en omvang van tegnologie in 'n demokratiese Suid-Afrika. Die hipotese dat "*groter vordering in tegnologie daartoe neig om die demokratiseringsproses in 'n politieke stelsel te verbeter*" word in die studie voorgestel en geargumenteer. Die argument bestaan grotendeels daaruit om bewys te lewer dat tegnologie die menslike sowel as die nasionale sekerheid beïnvloed, en sodoende word getoon hoe tegnologie as 'n sistematiese aanwending van kennis op hulpbronne as 'n goeie instrument kan dien om demokrasie in Suid-Afrika te handhaaf.

Tegnologie is alomteenwoordig in die Suid-Afrikaanse demokratiese politieke stelsel, en dit kan as seën of vloek beskou word. Dit behels voordele sowel as nadele in soverre dit komplekse keuses vir 'n demokratiese politieke stelsel stel, beide in die benadering en in die implementering daarvan binne 'n beleidsraamwerk. Die sosiale tweeledigheid van hierdie beleidsraamwerk gee aanleiding tot die behoefte om verder ondersoek in te stel na die redenasie en aanwending van tegnologie in die hantering van sosioekonomiese noodsaaklikhede ten einde demokrasie te konkretiseer, om sodoende "'n beter lewe vir almal" te bewerstellig. Die demokratiese imperatiewe binne die beleidsraamwerk dikteer 'n ontleding van die gewaagde hipotese dat "groter vordering in tegnologie demokrasie in 'n politieke stelsel sal verbeter", en dit is in

hierdie opsig dat Suid-Afrika as 'n argetipe gebruik word om by 'n logiese afleiding te kom om hierdie hipotese in die studie te staaf.

EXECUTIVE SUMMARY

The impact of technology on democracy has presented a plethora of literature dissonance and has equally stimulated challenges in the global political arena. It is commonly noted that technology has precipitated itself and is continuously effecting the modernisation process in South Africa; and as such any patterns of modernity in the political system warrant an analysis of concern.

South Africa has moved from a shun-orientated status quo towards a nation that is growing economically, scientifically and technologically after democratisation, and subsequent competition in the international arena presents great opportunities but also threats to societal needs. South Africa is confronted by critical needs that are intimately connected with advances in technology.

The advent of a democracy in South Africa has also seen initiatives taken by government to review and reform the country's technology approach. In 1996 the government published the Science and Technology Policy, which envisages a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture. This future should ensure that democratic values are prevalent and that citizens have access to technology as regards the provision, availability and accessibility of basic services, which in turn will give the government a basic ground to strengthen democracy.

Democracy is preconditioned by stability and equality, which improves capabilities that advance technology as a systematic application of knowledge to resources in order to produce goods and services.

The government's concern about improving the democratic and the socio-economic wellbeing of society, inversely questions the certainty of whether technology can support and enhance democracy.

Global debates on the notion of technology as an aspect capable of enhancing democracy and its impact on socio-economic development are also imperative for national security in a political system. Preponderant challenges are to comprehend

how technology is being perceived in the unevenly distributed socio-economic resources in South Africa. The intensity of its pervasiveness in relation to time and space, and the opportunities and threats are also presented to determine how technology, particularly information and communication technologies (ICT), can pose theoretical and conceptual change that has serious ramifications for the assessment of human and national security in a democratic South Africa.

Technology is regarded as one of the major sources underpinning and strengthening democracy in a political system. However, technology also affects the daily life of the ordinary citizen, depending on the manner in which decisions are made to implement a technology policy. The South African government unveiled its new action plan for growth, which aims to set the economy on a more competitive footing. The action plan engages major technological projects to benefit the broader society but overlooks a major factor in the "democratic theory of technology", namely the imperative that communities be consulted about technology decisions. These efforts are concerned exclusively with democratic procedures in making policy decisions about technologies.

This study addresses the problem of whether technologies are substantively democratic, that is whether technology policy decisions are compatible with perpetuating a democratic political system. The study will investigate and appraise democratic theories and further critically analyse approaches and challenges in democratic politics of technology in South Africa. The study examines the character of and crisis in technology, and considers what theoretical and practical resources are available within the South African democratic political system.

Furthermore the study intends providing evidence that technology influences both human and national security, which forms part of the conditions for a democratic political system.

The literature review is conducted and assessed to reflect aspects pertinent to technology, and which relate to issues that are considered most important for democratisation in SA. The data reviewed assisted in developing practical solutions for the application of technology in enhancing democracy in South Africa.

The study further presents and argues the hypothesis that “*greater advance in technology tends to enhance stability in a democratic political system*”. Much of the argument is devoted to demonstrating that the systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa. It also provides a useful critical review of how technology can assist in shaping challenges of human security in the political, social, military and economic environment of a democratic political system.

As this study is intended to look into the role and magnitude of technology in a democratic South Africa, it may not necessarily apply universally.

ABBREVIATIONS

ANC	African National Congress
COSATU	Congress of South African Trade Unions
CSIR	Council for Scientific and Industrial Research
DACST	Department of Arts, Culture, Science and Technology
DoC	Department of Communications
DSTV	Digital Satellite TV
DTI	Department of Trade and Industry
ESKOM	Electricity Supply Commission (South Africa)
GDP	Gross Domestic Product
GEAR	Growth, Equity and Redistribution
GIS	Geographical Information Systems
GNP	Gross National Product
HDI	Human Development Index
HSRC	Human Sciences Research Council
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
IDRC	International Development Research Centre
ILO	International Labour Organisation
IMF	International Monetary Fund
IPR	Intellectual Property Rights
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunication Union
JSE	Johannesburg Stock Exchange
NGO	Non-Governmental Organisation
NITF	National IT Forum
NRF	National Research Foundation
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
RDP	Reconstruction and Development Programme
RSA	Republic of South Africa
SA	South Africa
SABC	South African Broadcasting Corporation
SADC	Southern African Development Community
SANDF	South African National Defence Force
SATRA	South African Telecommunications Regulatory Authority
SBDC	Small Business Development Corporation
SITA	State IT Agency
SMMEs	Small, medium and micro-enterprises
UNCSTD	United Nations Commission on Science and Technology for Development
USAID	United States Agency for International Development
UNDP	United Nations Development Programme
Unesco	United Nations Educational, Scientific and Cultural Organisation
WTO	World Trade Organisation
Y2K	Year 2000

CHAPTER ONE

INTRODUCTION AND PROBLEM STATEMENT

Introduction

South African politics have in the last quarter of the twentieth century presented a baffling array of complex transitional political dynamics. These multifaceted political issues include, among other things, the role of technology, which is seen as a benefit factor that is presented against the risk and dangers of those who uphold and cherish advances in technology. This confrontation poses very difficult choices for society and government when it comes to making policy decisions, particularly decisions that are technology related. Some of the most challenging issues result because of the ability of technological advancements and deployment to outpace the capacity of the institutions to determine the extent of the impact that technology has on democratic society. In many cases the rate of technological advance has far outstripped the capabilities to assess and evaluate implications and those of institutional monitoring and control.

Technology is regarded as the sum total of human tools and methods, devised by human beings to control the environment for societal net benefit. It is regarded as a systematic application of knowledge to resources in order to produce goods and services (Stilwell: 1994), because it is fundamentally instrumental and is itself morally neutral, usable for both good and ill. There are, of course, dangers of abuse and misuse of technology and the tendency to technologically divide society, but these appear to be problems not of technology but sometimes of policy implementations and of its human users, which needs to be addressed appropriately in general. And, besides abuse, misuse and policy implementation, there is a genuine problem of technology itself: the unintended and undesired consequences attending its proper use. There is temptation to question whether the problems of technology can be dealt with, on the one hand, by technology assessment and careful regulation - to handle side

effects and misuse, and, on the other hand, by goodwill, compassion, and the love of humanity – to prevent abuse. This combination will enable us to solve the problems technology creates, without sacrificing its delightful fruits. (Kass, 1993.)

The development, advances and use of technologies are a driving force in socio-economic prosperity and national security. Maintaining the strength and competitiveness of technological enterprise is vital.

In the current climate of intensifying global competition, technological advancement, and political uncertainties, there is a need for identifying critical technological approaches as the concentration of effort becomes even greater. (National Critical Technologies Report, 1995.)

South Africa undertook transformation to assume the strength and competitiveness of technology approach to intensify global competition and further address political imperatives for a democratic society. The 1994 elections ushered in a new democracy in South Africa, with the ANC-led government winning the elections on the basis of a vision of "A Better Life for All". This vision was highly structured in the Reconstruction and Development Programme (RDP). This programme served as the guideline for the technology policy, which in 1996 was published as a White Paper on Science and Technology. The policy is built upon the twin concepts of innovation and national system of innovation. This developmental approach and application of technology contained in the policy are central to the growth and development strategy of the government as it seeks to address the needs of a vision of a better life for all.

To achieve this vision there is a need to make provision for basic needs such as housing, education, safety, security, job creation, environment, and international trade, and to remain globally competitive, thus ensuring that a favourable socio-economic climate exists that can attract investments in technology.

The level of investment in technologies also has an influence on its advancement, which can extend or hinder democracy's reach. For example, technology can make it easier for people to track legislation, express preferences, ensure accountability by officeholders, and rally support for a specific political cause of action. Technology holds out the promise of giving the masses a stake in the political process and drawing the disenchanted back from political cynicism. But for that to happen, technology will

have to be appealing and accessible. And policy-makers will have to make democratic participation as important a goal of technology policy as consumer convenience and economic growth. (Benton Foundation, 2000.)

Challenges abound for a democratic political system in ensuring that democracy functions properly and citizens have access to technology and information about it. Other information, e.g. on rights and obligations concerning health and education, are also important. The government must guarantee that the information is available and accessible. On the other hand, information technology gives the authorities a very powerful tool to strengthen the rule of law. New technology can and will affect democratic societies. Information technology does not, however, change the fundamental principles of law and ethics. (Magnusson, Orlrich, Gudmundsson and Sigurdardttira: <http://www.statskontoret.se/gol-democracy/iceland.htm>.)

People have benefited enormously from invention, discovery and technical advances, ranging from electricity to vaccines, from advances in food production to information technology designed to advance democracy. Considering the beneficial effects of technology on the nation's quality of life and general prosperity, government has a vested interest in maintaining a strong infrastructure for innovation and research, a responsibility it shares with other stakeholders such as business and labour and the education, industry and non-governmental sectors. Traditionally governments have focused on ensuring that the basic needs of citizens are met, involving for example housing, education, product standards, safety, security, infrastructure, environment and international trade, and on ensuring that a favourable climate exists to attract investments in technology and innovation. Economic growth, job creation and sustaining the quality of life and the environment require continued public and private investments in technology. The high level of technological change in the global village demands short-term policies of government to reflect the changing nature, skill requirements and location of jobs, in response to the introduction of new technologies. Longer-term organisational and institutional changes are also required for the society to experience the full benefit of such technologies. Such policies and actions need to take into account the impact of the digital divide in a society and the resistance to fear of technology, which is mostly due to the absence of a proper national technology culture.

There are claims that the South African society is divided by severe forms of inequality that coincide with racial differences and also by the notion of the digital divide, that is the technology and information gap between rich and poor, and between rural and urban communities. Van Dijk (in Hacker and Van Dijk 2000) questions whether the ideals of digital democracy transcend the purported inequality of information access attending socio-economic gaps. It would be unrealistic to expect that democracy by itself will lead to harmony in inter-group relations amidst inappropriate technological advancements. Democratisation under such conditions may even exacerbate the adversarial problems of societal integrations. Since knowledge is regarded as power, some groups in society may start thinking that by virtue of their having access to information through the use of technology they are more advantaged than another group who may not be privileged to have access to information technology. The compilation of firmly entrenched inequalities, which undermine the rational basis for democracy, gives rise to the antithesis of a full or complete democratisation. It is anticipated that if all political spheres, particular those characterised by the degree of inequality, are simultaneously and evenly subjected to a process of democratisation, society will gradually be transformed. Most theories of modernisation also assume that differentials will narrow, culminating in the democratic state characterised by harmony and political cohesion.

Problem statement

The problem the study investigates is the impact of technology on a democratic political system. Specifically the study seeks to determine:

- 1) The extent to which the government's technology policy has since its inception influenced the South African democracy. That is, has the policy succeeded in achieving the broad priority areas it covers regarding the promotion of competitiveness and creating employment, political participation, political stability and predictability?
- 2) To what extent, if any, has technology succeeded in enhancing the quality of life; developing human resources, and working towards environmental sustainability in South Africa?

- 3) What is South Africa's level of success in bridging the digital divide and the level of success in promoting a viable information society?

The significance of the study

The study is particularly significant for four reasons. Firstly, the study provides empirical evidence concerning the extent to which the 1996 South African Science and Technology Policy anticipates a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture. Secondly, the study demonstrates the support for theories constructed along the modernisation process. Demonstrating support for such theories assists in the realisation that the world is changing so fast that democracy is endangered unless citizens are continuously involved in policy-making, and possible technology strategy intervention will be suggested. Thirdly, the study adds valuable data to the literature on the democratic politics of technology. In addition, the literature review allows comparisons to be made with earlier studies conducted on the democratisation process in South Africa. Lastly, the study tests the assumption that advances in technology enhance political stability in a democratic political system.

Purpose and objectives

The purpose of the study is to examine the South African technology policy, as well as the relationship between technology and democracy. The objectives are as follows:

- To analyse the proposition that technology influences stability and is regarded as one of the conditions for democracy in a political system.
- To investigate the proposition that a systematic application of knowledge to resources can provide a good tool for enhancing democracy in South Africa.
- To enquire whether technology can shape challenges to the political, social, military and economic environment of the political system.
- To test and analyse whether a thorough process of consultation can culminate in a well-functioning technology policy.

Rationale of the study

Since April 1974 the number of democracies in the world has multiplied dramatically. The number increased moderately in the late 1970s and early 1980s as several states experienced transitions from authoritarian, mostly military, rule to democratic rule. By the end of 1995 the pace of global democratic expansion accelerated markedly.

In seminal formulation, Samuel Huntington termed this post-1974 period the "third wave" of global democratic expansion and its central importance is shown in the regional and international democratisation effects. Huntington defines a "wave of democratisation" simply as "a group of democratic transitions that occur within a specific period of time and that significantly outnumber transitions in the opposite direction during that period". (Diamond, 1999) The trend that began in Southern Europe in the mid-1970s spread to the military regimes of South America in the late 1970s and early 1980s and reached East, Southeast, and South Asia by the mid to late 1980s. The end of the 1980s saw a surge of transitions from communist authoritarian rule in Eastern Europe and the former Soviet Union and a trend towards democracy in Central America as well. The democratic trend spread to Africa in 1990, beginning in February of that year with the sovereign National Conference in Benin, the release of Nelson Mandela and the unbanning of the African National Congress. By 1998 there were more democratic political systems on the African continent.

In South Africa, the 1994 elections presented a new democracy, delivering not only a universal right to vote but also formal equality before the law, avenues for citizen's participation in governance, and statutory institutions bolstering democracy. The second democratic elections in 1999 took place amidst large-scale societal transformation and reform and presented opportunities to investigate the impact of technology on democracy in South Africa.

Democracy in South Africa has seen initiatives taken by government to review and reform its policies, including its technology approach. The 1996 government technology policy envisages a brighter future for all citizens. The policy has since its inception had some impact on the South African democracy, presenting various challenges in terms of the promotion of competitiveness and job creation and the

extent of success in enhancing the quality of life, human resources development, environmental sustainability, and narrowing of the digital divide. Any attempt to address these questions warrants an analysis of the impact of the technology policy on the South African democratic political system.

Within the ambit of the South African democratic political system, the technology approach justifies a policy analysis, which should be placed in the context of the rationalisation of the state and politics as a policy-making activity. The notion that the world is full of puzzles and problems, which could be solved rationally through the application of human reason and knowledge, forms the backbone of this study. Thus the approach in policy analysis in terms of the desire for knowledgeable governance, that is the acquisition of facts and knowledge about problems, is to formulate better solutions.

This technology approach is supported by Lasswell when he suggests that policy science settled on two main approaches which could be defined in terms of knowledge in the policy process and knowledge of the policy process. (Lasswell (1970) Policy analysis is concerned with knowledge of the policy process while the analysis of the policy is concerned with knowledge about the formulation and implementation of public policy.

David Easton (1953, 1959) established a policy approach that provided a model of the political “system” which influenced the way in which the study of policy (outputs) began to conceptualise the relationship between policy-making, policy outputs and its wider environment. His model views the policy process in terms of received inputs – in the form of flows from the environment, mediated through input channels (parties, media, interest groups) – and demands within the political system (with inputs), and the conversion of such inputs and demands into policy outputs and outcomes. (Parsons,1995)

Policy consists of "outputs" of the political process. It reflects the impact of government policy decisions on society, that is, its ability to make things better or to make things worse. A distinctive area of study in policy analysis was developed purposely to examine how the policy was initiated, formulated and implemented, and how the policy process could be improved. Policy analysis is not only concerned with

issues of efficiency and effectiveness, i.e. with the "how" of the policy-making. It also addresses the "what" of policy-making: the nature of government "outputs" and their "outcomes" for the larger society. At the heart of policy analysis is the normative question such as "what is government for" and what is the nature of the "good society". Any attempt to evaluate the performance of government or the political system must therefore consider some deepest political and ideological division in the discipline itself. (Heywood, 1997)

Policy analysis is set to be concerned with improving the methods by which problems are identified and defined, goals are specified, alternatives evaluated, options selected and performance measured. It thus focuses on what Bobrow and Dryzek (1987) term "knowledge based interventions in public policy making".

In analysing the impact of technology, as a systematic application of knowledge to resources, on democracy, the study does not only ask the question how plausible, feasible and viable is technology, but goes beyond this to translate technology in a way that will incorporate the complex realities of democracy. This poses a challenge to expand the theoretical boundaries within which the democracy has traditionally been shaped, a challenge that is intensified by the thematic nexus of technology, democracy and policy studies as a subfield of political science.

The technology policy culminates with the evaluation and review of policy, leading, in theory at least, to decisions being made about the maintenance, succession or termination of some policy aspects. This will complete the policy cycle in the sense that information acquired through evaluation can be fed back into the initiation and formulation stages. This process may show up new policy proposals and help to refine and improve existing policy. For the purpose of addressing substantive issues related to the appropriateness or effectiveness of technology approach in South Africa, evaluation might shed light on procedural issues, such as how the formulation stage is organised, who is consulted and when, and how implementation is controlled.

The South African government is concerned about improving the wellbeing of society. Such concerns inversely question the certainty of whether technology can support democratisation. In view of these concerns and technology-related problems, the scope for assessment, monitoring and evaluation of technology impact has grown

enormously in response to the demand for democratisation and the increasing complexities and challenges of providing goods and services to meet the basic need.

Democracy is predicated by political stability and equality in the distribution of socio-economic needs. Advance towards stability and equality will improve the inputs (demand and supports) where the creation of (technology) capabilities by the systematic application of knowledge to resources produces equitable distribution of goods and services within a democratic political system.

If severe forms of political instability and inequality divide South African society, it would be unrealistic to expect that advancements in technology will by themselves sustain democracy. Democracy under such conditions may even exacerbate the adversarial problems of technology in society. The collection of firmly entrenched instability and inequalities, which undermine the rational basis for democracy, gives rise to the premise of an undemocratic political system. It is probable that if all spheres of the environment in a political system, and in particular those characterised by advances in technology, are simultaneously and evenly subjected to demand and support, the outputs will have an impact on a democracy. Differentials will narrow, culminating in the egalitarian state characterised by prosperity and democratic rule.

The question on the social and economic preconditions for a democratic South African society also refers to conditions for stability. Lou (1983) has indicated that “equality means stability; inequality, movement”. The implication is that an advance towards social economic equality will improve the stability of democracy. The improvement would be the outcome of a process of development. It could also result from a radical redistribution of income, wealth and economic opportunities.

(Haasbroek, 1994)

The study presents a policy analysis of technology by evaluating its impact on South Africa as a democratic political system. It will argue that the South African technology policy as an aspect of politics is directly related to the character of democracy and therefore its performance can only be evaluated in the light of its impact according to what actually happens for good or ill. The study will begin with some contextual conditions that strongly argue for increased attention to the linkage

between technology and democracy. It then briefly explores the meaning, characteristics, and necessary condition of democracy, and next posits some hypothetical linkages between democracy and technology content or design. Most of the work will develop these pathways or linkages as a subject matter for political science.

As a subject matter for political scientists, the role of technology has evoked renewed interest in the wellbeing and vitality of the democratic political system. It is generally agreed that a political system benefits from having a stable democratic rule. Whether or not the South African technology policy has abated or changed the wellbeing of society, there is an apprehension as to whether technology policies can stimulate, diminish, or change the nature of democracy. It concerns the need for strategies in order to bridge the technology divide, requirements for technological advancement, unsatisfactory technological enterprise, and lack of clear channels through which technology can promote social and economic progress in a democratic political system. And lastly, the problems of technology concern not only problems of ends and means but rather the control of unintended consequences, as well as the basic moral and political question.

These issues mar South African democracy, despite several years of seemingly aggressive governmental policies to alleviate them. Rather than disappearing as issues, such technological problems permeate the debates on such diverse subjects as defence, health and welfare, and social and economic aspects. The persistence of these technological problems represents not only a policy failure, but also a misrepresentation of democratic rule. Governance structures have altered dramatically with information and communication technologies. Programmes in which the government plays a critical role have replaced governmental agencies in areas as widely divergent as telecommunications, postal services, broadcasting, health services and provision of water and environmental aspects. Political science principles of governmental accountability through elected leaders may operate poorly where lines of democratic control and accountability are different and less direct. The accumulation of both theory and empirical research linking public policy and institutions with democracy provides a particularly favourable context for further work in this policy area.

The relationship of technology to democracy in the South African democratic political system is an unfinished and open-ended political phenomenon. As John Dryzek (1996) has argued, democratic governance is largely striving to expand the franchise, scope, and authenticity of democracy. Franchise refers to the number of active participants in any political setting, scope concerns the domains of life under public control, and authenticity is the degree to which democratic control is substantive, informed, and competently engaged. None of these ought to take place at the expense of the other. Expanded franchise, for example, must not lead to superficial deliberation that impairs authenticity. Of course, there are many forces apart from policy that affect democratic rule, such as interest groups, political parties, leadership, and the press. However, since the important work of Lowi (1964) and Wilson (1979), which connected the content of policy with patterns of politics, substantial literature has developed that traces the consequences of public policies, including technology, to politics and to democracy.

There are pathways through which technology policy content may influence the character of democracy. There are critical conditions for democracy: there needs to be open field for public discourse in which all relevant points of view regarding technology are expressed; citizens ought to view their role as citizens as important, as involving obligations as well as rights, and they need to be convinced that government has the interest and capacity to solve technology problems; society needs to be supportive of technology policies and be positively involved in formulating shared goals; and there must be means to hold government accountable for its actions. These important conditions for democracy are directly related to consequences flowing from policy designs, namely: the framing of issues; how targets are constructed; the structure of implementation and delivery systems; and transparency of governmental actions and citizens' access to information. These issues reflect how policy affects the framing of problems and their discourse.

Definition of terms

- Science – improvement of natural knowledge. It is both a method by which knowledge is gained and the knowledge that results from that process: the constellation of facts, theories, and methods collected in current text (Kuhn, 1970).
- Technology – the systematic application of knowledge to resources to produce goods and services (Stilwell, 1994), or putting knowledge into practice, to alter and control the material conditions of life, or to “create a reality according to design” (Grove, 1980).
- Technology management – the management process by which organisations identify access and use available international technology to achieve ongoing competitive advantage, profit growth and shareholder value through optimum customer and community benefits.
- Technology strategy – is concerned with exploiting, developing and maintaining the sum total of the organisation’s knowledge and competencies.
- Political system - a network of relationships through which government generates "outputs" (policies) in response to "inputs" (demand and support) from the general public.
- Democratisation - the advance of liberal-democratic reform, implying, in particular, the granting of basic freedoms and the widening of popular participation and electoral choice.
- Functionalism – approaches to the state focus on the role or purpose of the state institution. Its central function being invariably seen as the maintenance of social order and the delivery of social stability.
- Modernisation - refers to the contrast and transition between a ‘traditional’ society organized by hierarchical division by class or caste and the type of ‘modern’ society that is based on trade and industry, organized by function, such that the major functions are performed by modular social systems that include the political system, the public service, the armed forces, the legal system, the economy, religion, education, the health service, the mass media, etc
- Public policy – an action which employs governmental authority to commit resources in support of a preferred value.

- Policy analysis – concerned with improving the methods by which problems are identified and defined, goals are specified, alternatives evaluated, options selected and performance measured.
- Socio-economic public policy - a look at how public policy is the outcome of economic and social factors, which have a major influence on the making of policy and upon its outcome.
- Productivity – the term productivity generally refers to the ratio of output units per input unit. It assumes that there is a process which transforms units of input into units of output.

Delimitations of the study

The study will be confined to available primary information sources, i.e. already existing textual information, such as annual reports, mission statements, memoranda, official documents – including white papers, green papers and press reports, as well as secondary information sources drawn from the library, press reports, discussion papers, comments, debate, and information obtained from the Internet.

Limitations of the study

The study will be limited due to the fact that literature review can, according to Mouton (2001), at best only summarise and organise the existing scholarship. Even a critical review of the literature cannot produce new or validate existing, empirical insight, it can only lead to theoretical insight. Further limitation will be that the study is restricted to South Africa, and within the context of a new democracy, advances in technology and the dynamics of transitional democratic politics progress rapidly. Caution will be taken against generalisation.

Overview of the research programme

As has been stated already, technology is ubiquitous within South Africa's democratic political system. It has both benefits and disadvantages and also poses a difficult choice for society and government as regards policy approach. The social dichotomy of this nature raises the need for further inquiry as to the reasoning and application to technology as the systematic application of knowledge to resources in addressing

democratic imperatives. The second chapter is the review of literature; it discusses and reviews the literature relevant to this topic. Chapter 3 sets out the research design. It provides the key concepts used in the study. It also discusses the methodological premises, justification for the hypothesis, data analysis and interpretation, and the shortcomings. Chapter 4 looks at the role of technology in the development of the modernisation process. Chapter 5 discusses information technology as an imperative for securing democracy. Chapter 6 focuses on South Africa within the context of a democratic political system. Chapter 7 focuses on the national democratic politics of technology, and, lastly, Chapter 8 will present the conclusions and recommendations about the hypotheses and the research problem, and the implication of the policy and practice for both public and private sector analysts and managers. It will discuss the limitations of the research and identify areas for further research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

The purpose of the study is to examine the impact of technology on a democratic political system in South Africa. The study investigates the relationship between technology, as a systematic application of knowledge to resources to produce goods and services, and democracy in South Africa's democratic political system. This chapter deals with the review and analysis of the literature relevant to this topic. The chapter provides three themes, which are the core of the theoretical background, of which the objective is to discuss technology in different perspectives where there is a major impact on the democratisation environment in a political system. The following themes are the key constructs: *the historical overview of the literature debates on technology policy; the democratisation process in South Africa; South Africa's technology policy; the democratic politics of technology*, and a summary to conclude the chapter.

The above key constructs in the study correspond with the divisions of works under review. They are central themes of the study and are clearly manifested in the formulation of the research problem. (Mouton 2001) The objective in this particular instance is to determine, through inductive reasoning, the definition and description of the key construct in the study. Each presents a broad context, then current variations and challenges, a review of selected literature, and finally a perspective relating to the hypothesis in this thesis. Each theme presents a set of premises pertaining to each construct in a democratic political system, broadly considered. Some of these find corroboration within other chapters, particularly in relation to the links between them as categories of analysis.

Literature that supports this study

This research is both interdisciplinary and integrative, and therefore draws on areas of study not usually considered connected. Drawing on literature from political sciences and extended analyses of technology means not all relevant studies could be covered. Areas of public administration and management are omitted. Rather than exhausting a narrow area of research, the intent here is to focus and examine broad areas in order to identify patterns that exist across the separate categories of analysis where in-depth analysis normally occurs. The deductive derivation of the research hypothesis suggests links between disciplines; it draws on sources, which are to be found relevant to the processes of technology policy formulation and governance in the South African democratic political system. Crow and Sarewitz (2000) see technology as a force that can transform social structures and create new phenomena. Because this study falls into the general category of a deductive goal, it realises the potential of technology to enhance the democratic political system. The provision of access to information and technology and instituting mechanisms for democratisation at all levels of society is a fundamental assumption of this thesis, and is supported by modernisation theories. Some of the literature below does not share this point of reference, being mostly concerned with non-critical contribution to political science. This is particularly evident in the business literature. Other areas, such as studies of media, technology and society, and in particular electronic governance, are overtly concerned with social outcomes. This study addresses the overlaps and gaps in these approaches in order to accumulate a perspective that is intended to be both a practical and a theoretical contribution. The relevant areas are outlined below, along with the additional perspective provided by the current research.

Themes of the literature review

The following themes are the key constructs in this literature review study. Firstly the chapter looks at *the historical overview of the literature debates on technology policy*; secondly at *the democratisation process in South Africa*; thirdly at *South Africa's technology policy*, and fourthly at *the democratic politics of technology*. A summary of analysis concludes the key constructs, which correspond with the divisions of the works under review.

A historical overview of the literature debate on technology policy

There has been more literature on technology policy approaches in the past two decades. The development of this literature started around the late 1960s and continued to the early 1980s, and focused mostly on the concept of "appropriate technology" or "intermediate technology" as it is commonly known. The concept first originated from the Neoclassical discussion on the "choice of technique", where many social scientists criticised developing countries for choosing the "overly capital-intensive" technologies in their import substitution industrialisation strategy and called for them to choose more labour-intensive technologies which were more suited to their own environment. The concept was subsequently adopted by a more radical school of thought in Schumacher's book "Small is Beautiful" (1973) and the Dependency theories. Both these schools argued that not only were the technologies imported from the advanced countries inappropriate for the local environment, they were also inappropriate for meeting the real consumption needs of the population. (Emmanuel, 1981).

From the late 1970s the debate moved to a more productive phase. Rather than debating at the general level whether imported technologies were appropriate or inappropriate, the debate was on why some countries were more successful in absorbing imported technologies than others. The consensus that emerged out of this debate was that, to some extent, developing countries needed some degree of technological capability if they were to be successful in choosing, adapting, and making incremental improvements of imported technologies. It was also emphasised that irreversible investments were often needed in building such technological capability and that policy actions had an important role to play in the process. (Fransman and King, 1984.) The crucial point in this particular instance is that technology needs to be assimilated in society. Imported technology needs to be invested and must be adapted to local conditions if the appropriate national productivity levels are to be achieved. Where productivity levels are high, other socio-economic imperatives are covered and the standard of living gets boosted.

From the 1980s the literature became more sophisticated. Rosenberg (1982), Nelson and Winter (1982), and Freeman (1982) opened new debates in the study of technology. They laid emphasis on the evolutionary nature of the advances in technology and the importance of institutional and political policy factors in the process. (Dosi et al.1988.) These developments culminated in the birth of the concept of "national systems of innovation" (NSI), which South Africa adopted as its policy approach (White Paper, 1996) and through which the institutional initiatives were undertaken by government in the establishment of the National Advisory Council on Innovation Act, no 55 of 1997 (NACI Act), the primary objective of which is to advise the Minister on issues of science and technology policy. The importance is based on the role of institutional factors, and particular emphasis was placed on the inter-relationship between the constituent parts of the institutional complex in the determination of technological progress. (Lundvall, 1992 and Nelson, 1993).

These two schools of thought differed in their solutions. The former strongly advocated small-scale industrialisation, while the latter also wanted capital-new theoretical developments. They influenced the literature on technology policy, producing a new breed of theoretically sophisticated and empirically well-grounded literature, of which the most updated synthesis is that of Lall and Teubal (1988).

Most authors assert that the world markets, especially in developing countries like South Africa, may fail to generate a socially desirable degree of technological progress and that it is only the type of political policies that may be necessary to resolve this problem.

At best this literature review's contribution can be related to two areas that have been relatively ignored in the existing South African literature, namely the political and the institutional aspects of technology policy design and implementation. Succinctly stated, whether a technology's design and its use are compatible with perpetuating democratic social relations. (Scolve, 1995)

It would be a gross injustice to state that authors who contributed to the debate on technology policy in South Africa have completely neglected these two aspects. However, it would not be too much of an overstatement to mention that most of other

literature reviewed was decided rather on the basis of some objective theory diffusion, with little attention to the political aspect of technology policy design and implementation. In the same breath it would also be wrong to say that institutional factors have been neglected in some literature, especially given the numerous writings on national systems of innovation. However, it would be fair to say that far more attention has been paid in the literature to the institutions related to knowledge generation. (White Paper, 1996).

The political aspects of technology policy in South Africa unfortunately lacked a relatively well-developed literature which this study could draw from. Most literature dwells on industrial technology, with technology policy considered as the subcomponent of political sciences.

Having drawn some literature from other developing countries with experience, which were more less in the same situation as South Africa, the earliest stage of the debate on industrial policy was prompted by the success of Japan in dealing with the industrial changes they made towards their technology policy. (Johnson (ed.) and Thompson, 1989.) Subsequent literature was also mostly concerned with industrial policy, for instance the debate that started in the mid-1980s and culminated in the debate surrounding the World Bank's "East Asian Miracle Report". (World Bank, 1993). The debate at this stage was not really fruitful for the purpose of this study as it focused on establishing the existence of industrial policy in East Asia, with little relevant lessons to draw for the South African experience. Most authors argued that little industrial policy existed in both South Africa and the East Asian countries (Shcultze, 1983 and Balassa, 1988), and that its execution was mainly involved in the technical process, without some political elements which would have been useful to compare and analyse with the South African democracy.

Literature on the scope of the democratisation process in South Africa

Since the 1994 elections in South Africa there has been interest in the progress and the extent of the democratisation process. There is now substantial literature on many

aspects of democracy in South Africa, aspects which include issues of national security, socio-economic development, poverty alleviation, etc. The review in this section provides an overview of the issues and answers of various authors and relates them to the above analysis of democracy in South Africa. Most debates on South Africa's democracy justify theories around liberal democracy and the continuation of concerns about democracy in general. MacKinley (2001) argues that the African National Congress (ANC) became the standard-bearer of liberal democracy in South Africa. Since coming to power in 1994 it has followed the liberal democratic formula of institutionalising the combination of individual rights and capitalist market economics. South Africa's smooth transition from apartheid to democracy (Williams 2000) also outlines neoliberalism. Williams also presents the major shifts in the ANC's economic policy and makes particular reference to the role that the neoliberal discourse played in delegitimising alternatives and stifling debate during the transition. Now integrated with the global offensive mounted by internationalised corporate and finance capital, liberal democracy has acquired the mantle of a necessary and natural political product of an equally necessary and natural economic order. (McKinley 2001.)

Other aspects of the South African democracy relate more to opportunities created by democracy. Some authors are pessimistic or critically ambivalent about South Africa's democracy, while others are relatively optimistic. Muthuinen, Khoza and Magubane (2000) give a corresponding review on the democracy in South Africa. They have reviewed the institutional forms and capacities that underpin South Africa's democracy and argue that a new culture of participatory democratic governance has emerged short of addressing prevailing inequalities.

Literature on the South African technology policy challenges

Prevailing technology policy challenges are the same as the insurmountable challenges of social inequalities that still face the South African democratic government. Lamounier (2002) in Tulchin (2000) observed challenges that social inequality present to democratic governments around the world. One of the particular themes which he looked at is the effects of globalisation on the distribution of income and wealth within national frontiers; he also looked at the impact of inequality on the stability and the quality of democratic governance. He thus presented an analysis of the future of democracies as being able to redress social ills of the past. The latter is important for this part of the study as there is a direct link between the effects of globalisation and the advances of technology, and the relative ease with which these travel across national boundaries.

Technology has inevitable political and economic effects. There are empirical grounds, as suggested by most authors, that technology as propounded by the effects of globalisation has more effects that influence the economic performance of a country. This is because the flow of the intellectual phenomenon presents ideas across the border. The intellectual phenomenon is more significant than transporting goods and resources as potential for technology in a democratic political system. It is also more real than in economic and political life, and thus knowledge in this regard plays a vital role in determining technology policy imperatives. The challenges for the South African policy imperative are that it should not be mapped outside the dictates of the globalisation effects. Schimmitter points out that globalisation may not even exist in any material sense but if enough people believe that it is present and potent, it will produce a significant effect by anticipated reaction. (Schimmitter 1999)

The main conclusion that emerged from this literature debate was that, although the policy tools used, such as tariffs, subsidies, tax privileges, etc., were in many ways similar for most countries, there were important differences in the way they were designed and implemented. For example, the Small, Medium and Macro Enterprise (SMME) and the Black Economic Empowerment (BEE) industry policy protection in South Africa come with relatively clear performance targets, like market performance and the extent of advancement given the incentives and non-incentives to the non-

industry performers, which would be penalised in the allocation of related privileges. And what determined these differences were direct factors such as political intervention directed by the government that is willing and able to provide material support.

The study endeavours to develop an analysis of the political and the institutional aspects of technology policy in South Africa, using some of the insights from the industrial policy literature and a very limited literature from technology policy itself. This was not necessarily simply a re-interpretation of the existing literature discussions on these issues in the policy debate. The study does not only seek to provide a somewhat more fine distinction analysis of the political factors in the policy process than what is currently available, but also undertakes to develop a more institutionally-focused analysis of the impact of technology in a democratic political system, with specific reference to South Africa. Before doing that, however, one also needs to identify the main characteristics of technology policy, as these characteristics will affect the way in which a democratic political system functions.

There are generally two extreme opinions presented by different authors: some believe that technology is a boon to democracy, while others believe that it is destructive to democracy. In an effort to demystify the cyber-utopia and the neo-ludite view, most literature makes reference to the fact that both schools of thought are correct in some respect as the policy process is also resultant from the political effect of advances in technology. It defines the ranges of how government communicates with its citizens and how society communicates amongst itself in a nation state given the level of advancement. The impact of technology, and particularly of information and communication technology, is a reflection of the extent to which innovations can be explored, and also gives an indication of the inefficiencies in the political system, which can sometimes be presented as a threat to democracy. Tetty (2001) asserts that even if more people are getting a lot of information, this does not translate into a significant expansion in the numbers and categories of those who engage in, and hence influence, the direction of democratic politics in the country.

There are dominant reasons why some authors see technology as being a threat to democracy. It is, firstly, premised from the fact that global network technologies have

no boundaries, that they do not respect any boundaries and at times undermine the enforcement of the rule of law, which defines the essence of democracy in a democratic political system. Democracy makes good neighbours in an increasingly interconnected world; it has both the means and the motives to promote the democratic process abroad. (Talbot 1996.) For instance, the availability of information and communication technologies (ICT) is the ease with which one can create a public sphere in 'cyberspace' through the use of personal computers, modems and telephone lines, the new global communications which are being established. In most parts of the world different organisations are integrated into the webs of horizontal, non-hierarchical exchange, and have already proved themselves able to counter censorship and disinformation. Interest and pressure groups have to a larger extent made use of the new technologies to advance their course, for example "one of the important tools of the Zapatista movement in southern Mexico has been the internet". The movement's leader, Subcomandante Marcos, carries a small computer, through which he has been able to communicate with the rest of the world in a form that is not easily controlled by the government. (Ferdinand, 2000.) In fact, individuals can even find a way on the Internet to send a message to the Subcomandante. Communication was vital because for the rebel movement to succeed, it needed involvement from oppressed people all over the world, not just from the Chiapas. (Lutz, 1999). Secondly, it is argued that technology is dominated by the English language and as such is seen as eroding cultural differences and giving preference to a new set of national commercialism and consumerism values that thrive on the net; despite the global network that may integrate different communities there is therefore a concern regarding the growth of transnational cultural industries, as well as liberalisation policies pursued by organisations like the World Trade Organisation, which may reinforce current patterns of cultural colonialism. Technological innovations are in fact the enormous growth of international trade, and very supportive, liberal, political climate has facilitated the rapid transnational proliferation of mass market, advertising and electronic entertainment produced by mega conglomerates. A uniform consumer lifestyle is being aggressively marketed across the globe. Thirdly, the private and privatising environment of the Internet in particular is seen as destroying national democratic values. Although the South African economy has distinct positive privatising features in its technology approach, it is also hampered by political uncertainty, poor productivity, an over-emphasis on the

exploitation of natural resources, and consumer-driven economic cycles. Hawkins (1992) maintains that, to achieve rapid growth, South Africa will have to transform its economy to become investment driven and export intensive, with the emphasis on manufacturing and services. Private sector alliances with foreign multinationals could provide South Africa with access to the technology and marketing skills it needs.

Southall (2000) alludes to the fact that South Africa's first universal suffrage election of 1994 inaugurated a transition from apartheid to democracy. Yet there are continuing debates about the quality of that democracy that promised a better life for all during those first elections. He is cautiously optimistic to note that, although South Africa faces several problems and long-term challenges that could easily erode its democratic potential, democracy is acquiring a basic strength. The transition, which transformed South Africa from a pariah nation into a progressive multicultural democracy, is identified as a model throughout Africa and a symbol of hope for struggling democratisation processes elsewhere. Jung and Shapiro (1995) have a worrying notion that there is a possibility that the South African democracy may lack some of the basic ingredients of a viable democracy due to the fact that the transition has been negotiated between the ANC and the apartheid government. The exploration and evaluation of the conjecture of the dynamics of democratisation presents challenges for the political system to concretise a democratic order.

South Africa's consolidation of democracy must be judged according to its own society's political involvement in the policy decisions and how it meets its achievement of social democratic vision. Under such provisions, South Africa is not a consolidated democracy but an emerging one; its transformation has been more political than economic. South Africa has witnessed considerable institutional and representational change, but certain behavioural and attitudinal elements continue to hinder its democratisation. Specifically, there is a technological divide in society, particularly between the rich and the poor, and the urban and rural communities. There is also a considerable allegation of corruption among the levels of government officials, which has led to the disillusionment of the population. (Dreijmanis 2000.)

In an attempt to enhance democracy, the first democratically elected President of South Africa, Nelson Mandela, encouraged all the citizens of South Africa to take the

national project of accelerated and fundamental transformation of the country very seriously. He also encouraged the people to unite in a new patriotism in order to achieve the goal of creating a new society. He suggested some investment challenges that needed to be met, some new roles for local government, and some ways in which democracy could be promoted. Finally, he encouraged citizens to work together to make their country a winning nation. (Mandela 1996.)

The objective of this call was primarily the recognition of concerns about poor performance as regards the provision of socio-economic services in South Africa. Simkins (1996) maintains that South Africa's economic future depends on moving towards the conditions for cooperation, where all facets of the social services will be intertwined with the economic aspects. He had looked at the problems associated with the state's reconstruction efforts in terms of housing, health and education, the development context, taxes, spending, and poverty, and the move towards cooperation with business. He is doubtful whether, in the absence of political policy interventions, the delicate political balancing act required to achieve cooperation can be sustained long enough.

Currently different policies coexist in South Africa, for instance those that deal with individual human rights and with traditional communal obligations. Diverse political communities propagate different models of citizenship, even as citizens act out simultaneous membership in multiple groups. South Africans thus adhere ambiguously to conflicting notions of transformational society as is dictated by modernity and tradition, and economic needs. Society has to reconcile itself with those vestigial subjugations and disparities of privilege that continue to bother it. (Ramphela 2001.) The repercussion of these disparities in a diverse political community is also symbiotic to the technological divide which has been clearly documented as dividing society along the technological lines. Hence in an attempt to bridge the gap, South Africa has to recognise the importance thereof. President Mbeki, through the International Presidential Advisory Council on Information and Communication Technology, has taken wide initiatives to solicit advice in order to cover all elements of the information and communication technology sector in order to monitor rapid changes and keep track of the application, thus keeping pace with inevitable advances in technology and its applications. (ANC 2001.)

Technology policy in South Africa has been debated across a broad spectrum of society with vastly different interests. During the literature debate process it emerged that caution should be taken as the inherent power of technology application could lead to abuse in both government and society. For this reason Christianson (1990) presents an argument about certain inherent characteristics of technology which might be abused and with which a state may instil fear in its society and its neighbours. He specifically makes reference to nuclear power capability, which he says may undermine the public accountability of decision makers. He contends that there is a strong case for the demand that public policy decisions meet clearly defined criteria for rationality. He demonstrates that irrational policy decisions pose a distinctive threat to liberal democratic principles in South Africa; for instance, he says that nuclear power has been mooted as the answer to South Africa's long-term electricity requirements. However, nuclear power is controversial, and there is increasing awareness worldwide of both adverse environmental implications and its costliness. There are also other issues that demand careful consideration, and public policy decisions, such as the decision to launch a nuclear power programme, need to take account of clearly identified standards of accountability and rationality. Advanced technologies like nuclear power pose distinctive problems. These are discussed with specific reference to the nuclear option in South Africa. (Christianson, 1990).

There are some aspects of technology, especially information and communication technology (ICT), that present another level of power and control in a political system. Willett (1995) agrees that this level of power and accountability should be able to identify the beliefs, myths and values attending to the notion of democratic accountability. He asserts that this will show how the basis for the right to communicate should be established, as well as the strategies necessary for this right to be recognised, understood and accepted, and thereby legitimising the democratisation process. Challenges abound for ICT as an instrument to fast track a democratic process.

The South African Parliament also faces challenges that are posed by an increasing reliance on ICT; it has to have the ability to uphold the values and principles of an

inclusive participatory democracy for all South African citizens. The potential value to Parliament of harnessing increasingly sophisticated ICT vests in the ability of such technologies to play a critical role in facilitating co-operative governance and overcoming the information gap between itself and the majority of South African citizens. Consideration does however become important when there is an increasing dependency on such sophisticated technologies, which needs to be weighed up against the ability of Parliament to uphold, simultaneously, the democratic values of freedom and equality of access for the majority of citizens who may not have access to such sophisticated technologies. (Groenewald, 2000).

Despite all these technological efforts regarding socio-economic and political problems, South Africa has taken a courageous position with its adoption of a policy on the National System of Innovation (NSI) approach. Blake (1996) maintains that if an effective national system of innovation is the main approach of the policy, IT has to play a very central role in the realisation of that policy system. He further alludes that information and technology both enable and depend on a national system of innovation and that the IT industry in South Africa can be a major driver for the economy. He thinks that the information society makes great demands on human resources and that current deployment of IT is hampered by having far too few people with ability for innovation in IT.

Envisaged within the context of NSI is the new mode of production – centred on information technology and instantaneous worldwide electronic communication – which has become dominant in the era of transnational capitalism. There have been arguments around this topic; at the forefront is Louw (1995) who argues that if South Africa's potential is to be realised, the country will need to be fully integrated into the global electronic grid of information. If the challenge of a post-Fordist information economy is accepted, South Africa needs to concern itself with producing a population able to operate within an 'information economy'. This requires critical and aware media producers and users, which, in turn, requires a degree of coordination between media policy and education policy formulators. Contemporary cultural studies should grasp the opportunities offered by the flux of the post-apartheid reconstruction of society to demonstrate that a democratic political system can be built by co-opting the post-Fordist media technologies developed by multinational

capitalism. Louw's argument is also followed by Budlender (1995), who argues in his claim that by providing people with the capacity to use communications they will be able to make their demands more forcefully and successfully, testifying to a deeply urban-biased vision.

Literature on a theoretical construct of the democratic politics of technology

In the last years there has been a momentous continuation of victories in the world arena for liberty, human rights, and market economies. Historically these have been associated with democracy, thus democracy has emerged as a political system of choice around the globe. Within this democratic political system technologies have been exploited not only to enhance society's socio-economic conditions but also to enhance the democratic rule. The impact of technology upon lifestyles (Weeamantry 1993) that have been maintained for centuries, if not millennia, has been profound and widespread.

Tracing back to the genesis, a growing awareness of the problems at the interface between the expanding domain of technology and human rights prompted the General Assembly of the United Nations in 1975 to proclaim its Declaration on the Use of Scientific and Technological Progress in the Interest of Peace for the Benefit of Mankind (resolution 3384 (XXX) of 10 November 1975). This declaration called upon all states to take appropriate measures to prevent the use of scientific and technological developments to limit or interfere with the enjoyment of human rights and fundamental freedoms of the individual as enshrined in the Universal Declaration of Human Rights, the International Conventions on Human Rights and other relevant international documents. The same Declaration called upon all states to cooperate in the establishment, strengthening the development of the scientific and technological capacity of developing countries with a view to accelerating the realisation of the social and economic rights of the people of those countries.

In his book *Democracy and Technology*, Sclove (1995) presents a "disdain from the epistemological inanity of value free technology and the reductionist fallacy of technological determinism". He argues that misunderstanding about technologies enhances their relative structural significance, because it enables technologies to exert

their influence with only limited awareness of how, or even that they do. It is given that technology constitutes an influential social structure. He considers how this particular structure relates to the traditional question of democratic theory. What he ponders is the optimal size of a democratic community, the minimal standards of an informed citizenry, and whether communitarian/cooperative technologies would provide alternatives to today's monstrous business enterprises and public bureaucracies

Sclove (1995) has been brave to confront the possibility of conducting elections through the Internet; he does alternatively give unqualified endorsement to the popular notion that "virtual communities" might one day replace territorially defined states as the predominant locus of democratic politics. The apparent anarchy of the Internet is plainly at odds with the emerging hegemony of corporate control over cyberspace; the outcome of the struggle is as yet unclear. He provides clear illustrations of political and economic alternatives to social gigantism that give practical expression to the belief that technologically alternatives mediated tyranny, while a clear and present danger is not our necessary fate. From cooperative networks of small manufacturing firms to the non-profit centre for technology, democracy and technology are replete with practical illustrations of innovations, which permit the democratisation of technology in small and medium scale context. If this is less than a prophecy of a techno-democratic utopia, so much the better.

With regard to the hegemonic institutions of transitional business and the state, he maintains that "at a minimum they too should be reorganised into federations of quasi-autonomous, democratic divisions and subsidiaries". He is realistic enough to acknowledge that, although some decentralisation is taking place under the sway of strategic planning initiatives and reengineering programmes, any claim that a more democratic ethos is accompanying such organisational restructuring is at best premature. The summary in the Sclove literature is that it is possible to evolve societies in which people live with greater freedom, exert greater influence on their circumstance, and experience greater dignity, self-esteem, purpose and wellbeing.

It is said that the 21st century has promising scientific and technological innovations that were previously regarded as fictitious. Developments in nanotechnology, microelectromechanical systems (MEMS), genetic engineering, cloning, robotics, and

optical and quantum computing are likely to have a great impact upon the future structure of the society. While there is wide dispute as to whether these advances will be a boon or bane to humanity, there is a consensus opinion that change is coming. Joy (2000) sees a future that is frightfully bleak. He maintains that “accustomed to living with almost routine scientific breakthroughs, we have yet to come to terms with the fact that the most compelling 21st century technologies – robotics, genetic, engineering, and nanotechnology – pose a different threat than the technologies that have come before”. He warns that society has become enamoured with the quest for scientific knowledge, that it no longer bothers to consider the impacts of the societal discoveries. Moreover, he is concerned that the self-replicating abilities of novel innovations in genetic engineering, robotics, and nanotechnologies (GNR) could produce dire results, including the end of humanity.

In the light of this potential danger, Joy suggests a controversial solution: verifiable, voluntary relinquishment of dangerous GNR technologies. He writes that “this requires vigilance and personal responsibility by those who would work on both NBC (nuclear, biological, and chemical weapons) and GNR technologies to avoid implementing weapons of mass destruction and knowledge-enabled mass destruction”.

Joy (2000)’s sentiments are rebutted by Brown and Duguid (2000). They use the “ballyhoo associated with the dawning of the nuclear age in the 1950s to make their case”, by referring to the fact that techno enthusiasts had previously predicted the “end of power monopolies, the emergence of the ‘electronic cottage’, the death of the city and the decline of the corporation”. They both believe that much of Joy’s pessimism stems from a tunnel vision that leaves people out of a picture and focuses on technology in splendid isolation. Brown and Duguid hold that the future is only profoundly bleak if one looks at it through the “6D” lenses of: demassification, decentralisation, disintermediation, despecialisation, disaggregation and demarketisation.

Dertouzos (2000) is also critical and troubled by the notion that human logic can anticipate the effects of intended or unintended acts, and the more arrogant notion that human reasoning can determine the course of the universe. He counters that society in

its ability to assess consequences can rely on its humanity, feeling and beliefs when determining the impact of technology. Unlike Joy, who would prohibit certain types of research because of their potential dangers, Dertouzos states that "we should instead proceed, but stay vigilant, ready to stop, when danger is imminent, using our full humanity to make that determination".

Crow and Sarewitz (2000) both see technology and innovations as forces that can remake social structures and create new phenomena, which in turn lead to new institutions and response mechanisms. They believe that nanotechnology has the potential to be another catalyst for sweeping societal change. Their point is not to predict the future of nanotechnology and its impact but to illustrate the direction and scale of thinking that will be necessary if we are to successfully manage the interaction of new knowledge and innovation with society. They warn that the revolution is coming; that we can allow ourselves to be caught by surprise or we can prepare for it in order to enhance the benefit and reduce the disruption and dislocation that must accompany any revolution.

Nowadays it is clear to everyone that there is this problem of technology. It can be argued that no other comparably larger theoretical issue impinges so directly on daily life as does this problem in its various aspects.

It therefore follows that there is an adequate confrontation or reckoning with this issue in its full theoretical dimensions. For the most part this problem comes to light only as the problems of specific technologies. Is it moral and desirable for biological engineering to alter natural species? For example, who has the right to decide whether a foetus should be aborted or a patient disconnected from life-support machines? How are we to deal with the potential dangers of environmental degradation or nuclear war? Different technologies bring different problems, but beneath this apparent variety three practical questions seem to be raised by every advance in shaman power: Is it moral and desirable to do what this new capacity enables us to do? On whom devolves the right to decide this question? And how does one control the unanticipated or unintended consequences that may emerge from the exercise of this power? These are the problems arising from the development of a particular new technology, posed as a difficulty that is usually treated as a technical problem or as

policy questions to be resolved within the context of established moral and legal practice.

Not far beneath the surface of these practical issues, however, hang theoretical questions about the rational coherence, the psychological impact and the moral propriety of technology. The question can be asked if modern scientific rationalism can give an adequate account of the world, and especially of the human world, including the human capacity for science. Is the vision of nature and of man that imposes on society compatible with a truly human life, and does the technological project for the mastery of nature not violate some sacred or perhaps salutary limit on human power established by nature? These questions always cloud the existing policy debates. While escaping their direct attention, they constitute the problem of technology in a deeper and more interesting sense that guides the inquiry.

Amongst the critics of technology, Heidegger stands outside and against liberal democracy, which he sees as merely a political manifestation of technological rationalism. He views liberal politics and technological science from when it began to emerge at about the same time when it sprouted from premises concerning the autonomy of practical and theoretical reason to scriptural or technological absolutes. Critics of technology like him were nourished by shared hopes for humanity's progressive self-improvement through its conquest of political and natural worlds. Crow and Sarewitz (2000) also support each other symbiotically; they see liberalism protecting free and public scientific inquiry, with the latter having generated the technological and economic growth on which the former has depended. Because of this intimate connection, it seems peculiarly difficult for thinkers working within the liberal democratic tradition to confront the problem of technology in its most radical form, as the relative silence on this topic by liberal theorists John Rawls, Ronald Dworkin and Robert Nozick would seem to indicate. But for the same reason it is above all necessary for liberals to address it. The problem of technology is, to a very great extent, the problem of liberal democracy.

A general tone is set by Kass (1993) in specifying problems of technology, and by thinking about its possible implications for liberal democracy. He worries about technology because it provokes anew the age-old question of human happiness at the

same time that it tends to undercut the validity of such questions and endangers society's capacity to lead good and happy lives. According to him, liberal democrats must rediscover the richer, non-technological conception of liberty and dignity, if they are to keep their moral bearings in modern age.

Bimber (2001) asserts that some aspects of democracy appear more sensitive than others to the availability throughout society of political information. Individual-level political engagement poses a puzzle in this regard. An instrumental-quantitative conception of information central to rational theories and also found in some behavioural theories of participation, appears contradicted by historical trends. He alludes that contemporary expansion in political information is made possible by new information technology. He presents a model of the relationship between information availability and political engagement, based on survey data of Internet use between 1996 and 1999. The presentation is relevant to the debate whether the information revolution will prove salutary for participation, and at the same time sheds light on contending theories of information. His finding reveals that little relationship exists; the only form of participation demonstrably connected to Internet use is donating money. This finding fails to support instrumental conceptions of information and instead endorses cognitive conceptions employed in psychological and certain behavioural theories of political engagement.

Miller (2001) maintains that what moderns call technology is essential to liberal democracy, for without the increase of wealth, knowledge and opportunity that technology provides, the ruling majority could not be an enlightened middle class. Nevertheless, critics point to advancing technology's harmful side, with some hope to prevent these harms by tight controls. Others despair that technology lies beyond our control. In a neglected 1858/59 lecture and related speeches, Abraham Lincoln grappled with these issues and their implications for democratic statecraft. Although convinced that "discoveries and inventions" had rescued humankind from savage beginnings, produced abundance, and put genuine democracy within reach, Lincoln recognised that advancing technology alone would not guarantee freedom, but might bring new forms of mastery. Lincolnian statecraft seeks to moderate or limit this advance, not through stringent controls but by a moral teaching that builds on the natural right to oneself and includes a comprehensive doctrine of labour.

The effects of new information and communication technologies (ICTs) on democratic political systems in industrial societies have also been investigated by Chambat (2000), who in his study describes early adoption of ICTs by political institutions, e.g. computerised polling and voting, and evaluates the benefits and drawbacks. Preliminary evidence suggests that ICTs have not been that successful in improving political participation; the reaction of citizens to “teledemocracy” are not what has been said about the hype of technology. Looking at the machinery of government, he concurs that ICTs have been adopted successfully, improving public administration, decision-making, and information management. The role of ICTs in the public space is better off in terms of how it impacts on individuals in a society, the social communication network, mass media use and political function, and community cohesion. Contrary to Chambat, Slaton and Becker in their arguments assert that modern representative democracy was neither intended nor designed to function as a democracy, and progress in the past 200 years has come from the persistence of citizens operating outside established hierarchical power structures (Slaton and Becker 2000). A transformation of modern representative democracy is under way, and information and communication technology (ICT) is a key component in the evolution of more participatory democratic governments. The failings of modern representative democracy are highlighted by the decline in voting turnout rates and a high level of dissatisfaction with and distrust of elected political leaders. While advances in technology and the expansion and availability of information can hinder and harm efforts to advance democracy, a balance is sought to the discourse by emphasizing the potentials and benefits and by seeking solutions to problems in the representative systems. This is approached through the examination of four areas of enormous innovation and experimentation in utilizing ICT to develop new forms of greater citizen participation within representative democracy and for creating more effective direct democracy: voting from home, scientific deliberative polling, electronic town meetings, and direct democracy activities. The main conclusion is that ICT has aided forces that favour a stronger influence by citizens in representative government, which is already in the process of being transformed as nations move toward the global economy and citizens insist on more self-governance.

Stevenson (2000) seeks to tie in arguments that can be connected to the development of a global media culture and concerns around cosmopolitan forms of democracy. This is done by considering arguments for firstly a global human rights initiative in respect of global media conglomerates; secondly technological change in respect of digital cultures; and lastly the arrival of what Castells has described as the culture of "real virtuality." These views and perspectives are assessed in terms of the contributions they are likely to make towards what he calls a "cautious cosmopolitanism". He seeks to make some definite policy reference that helps foster conditions in which cosmopolitan democracy flourishes.

Cherny and Kapkov (2000) present an analysis of the rapid and dramatic changes in the politics and economics of the world during the twentieth century, and reveal that the role of science and high technology becomes extremely important for international development, security, and cooperation. The consequences of fundamental research become critical for mankind, and they determine and define preventive security. International scientific and technological cooperation, coupled with the financial power of the dollar, will make it possible to avoid an "end of history" or a "clash of civilizations", as well as to resolve many world conflicts. The importance that science and technology holds for the future of humanity must be added to the current definition of "democracy".

Catinat and Vedel (2000) contend that public intervention is the key to fulfilment of the promise of digital democracy. He describes liberal and digital democracy by alluding to an argument for government empowerment of digital information dissemination referring to economic, contextual, marketing, and subjectivity issues. Policy considerations are listed, such as privacy protection and access to infrastructure, public information, and services. Details are included of the cultural, educational, and sexual composition of Internet users. There is an examination of international gaps in technological access and changes in information-access policies. Exemplification of ways in which public actions may promote digital democracy includes specific methods for providing information and elucidation of laws concerning public access to data. Also considered are pivotal actions in the liberalisation and sponsorship of telecommunications. A government role in

promoting public awareness and enthusiasm for computer use, system design promotion, and organisation is important.

Barber (1999) argues that there are at least three scenarios for the future relationship of technology and democracy: (1) the Pangloss scenario, which is rooted in complacency and is simply a projection of current attitudes and trends; (2) the Pandora scenario, which looks at the worst possible case in terms of the inherent dangers of technological determinism; and (3) the Jeffersonian scenario, which seeks out the affirmative uses of new technology to nurture modern democratic life. He concludes that uses of technology that will nurture strong democracy require hard and imaginative work for which the political will appears to be lacking.

As in previous cases, Sclove (1995) argues that, insofar as citizens ought to be empowered to participate in shaping their society's basic circumstances and technologies profoundly affect and partly constitute those circumstances, it follows that technological design and practice should be democratised. He presents his argument in three parts. Part I synthesises two disparate bodies of knowledge. One is a corpus of recent research into the social dimensions of technology. The other is that body of knowledge and practice known as democratic theory. Part II develops a provisional system of design criteria for distinguishing technologies that are compatible with democracy from those that are not. Part III elaborates on the concept of the democratic politics of technology. Challenging the foundations of modern economic thought, the author argues that the democratic theory of technology qualifies as a coherent alternative to neoclassical welfare economics. Indeed, reinvigorated democratic politics should largely supersede conventional economic reasoning as a basis for technological decisions.

Hager (1993) revisited the developments in Germany that during the past two decades the mobilisation of grassroots citizen groups has posed a fundamental challenge to institutional politics. One important, often-overlooked aspect of this challenge is the relationship of democratising movements to technology. Grassroots protest arose mainly in reaction to large, state-sponsored technological projects. Citizen movements reopened the question of the citizen's proper role in technological decision-making, which had long been part of theoretical discourse. Grassroots activists challenged not only policy decisions but also the legitimacy of the bureaucratic institutions that

produced those decisions. Informed political participation has raised the technical competence of policy in Germany, while eroding the legitimacy of traditional policy-making institutions. Citizen groups have since directed their efforts toward developing alternative political forms that will reconcile technical competence and participatory democracy. The theories of Claus Offe and Jurgen Habermas illuminate the legitimation problems that lead to citizen protest.

Weinberg (1990) considers two questions: Do the two technologies that represent the highest engineering achievements of this democratic age (nuclear energy and the microchip manifested in instant communication and precise control) threaten the stability and freedom of liberal democracies? Can technologies that pose risks, but are regarded by many experts as necessary for survival, survive democracy? In short, the author asks whether modern technology and democracy can coexist

Summary of the literature review and analysis

Challenges in the political, social and the economic milieu prompted the review of the literature, which demonstrated that technology could have an influence over a democratic political system. It is evident that technology can shape the military and the economic environment of the political system. It is also clear that technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

The important question that was addressed is whether technologies are substantively democratic, and whether technology policy decisions are compatible with perpetuating a democratic political system. The review investigated and appraised democratic theories and analysed approaches and challenges in democratic politics of technology, which could be applied in South Africa. Specifically the focus was the character and crisis in technology, and also the theoretical and practical resources that are available for democratisation in South Africa.

In essence, if democracy is impacted by technology, as systematic application of knowledge to resources to produce goods and services, it also enhances stability and

equality. Therefore, it can shape challenges in the environment of a democratic political system by maintaining stability; it will also deliver material prosperity, and foster democratic rule in society.

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.

CHAPTER FOUR

THE ROLE OF TECHNOLOGY IN THE MODERNISATION PROCESS

Introduction

This chapter aims to recognise the modernisation process within the context of the role technology has played and the wider socio-economic and political changes that took place over the past years, particularly in South Africa. It examines the transitions in political culture in relation to the re-conceptualisation of the role of technology as a factor contributing to the modernisation process, while taking experiences from other countries into consideration. The chapter specifically looks at the modernisation of democracy through technology.

The process of modernisation in SA is closely related to the perspectives of integration and political strategies that have been defined as the "rationalisation of society", which claims the imposition of a specific form of social progress. (Feenberg, 1986). This process is also articulated by Marx's political revelation that originates from the growing rationalisation of society in terms of both technical progress and of his common understanding of society. Modernisation is being perceived as a process of transformation in the political culture that tends to establish new forms of governance and to redefine the links between state apparatuses and socio-economic structures.

In view of this analysis, this chapter examines the role of technology in the modernisation process, and how technology influences democratisation. It is argued that advances in technology reflect the wider challenge for modernisation in South African society. Some of the main features of this process are the changing links between politics and the economy, and the redefinition of political participation and liberal democracy. Furthermore, the chapter argues that modernisation is a contradictory process. There is no era clearly defined by 'modernity'. Tradition and modernisation coexist in a strenuous symbiotic relationship. In the context of South African political dynamics, however, political modernity coexisted symbiotically with the democratisation and the concomitant advances in technology. The chapter makes

reference to both scholastic approaches, as most of the background assumptions derived from the thought that helped to explain the causal relationship between modernity and technology.

The conception of political modernisation

The concept of modernisation emerged after the Second World War as a result of the global dismantling of European empires, and was seen as the development theory concerned with the development gap between the North and the South, and how best to lessen this gap so that the Third World could develop more rapidly and more successfully. It was during this time that humanities and social sciences were swept by a wave of technological determinism. If technology was praised for modernising societies, it was also blamed for the crisis it caused in culture. Whether interpreted in optimistic or pessimistic terms, determinism appeared to offer a fundamental account of modernity as a unified phenomenon.

This early period of the political modernisation phase is the central element of the early discourse, primarily of progress and control over both society and nature, which come together in the notion of the rational society. Rationality in society refers to what Feenberg (2003) calls "...the generalisation of technical rationality as a cultural form specifically, the introduction of calculation and control into social process with a consequent increase in inefficiency". Succinctly stated, it refers to the idea of man's ability to shape both the social and the physical world. This ability of man to take control of his environment is what in sociology is regarded as functionalism, which takes the form of an explicit evolutionist perspective with regard to sociology of development, as that of the modernisation process.

The modernisation process takes a bipolar view of the world, that all societies can be divided into two varieties, i.e. traditional and modern. An influential exponent of this dichotomy was economist WW Rostow. The modernisation process is driven by a number of different ideologies, which share the basic assumption that it is possible to outline the most desirable development of society. Rostow depicted five stages of sociological growth. The first of these stages is the traditional society, which is an astoundingly general category; it links together a vast diversity of different societies, ranging from stone age cultures to France on the verge of its revolution at the end of the eighteenth century. But he asserts that the similarities outweigh the differences

between them. (Rostow, 1960). These similarities include: 'pre-Newtonian' science and technology; a basically agricultural economy; and a rigid ascriptive system based on bloodline, kinship, etc. Until just before the industrial revolution that took place in Western Europe two centuries ago, all human societies were based on this form. This stage of development can be said to encompass all societies prior to the 17th century, which possess little of the structural characteristics that can be seen today.

Next come the preconditions for take-off. This stage is said to be often triggered by a stimulus from outside, such as imperial profit motives. It is characterised by an increase in trade, services, communications, and the beginnings of industry, especially extractive industries, such as mining. The economy becomes more specialised and interdependent, less localised, and self-sufficient. Rational science plays a more major role. An elite group comes to power, which wishes rather to re-invest its wealth rather than squander it. This is the period whereby a society begins to grow at a steady rate, both in quantity and quality. Essentially, the political, social, and manufacturing sectors are reformed to allow growth within all aspects of the country, and the society can be said to be emerging as a modern, market-oriented civilisation. The preconditions for this are various, but can be categorised as a general change in direction through all walks of society, toward the transition from a traditional to a modern society. The final two stages are natural extensions from the take-off: the drive to maturity is the expansion of the newly developed ideas and technology into other divisions of society, that is, a period of consolidation. Modern science and technology are extended to most if not all branches of the economy, and thus the range of leading sectors is widened, and the age of high mass consumption, which is a description of a period of further consolidation and advancement, and is as such not clearly separated from the 'drive to maturity' (Bell, 1973). Because of the high level of economic development, choices can be made about how the society works, and what its priorities are. Wealth can be channelled into individual consumption, as in the USA, or channelled into a welfare state, as in Western Europe, or social and political power. This is the final stage whereby the progress made previously has been fully filtered throughout the economy and culture, and is essentially the state of a country where little or no growth is longer necessary to maintain itself. (Rostow, 1960).

In simplifying the progress that has filtered through the economy and culture, the modernisation process assumes the fundamental proposition that people in traditional

societies should adopt the characteristics of modern societies in order to modernise their social, political and economic institutions. The main characteristic of modernisation is that of its simplicity, which dictates to the traditional society to recognise what is needed, from examination of other 'take-offs' to modernity, for their own culture to evolve. Having been modernised, the modern societies can assist in the evolution of the traditional society, which may not necessarily be the case. As a theoretical model, Rostow's perspective on modernisation is useful in that it is indiscriminate and unsophisticated as it requires little adaptation from one culture to the other. The basis of the concept is that the ultimate goal already exists and can be examined readily, and that this is what the developing country should strive for, hence the technologies that exist could easily be adapted to suit the environment in the developing countries. Although Rostow makes no attempt to isolate individual cases and discover the different ways to adapt the theory to suit the environment, the concept does provide the structure and ground rules to benchmark its applicability within the South African context. (Rostow, 1960).

Based on the foregoing, the South African model could also be depicted from other theories that are central to all modernisation and political development. These theories also present the notion that all societies have passed, or are in the process of passing, from a condition in which a bundle of related characteristics which can be broadly classified as traditional predominates to one in which modern characteristics predominate. A consideration of this series of changes as it relates to politics has been a relatively belated development in political science and rests on the work of social scientists concerned with the broader distinction between tradition and modernity. In its early development from the 1920s on, political science's lack of concern with change (Huntington, 1971), let alone with the modernising change from traditional to modern, can be traced to a number of factors. First, political science was concerned almost exclusively with relatively stable political systems, essentially those of Western Europe and North America. These had elements of change that could be studied, for example the rise and fall of particular political changes in balance of power between executives and legislatures, but did not seem to exhibit fundamental overall change. Political science also neglected fundamental change because its practitioners sought autonomy for their discipline by rejecting historical approaches, a

rejection reinforced by its adoption of behaviourism, which emphasised non-historical evidence such as surveys, interviews and observation.

The rise in modernity and hence in the study of political change, which became synonymous with political development, began in the 1950s as a result of the attempt of Western and particularly American political scientists to come to grips with the changes brought by the Second World War and, where Europeans ruled over dependent territories, the beginnings of decolonisation, in Asia, Africa, the Caribbean and Latin America – the areas that were later to be described as the Third World. Political scientists studying Africa were in the forefront of this movement. Thus, for example, David Apter's study of "political institutional transfer in the Gold Coast" (now Ghana) was researched as early as 1952 and first published in 1955, before Ghana's independence. (Apter, 1955). It was essentially an attempt to explain and predict modernisation; the institutional transfer was from traditional to modern, independence, direct institutions, in terms of Weber's threefold typology of authority.

Apter was a pioneer in his attempt to explain modernity and political development. The work played a major role in first focusing the attention of political scientists on developmental problems. Almond and Coleman (1960) in their book *The Politics of the Developing Areas*, have laid some of the ground rules for the study of political development, notably a characterisation of the distinction between traditional and modern social systems and a functional model of the political system which, it was claimed, had universal applicability. Almond and his collaborators were by no means the only authors to construct models of political development on the basis of these static formulations.

At the most general level, the distinction between modern and traditional is equivalent to a distinction between what are considered rational approaches to social organisation, action, and goals, as contrasted with irrational approaches. Without a predominance of rationality, modernity cannot exist. Already a caution is warranted. Rationality is in the eye of the beholder, what is rational to the self-proclaimed modern man may be hopelessly irrational to the man he has labelled as a traditionalist. Almond's characterisation of the rational/modern dichotomy rests on the pattern variables developed by Talcott Parsons but are part of a long tradition on political

thought. Three of these dichotomies are considered particularly relevant; ascription/achievement; diffuseness/specificity; and particularism/universality. (Parsons, 1951).

In a traditional society in which ascriptive values predominate, individuals will – to take but one aspect of life – be appointed to high office because of their family caste, sex or age. In a society (modern) in which achievement values predominate, an appointment will be made on the basis of clear indications that a person is qualified to carry out a particular function through the skills he has acquired rather than the status he has inherited. Secondly, in traditional society where diffuse values predominate, there will be, for example, little actual specialisation of activities or actors or perception of such specialisation. The economic, political and religious systems will merge both in the theory and practice of participants. By contrast, in a modern society where specific values predominate, individuals will both perceive and act in the knowledge that there are clear distinctions not only between the political, religious and economic spheres but also, for example, between different aspects of the political, such as the legislature, the executive and the judiciary. Finally, where particularist values predominate (in traditional societies), there may be a sharp distinction between, for example, the rights and obligations of different sectors of the population. Only a few might for instance be free men or entitled to own property or to pursue certain occupations. In a modern society where universalist values predominate, obligations and rights applicable to one man will tend to be applicable to everyone. (Nwabuzo and Mueller, 1985).

It should be noted that the above three dichotomies are of course closely related. Universalism, for example, implies an orientation towards achievement values. Finally, to Almond, the dichotomy between traditional and modern is not intended to be a rigid one. No society, or its political system, is from this point of view seen to be entirely traditional or modern. Rather, all political systems are transitional systems. There is also a need to look at the functional model of the political system, which together with the traditional/modern dichotomy forms the basis for the dynamic elements of the model of political development.

Like the characterisation of traditional and modern societies, Almond's model of the political system is by no means original. Aiming to provide interconnected analytical

concepts that would be applicable to any political system – however primitive or advanced – the functional model avoids such formalistic terms as legislature, executive and political party, and certainly any explicit reference to the machinery or characteristics of any specific political system. Whether such reference is implicit is another question. The emphasis is on the functions that the system performs, and the core of the model is developed from David Easton's notion of the political system as having certain inputs. Almond's model can be simply categorised as the input/output process, where for example *Inputs* are socialisation and recruitment, interest articulation, interest aggregation, and communication, and *Outputs* are rule-making, rule-implementation and rule-adjudication.

The model is elaborated in Almond's work in collaboration with Powell, partly to counteract criticism that the original model was static and had conservative implications. Almond and Powell conceded that the earlier framework was suitable mainly for the analysis of political systems in a given cross-section of time. It did not allow for explaining developmental patterns, that is to explain how political systems change and why they change. (Almond and Powell, 1966).

In the model, the outputs are characterised in terms of their relationship to their environment: they may be regulative, extractive, distributive, symbolic and responsive capacities. Implicit in such categorisations is the notion that a successful modernisation process or political development depends on the ability of the political system to adapt its capacities to the changing national and international environment. Such a suggestion is unexceptionable; a political system, for example, must be able to organise the extraction of resources needed to fund its changing activities, or create symbols which encourage the populace to grant it legitimacy under changing circumstances, if it is to survive. Almond and Powell, and some other theorists, do not, however, rest content with a model of political change that is universally applicable, in time and space, if somewhat truistic.. In so far as the notion of a traditional society is at all useful, one could – using Almond and Powell's broadest notion of adaptation – conceive of modernity which, for example, rested on the creation of new forms of traditional organisation. If every society that is not predominantly modern is also predominantly traditional, then indeed this must have happened innumerable times in world history. However, the elaboration of the mechanisms of adaptation that Almond and Powell offer, makes it clear that they are

concerned only with the modernising phase of political change. The model they offer therefore warrants further examination. (Almond and Powell, 1966).

Given the reasons discussed earlier in this chapter for the rise in the theories and models of political development, it is hardly surprising that interest should focus on questions of modernisation. Modernisation was the avowed objective of most of the governments of the new states, an objective looked upon benevolently by the United States – the home of the modern – anxious to maintain or expand its own influence and foster viable political systems after its own image as a buffer against revolution. Most political scientists concerned with political development were American and, as critics were to point out, they not only took up modernisation as a process that should be studied and conceptualised in an objective manner, but often seemed in their enthusiasm to have assumed rather than demonstrated that modernisation was indeed taking place.

The concept of modernisation, itself dependent on the demonstration of substantive distinctions between traditional and modern societies and political systems, is also central to various models of political development by Almond and Powell, Feenberg, Beck, Apter, Parsons, etc. According to them, both the process of political development and its ultimate goal may be subsumed under the concepts of structural differentiation, subsystem autonomy and cultural secularisation. (Apter, 1965). They argue that the political modernisation process results when the existing structure of the political system is unable to cope with the problem or challenge which confronts it without further structural differentiation.

The political modernisation process

Contemporary society is in transition as a consequence of processes of democratisation and the effects of technological accessibility. These processes are said to aggravate a new stage in the political arena in which the general idea of the modern society is being redefined. This phase of political modernisation is a combination of debates on post-traditional and modernity. Some modernist theorists assert that contemporary societies show a new or intensified degree of political, economic and cultural life being strongly influenced by advances in technological

developments and other related developments at global level. Modernism proclaims multicultural and multiethnic societies and promotes the politics of difference, linking the local and the global societies in which identity is not unitary or essential, but fluid and shifting, fed by multiple sources and taking multiple forms. (Ray, 1987). Contemporary modernisation theorists understand change as an accumulation of and within modernity, in which aspects of technology and globalisation are put at the forefront. It seems as though there is no way to overcome the impetus of technology, but at the same time individuals have to enjoy and live with these consequences of modernity. Modern society is seen as a society that assumes to be at a stage of high or radicalised democracy. Essential here is the unintentional and unplanned transition from traditional society to modern industrial democratic society. This transformation to a modern democratic society is understood to be at a phase of development in which the combination of individual, social, economic and natural aspects, created by the momentum of technological innovation, increasingly supports the social and political issues prevalent in a democratic society. As political processes become modernised, society as a whole too can no longer rely upon traditional institutions, and the less it can rely on traditional securities, the more it seeks reliance on technology. (Kumar, 1995).

The concept of modernisation in the technological era

Over the last century society has witnessed a revolution in information and communication technologies that has moved much of the public discourse and agenda setting from the individual and community level to the mass level. As communication technologies and their use by people continue to evolve, there are indications that this trend is now reversing, with some notable globalisation exceptions. With computer-mediated communications, people are reclaiming their communications power from mass institutions. (Clift, 1997).

Studies in the theories of modernisation and technology have made great progress in recent years; they have, however, remained different in the nature and role they have played in society's economic and political sphere. The relationship between the two is somewhat complex, such that it is incomprehensible to make sense out of modernity without an adequate account of the technological advancements that make it possible, and that it is also difficult to understand how the technologies can impact on society without a reasoning of the larger society in which they develop.

Modernisation is premised on the key notion of rationalisation to explain the uniqueness of modern societies. Rationalisation refers to the generalisation of technical rationality as a cultural form, specifically the introduction of calculation and control into social processes with a consequent increase in efficiency. (Feenberg, 1986). But rationalisation also reduces the normative and qualitative richness of the traditional society, exposing social reality to technical manipulation. It depends on a broad pattern of modern development, which is described as the “differentiation” of society. The notion of this differentiation in society has common applications in the separation of real political issues like property and political power, religion and the state, etc. Modernity as a theory relies on the key notion of rationalisation to explain the uniqueness of modern societies.

Technology’s influence in the modernisation process

In the past years, the subject of modernity has been recaptured in the humanities and social sciences, and has gained increased attention. What is striking in the existing literature on modernity is the ambivalent role played by technology in its analyses. Technology is often depicted as the engine of processes of modernisation and as one of the principal icons of modernity. It is the main motor-force of social change that is considered to be economic, more particularly technological change; and as such economic change is alleged to determine the most significant changes in social relations, values, or ideology, and political structure. (Nwabuzor and Mueller, 1985).

The role of technology in the modernisation process involves a complex relationship between its adaptations and how it is applied as an engine of the modernisation process. In terms of its adaptation, specifically the use of the Internet technology, technology seems to be a strong artefact for fast-tracking the modernisation process as it encourages mass interaction around the world due to its public openness and non-proprietary nature, in that there is nobody who can claim to own the protocols. Shapiro (1999:14) suggests that technology has been used to modernise societies, either from the traditional or authoritarian to modern democratic societies.

Democracy in the post-traditional societies in the late twentieth century was characterised by two major trends. The first being the transitions of traditional societies, mostly from authoritarian rule to democratic political system, which Huntington (1991) refers to as the Third Wave of the democratisation process. The

second trend has been referred to as the crisis experienced by Western democracy as a result of the lack of political participation and mostly the domination of democratic processes by special interests in political systems. It is argued that technology impacts on these trends in ways favourable to democracy. Technology has also played a role beyond enhancing the modernisation process within the context of national democracy by facilitating transnational networking, which scholars refer to as the globalisation of democracy.

Huntington (1991) defines democratisation as the transition from authoritarianism to democracy. Democratic transitions involve two processes. The first is the non-democratic government that abdicates or is overthrown, and a democratic government is installed through free and fair elections. The second is rather a broader modernisation process that involves creating a democratic political culture. The latter process commonly commences before a democratic government is inaugurated, fast-tracking the democratisation process, and usually continues after the installation of a democratic government. The following are examples of how advancements in information technology play a role in the modernisation process and consequently in the democratisation process.

The role of information technology in modernising the democratisation process

The Internet has been cited as one of the most powerful artefacts that have been significant in influencing the democratisation process, particularly because of its capacity to be used as a mass media instrument. Originally designed around 1969, it has the potential to enhance opportunities for participation within existing political forums. Many commentators have pointed to the Internet's potential to create entirely new political spaces or to update those historical spaces that have been lost as a consequence of the increased complexity of social and political life. Thus, some have suggested that the Internet offers the potential to re-enact direct forms of democratic engagement amongst citizens through the medium of electronic 'town hall' meetings and even the recreation of something similar to an ancient Athenian public sphere. For those optimistic of the Internet's potential to re-engage citizens in face-to-face, or at least keyboard-to-keyboard, political deliberation, a number of high-profile experiments in the United States are repeatedly cited as examples of the way in which this aspect of communicative technology might develop. (Feenberg, 1986).

For instance, since 1995, the government in Korea has strongly pushed the construction of a National Information Superhighway and is putting its utmost efforts into moving towards an information society. With the wide provision of personal computers, which plausibly can be connected to online services or the Internet in Korea, people are getting plenty of domestic and international information. Information technology has enhanced the possibility that people can communicate with unknown persons around the world, exchange their ideas and experiences, and even develop their own curiosity about new information. The advancement of information technology has also led people to wish for better services and quality of life, and enjoy the rights of free expression.

Information technology and services augment the opportunities for developing public participation in, and awareness of, the political process. The online services played an important role in promoting openness of government. On the basis of a nation-wide information infrastructure, the Korean government at both central and local levels has been actively experimenting with electronic democracy to hear citizen's views on government policy and planning, government activities, and social issues. Public organisations have also been launching electronic democracy projects in many forms. Most of the projects are still in the infant stages of development. However, much attention must consistently be given to the creation of an enhanced information system which will enable the public to engage in an online dialogue with politicians and government officials and participate in government decision-making processes. (Lee and Cho, 1996).

In South Africa the government is setting up a government-wide call centre. It has phased in an electronic system, an e-government gateway, in which a directory of government services will be available. The government gateway project aims to enable the different government computer systems to communicate in order to fast-track service delivery and make services available around the clock. This is done in order to ensure that government goes to the people so that it sharply improves the quality of the outcomes of public expenditures intended to raise the standard of living. Recently the government initiated a Programme of Action which allows the public to track and comment on the government's progress. The Programme of Action is available in five 'clusters' by theme: 'Economic, Investment and Employment', 'Governance and Administration', 'International Relations, Peace and Security',

'Justice, Crime Prevention and Security', and 'Social'. The information on the implementation of the programme is made available every two months after progress reports have been submitted by clusters to Cabinet. The posting of information online forms part of the efforts to realise transparent governance in actual practice, and constitutes an element of the people's contract for a better life. (Brrows, 2003).

There is no doubt that all of the examples in the literature of attempts to re-engage communities in the politics of their locality, point to a number of ways in which information technology can lead to a genuine growth of social capital and the enhancement of local democratic participation. Today's technology can electronically support virtually every aspect of democracy so that, should the need arise for government to achieve more and more sophisticated levels of electronic democracy (e-democracy), focus needs to be driven towards sophisticated levels of e-government, such as online citizen services, which should include a companion progression to more and more sophisticated levels of e-democracy within and beyond its national borders.

Modernisation of democracy through the use of information technologies

Information technology, in particular the Internet, was originally designed around 1969 to allow the exchange of packets of bytes between computers; for a long time it remained restricted to the exchange of scientific data between scientists and secure information within the US government. In the 1990s it became a popular means of communication. In 1993 the US government opened the network to the industry, and the creation of the Hypertext Mark-Up Language (HTML) laid the basis for universal accessibility. Since then its growth has been phenomenal. A survey towards the end of 1999 suggested that 259 million people were now Internet users. Of these 111 million were in the United States, six times as many as the next largest figure, which was for Japan. The survey predicted that the figures would rise to around 490 million by the end of the year 2002. Another survey claimed that over 28 million people visited the Worldwide Web every day and confirmed that it was now spreading rapidly throughout the world and outside the US. As a means of communication it has the potential to revolutionise political activity as it offers the possibility of direct two-way interaction between the citizens and politicians. This has led to predictions that it will completely revolutionise government and democracy, even that the outcome will be a

new wave of democratisation worldwide, as authoritarian regimes find it difficult to survive and as established democracies are transformed. (Ferdinand, 2000).

The impact of the Internet has not been in politics only; it has also impacted greatly on business and society. It has already transformed marketing, procurement and recruitment functions of corporations in the United States. Now the impact is spreading to other parts of the world, partly through the socializing role of multinational corporations. At the same time the Internet has created opportunities for a whole host of new companies, principally dealing with information technology. Whilst making use of the Internet a core business function certainly requires the acquisition of technical skills, in other respects it may reduce the costs of entry into the marketplace for new companies. New companies may, for example, be spared many of the start-up costs of acquiring premises because they can deal directly with clients or customers. (Strommer-Galley, 2000).

The initial benefit of the Internet was its ability to reduce the costs of government administration. It has considerably speeded up communication with colleagues and clients. It has also reduced the costs of transmitting data. And business commentators predict that one of its chief effects will be to reduce the number of intermediaries between the original providers of goods and services, and the final consumers. This 'disintermediation' will challenge the traditional economic functions of wholesalers and retailers, agents, and so on. At least in theory it offers the prospect of more direct selling and more convenient buying. The more futuristically minded suggest a world with fewer large shops as people shop through the Internet, with fewer large offices, as individuals work from home, and fewer publishers, as writers, composers and performers distribute their creations directly through the Internet. They even suggest that the Internet will create a new paradigm of economics. (Ferdinand, 2000.)

Internet usage by people has increased; the Internet not only provides information services for others, it has become an increasing source of reference and has also modernised the education system as well as transforming other agencies that need to process large amounts of information. As a result, the institutions as well as individuals will be able to achieve much more from such usage. For example, the government of Finland has taken to the Internet for internal communication, and for diplomacy too. Previously the Finnish Foreign Ministry was unable to afford a

presence in a large number of countries or a large research staff. It did not have sufficient information about diplomatic issues in many parts of the world to be able to make a constructive contribution to developments. Now that it can rely much more on the Internet to keep abreast of what is happening around the world, it feels capable of a much more significant role in international diplomacy. (Ferdinand, 2000).

Given the modernisation process, the one kind of innovation that the Internet might bring to politics has been managerial expertise and improved service delivery. It has been linked with the assumption that most government departments, even in established democracies, are too dominated by outdated and out-of-touch bureaucracies. This viewpoint is expressed both by individuals and by companies that have a great deal of contact with government agencies. Whether it is welfare claims, or taxation, or planning applications, the experience of those outside the government was that traditionally the bureaucracy seemed to run their affairs primarily for their own benefit and to avoid embarrassment to the party in power, rather than for the good of the public.

Those who argue along these lines believe that the new technology will also open up the processes of administration to outside observers much more effectively than before. In so doing administration will become more transparent, and more amenable to democratic pressures. This will lead to a virtuous circle of increasing transparency leading to greater efficiency and then to greater democracy. This impetus has lain behind many of the proposals for reform at both the national and local levels, namely simply bringing administration closer to the people.

Others wishing to apply benefits to government through applications of the Internet have focused on local rather than central government. In many western countries, local government has suffered from popular apathy and/or official neglect. The Internet has offered an opportunity for improving local government services, and also possibly a new way for ordinary citizens to participate more directly in the decisions that will affect their wellbeing. In Europe there has also been an increasing interest in using the Internet to (re)create a new sense of community, especially at the local level. The European Commission has actively encouraged the formation of new networks of local authorities in various countries, which have achieved a pioneering success, for example the Civic Community network.

Technology and transformation in governments

Governments are usually traditionally orientated and move slowly due to the nature of their organisations and the duty to take all interests of society into consideration when undertaking change. For the moment a difference in cultures is occurring and there is a wide gap between what individuals and groups are doing online and what governments are currently capable of doing online, especially in their relationships with the public. The challenge of governments in a few years to come will be to set out mechanisms on how to embrace more of the public into the decision-making process. More importantly, governments, especially the elected bodies, need to take a leadership role in engaging the public in wide debate on how, or if, information and communication technologies can and should change the current dynamics of democracy. For a while many might argue that being online is essential for politicians to continue to get elected, yet the evidence does not point to this being a deciding factor at this time. The debate is a fluid one. There is a need for society to become partners in a debate on the nature of democracy in its very changed world, which will then lead to ways and means whereby information and communication technologies can be strategic tools for the democratic process. Governments are concerned about the decline in public approval of their institutions. There are tools available that can help reverse this attitude – it is now a question of how extensively these tools can be used to effect this change. As is evidenced in this section, it is becoming increasingly important to engage the citizen. Tools for consultation are still run from the top down but, if done properly, the goals of an interactive government and an interactive citizenry can be reached.

Democracy as practised now by many countries, is an evolving concept. The principles and practice of democratic ideals vary from jurisdiction to jurisdiction, but underpinning all democracies are the underlying tenets of liberal democracy as evolved in the past two to three hundred years. There is representative democracy, and many electoral and legislative forms of this type of democracy, participatory democracy (practised in some jurisdictions, such as the town hall meetings tradition in the United States), and direct democracy (the closest example of this today being the practice of decisions of national importance by a referendum amongst the electorate). (Riley and Riley, 2003).

The following are but a few examples of governments that already exploit this e-democracy as technology to gather inputs from citizens and business to determine a course of action that could take society into a new form of democracy, which would reflect a wider voice of the public:

In Queensland, Australia, the website (www.qld.gov.au) gives citizens an impressive array of opportunities to interact with government. The “Get Involved With Government” choice links citizens to their representatives, to Queensland agencies, and to Parliament. The ‘Queensland Agencies’ link gives citizens background information on an issue, current law or proposed legislation, and invites direct citizen comments which go to the committee and then eventually to Parliament to help formulate policies and standards on a variety of legislative issues. The ‘Queensland Parliament’ link empowers a citizen to make a formal, direct request to Parliament in the form of an e-petition with the object of “persuading Parliament to take some particular action”. Citizens can also review existing e-petitions and add their own signatures in a show of support, or express their objections. The site also surveys users about the e-petition process itself – a built-in quality control and improvement mechanism.

Likewise, the Scottish Parliament was an early innovator in e-petitioning. Citizens can create an e-petition or comment on or add their support to an existing e-petition – all electronically (www.scottish.parliament.uk/e-petitions/index.htm). The International Teledemocracy Centre, founded in 1999 by Scotland’s Napier University and BT Scotland, aims to develop and apply advanced information and communication technology to enhance and support the democratic decision-making process. Their mission includes:

- Promoting the application of information and communications technologies (ICT) by governments and parliaments worldwide in order that elected members and supporting staff can conduct their business more effectively and efficiently.
- Demonstrating how technology can contribute to more openness and accessibility in government.
- Encouraging and assisting the public, voluntary organisations and business to participate in government through the use of technology. (Caldow, 2003).

In 2001 the European Commission adopted an “Interactive Policy Making” (IPM) project to improve the European Union’s governance. Through its website, “Your Voice in Europe” (<http://europa.eu.int/yourvoice>), the IPM collects and analyses citizen and business input to evaluate existing EU policies and to solicit consultations on new initiatives. The purpose is to make EU policy-making more transparent, comprehensive and effective, giving stakeholders an active role in the policy-making process. (Caldow, 2003).

To some extent, the same variable of organisational transformation has penetrated government. It began with internal organisation, but then gradually spread more widely to include government's relations with outsiders, whether businesses or citizens. Certainly part of the impetus for change came from businesses that had begun to adapt to the new technology and expected government to do the same. But in addition the US government recognised from early on the potential for the Internet both to increase the efficiency of its administration and also to reduce its costs. The government spends \$25-billion a year on welfare, \$27-billion on food stamps, ideas where to get job training, and the skills of the workforce further behind. It is an opportunity to use the power of information technology to fight the war on crime, to deliver social benefits to the needy; it is a secure and efficient manner while eliminating fraud and cheating; improves health care delivery, helps to find missing children, and to improve on privacy protection for all citizens – in short, to completely show how government delivers its services to its customers. (Ferdinand, 2000).

This possibility of enhanced efficiency through increased coherence government policies has attracted countries from around the world. Tony Blair’s government in Britain, for example, has been much attracted by opportunities afforded by the Internet to provide ‘joined up’ government. A large part of the rationale for the ‘third wave’, for instance, rests upon the possibility of uncovering resources that can be diverted to the pool members of society, not by increasing taxes on the rich or public owners of industry, but because of the savings that can be achieved through increased efficiency. It was no coincidence that Demos, one of the think-tanks associated with New Labour (Ferdinand, 2000), has devoted quite a lot of attention to new technology, government and democracy.

In East Asia, the Malaysian government of Prime Minister Mahath Mohammed proclaimed the ambition of making the country as advanced as any in the West by the year 2020 on the basis of information technology.

Singapore set out a programme for putting all the population on information technology by the year 2000. And even a country such as China, whose leaders are suspicious of the impact of the Internet on their people and who prevent complete, free interaction with people abroad through it, has become converted to this ambition of putting China on line. Beijing announced that 1999 was the year when Chinese government was put "online." Even non-significantly, in addition to the efficiency advantages that attracted the Chinese government, and the perceived need to provide an IT environment that would invigorate Chinese businesses so that they could compete with Western counterparts, the official announcement also pointed to the increasing 'transparency' that going online would bring to the administration of any government. (Ferdinand, 2000).

The Chinese word "tou-mingdu" was the same as that used to translate "glasnost" before the collapse of the Soviet Union. This was probably not directed so much at increasing popular control over administration, as was the case in the Former Soviet Union, as at increasing the control of the centre over the periphery in China. The stubborn persistence of obscurity and deceit practised by lower-level officials in their dealings with Beijing in the post-Mao era no doubt explains the enthusiasm of the leadership there for the new technology. Nevertheless, greater transparency was also explicitly linked with democratisation, and would certainly be a precondition for it. (Bray, 2000).

There is a general movement towards easing accessibility to information both in the news media and by governments. News agencies are increasing the speed at which and the scale on which they provide information, while giving citizens greater control over the information they want. In the United States, the National Information Infrastructure (NII) Agenda for Action makes provision for easy and equitable access to government information, while in Italy a new law on the need for transparency underlies the creation of a civic network. (Bryan Tsagarousianou and Tambini, 1998). Government and the news media often work together by broadcasting the

deliberations of government bodies, such as the C-SPAN channel in the United States and Parliament Online in South Africa (Ferdinand, 2000).

In Amsterdam, the Netherlands, a project was launched in 1994 by an independent political-cultural centre, De Balie, and a group of former computer activists, the Hacktic Network Foundation (now called XS4ALL). A virtual city was constructed where information providers have different theme-based squares, for example an environmental square, a news square, a health square, a book square and a gay square. Each of these squares has eight buildings occupied by information providers and citizens can build “houses” (homepages containing personal or other information) between the squares. In the public spaces of the squares citizens can have discussions. The project aims to use the city metaphor, a true-life frame, to:

- initiate and stimulate public debate between citizens and between citizens and local government in electronic discussion groups;
- create a platform for distributing local government, public and administrative information;
- assist/support citizens and civic groups to post their information electronically;
- stimulate citizens’ rights and obligations on the Electronic Highway and to look after the interests of consumers;
- provide opportunities for and connection between projects and information providers both nationally and internationally;
- develop instruments which would enable users to obtain access to information services; and
- maintain and expand contact with international community networks. (Francissen and Brants 1998).

The Amsterdam Digital City was such a success in terms of people registering as “inhabitants” and visitors, that there are today some 70 digital cities in the Netherlands. Despite the non-committal nature of discussion groups and the often racist or other bigoted contribution, the digital cities have become an Athenian-style

agora where people come to buy things as well as exchange ideas. (Francissen and Brants 1998 in Pretorius, 2001.)

E-democracy

Webster's defines democracy as "a government in which the supreme power is vested in the people and exercised by them directly or indirectly through a system of representation". Putting an "e" in front of democracy means nothing more than using information technology tools to facilitate, improve and ultimately extend the exercise of democracy.

There are many interpretations of what constitutes e-democracy. This is primarily as a result of the fact that the concept is at the beginning stage and as such there is much confusion about what it encompasses and how to define it clearly.

Steven Clift is an acknowledged expert and leader in the worldwide e-democracy movement. He describes e-democracy as referring to "how the Internet can be used to enhance a democratic process and provide increased opportunities for individuals and communities to interact with government and for the government to seek input from the community" (democracy online <http://www.dowire.org>). Characteristics of the Internet which he feels support e-democracy are that it provides opportunity to participate in debates as they happen, participation is less limited by geography, disability or networks, and it facilitates the access to information and provision of input by individuals and groups who previously had not been included in these debates. For instance, in Scotland an organisation that specialises in e-democracy, the International Teledemocracy Centre, states its goal as "to strengthen democracy through the use of innovative ICT to deliver improved democratic decision-making processes, thereby increasing citizen participation – specifically through the use of electronic consultation and electronic petitions". (Riley and Riley, 2003).

E-democracy has both a tactical side and a strategic side. On the tactical side, information technology has advanced communication and the access to information is arguably better than in any other known medium. But something even more fundamental is at hand. The underlying core principle of democracy is an informed and engaged citizenry. Most governments get passing marks for "informing" citizens via digital communication. But the vast majority have a long way to go to "actively engage" citizens or to effectively exert global influence using digital media. These

elements comprise the most overlooked dimension of e-democracy – the strategic side. How can a government use digital media to both actively engage citizens and advance its public policies to the world community? Engaging your “own” citizens or constituents through digital media includes enhancing active participation in the law-making, policy-making, and legislative processes, all of which are influenced by a variety of forces, public opinion, debate, lobbyists, special interest groups, consultation with constituents, portfolio committee hearings, and expert testimony. The regulatory process, subsequent to enactment of law, follows many of the same communicative and collaborative patterns as law making. It should be noted that the ability to leverage digital technology by political parties, campaigns and candidates is also part of the equation. Voter registration, election or referenda voting, and on-going communication between constituents and their elected representatives, are equally integral to e-democracy. (Caldow, 2003).

Political mobilisation and action coordination using information technology

Another benefit of information technology is the ability of users to mobilise society in order to overcome the limitations of both time and space in their communicative strategies through the near-instant delivery of information to an almost limited number of end-users. Political mobilisation and action coordination as espoused by interest and pressure groups garner support through the use of information technology to force authorities to make decisions as prescribed by their demand. This use of technology is another way of entrenching political decision-making in the modern democratic political system. Near-instantaneous communication technology like the Internet makes it possible to put pressure on decision-makers to act promptly. Having direct access to democracy in the information era could also be a risky business as voters may at times make quick decisions about complex issues without having regard to their situations. In the political sphere, this has opened up intriguing possibilities for organisations seeking to mobilise and coordinate political action where previously the ability to effect such mobilisation and coordination in any systematic fashion required the use of mass-based support and the high of the print and broadcast media. The Internet offers a means to realise such activities without a significant drain on the organisation’s resources.

In the US, within African American communities, the most prominent example of the use of information technology in aid of political mobilisation is perhaps that of the Nation of Islam and its organisation of the 1995 Million Man March. The event was the largest single political mobilisation of African Americans in history and made extensive use of the Internet to advertise its aims, coordinate the activities of organisers and disseminate information on arrangements to participants. These activities were structured through both a subscription-based electronic mailing list and the Nation's dedicated website for the event. While there is no analysis of the precise effect of the Internet's use in this instance, it is clear that the Nation of Islam itself has subsequently sought to expand its use of new communications technologies in the more recent development of its political strategy. The Nation is now at the forefront of implementing innovative technologies in the cause of political communication and education. Using audio and video streaming technologies, as well as more standard text-based information services, the Nation has an array of websites dedicated to different aspects of its work – including an online version of the organisation's Final Call newspaper; a health education website; a national student association website; an online study centre and a web page dedicated to links forged within the Islamic and African diasporas. In addition, the Nation of Islam has recently sought to exploit the potential of the Internet as a medium for political communication through a strategic link-up with America Online's Black Voices Internet site. This site, in conjunction with the Final Call Online, has featured live interactive 'chat' forums engaging Nation of Islam Ministers in debates with the wider public. (Lekhi, 2000).

The example of the Nation of Islam's enthusiastic and other interest and pressure groups' embrace of the use of information technologies as an integral part of their political strategy indicates the power of this new medium as an independent mechanism through which to channel the message of those on the political platform. And to the extent that it is effective in articulating its political programme to an increasingly sympathetic audience, these experiences offer a useful insight into at least one possible direction that might be taken by those who seek to exploit information technology's potential as integral tool of political mobilisation and communication.(Lekhi, 2000).

Information technology has made it easier for groups to organise on a local, national and global scale. Lobbying is more egalitarian because it is cheaper to mobilise

support for a movement. (Wright 1995:42). It is thus easier for those groups usually marginalised in the political process to convey their sentiments to their representatives.

The use of Internet technology by the pro and anti-democratic movements

Internet¹ is usually seen as the new medium with great potential for enhancing societal citizenship and democracy. (Chroust, 2000). Since the onset of the Third Wave of democratisation, rebel movements have used the information and communication technology to overthrow or counter non-democratic governments. Electronic media, like fax machines and video cassettes, were used in the mid-1980s in the Philippine revolution to spread disguised Western and Japanese news content to oust the Marcos regime, and in Panama the News Center in Washington D.C. used Apple computers to translate Western newspapers when President Noriega closed down independent radio stations and newspapers in 1987. These translated articles were laid out to look like news clips and faxed to businesses and corporations where they were photocopied and distributed by sympathetic distributors against the Noriega regime. (Ganley, 1991). However, the 1989 pro-democracy movement in China remains one of the best examples of how Internet technology was used to counter non-democratic governments during the early stages of the information revolution. Students made extensive use of video and audiocassette recording, photocopying, faxing and telephoning, and, for the first time, a vast computer network was employed to further their cause. An academic network linking US, Canadian and Mexican universities was connected to another academic network in Western Europe and a network in Japan and the Pacific basin. After the successful inter-connectivity it then appeared on the bulletin boards so that the Chinese students across the United States, Europe and Asia could post their outcries against the Chinese government. This technology also served as an organisational platform where pro-democracy supporters set up telephone, fax and letter-writing brigades. These were used to supply and coordinate news and messages, exchange Chinese fax numbers, keep lists of the dead and wounded of Tiananmen Square, make arrangements to lobby Washington, mobilise international public opinion, and arrange to get equipment for

¹ While reference is made to the Internet in this chapter, it should also be noted that the Internet incorporates a broad range of information and communication technologies which may include computing and telecommunications.

communication to protesters. (Bumbaugh 1990). The coverage of the Tiananmen Square events by television and radio both in China and abroad added to the effective mobilisation of public opinion and support for the pro-democracy movement.

In his research on silent revolutions, covering 43 societies in four continents, Ronald Inglehart writes that modernisation is characterised by an interlink process of industrialisation, urbanisation, mass communication and, following Max Webber, by rationalisation of all societies' spheres with a dissolution of traditional ties. Modernisation is also marked by the increasing significance of non-materialistic needs, such as demands for political participation or for the protection of natural resources. (Inglehart, 1997).

There are also other examples, like the Free Vietnam Alliance, and the Cambodian pro-democracy, where the Internet is used as a medium to discuss prohibited subjects such as corruption and military or government misconduct, to inform and mobilise public opinion both domestically and abroad, and to organise campaigns against the government. (Eng, 1998). In some cases the Internet is not so much used as a tool for insurgency, but more to focus attention on low-intensity, regional conflicts between people and their government. In Chiapas (Mexico) the Zapatista movement does not have any hope of overthrowing the Mexican government, just as women whose human rights were grossly violated in Afghanistan could not overthrow the Taliban even by mobilisation through the Internet (Afghanistan was a feudal agrarian society with few industrial production enterprises and public services and in 1994 the Taliban marked the revenge of the traditional village against the modern city). Their Internet activities can, however, draw attention to local conditions and problems and if they mount enough international pressure, their governments may be forced to address their problems. (Lutz, 1999).

The neo-Nazis also use advanced technology in their internal and external communications to react to the challenges of a second wave of modernisation; they attack the process of globalisation, worldwide 'dollar-imperialism' and the threat of racial inundation, while at the same time they demand the protection of natural resources against interest of profit and the equal participation of women in the national struggle. (Chroust, 2000).

The Internet has several distinct characteristics that make it suitable for dissident purposes. Firstly, it is possible to hide the identity of the dissident. In the case of Kosovo, Anonymizer (a US IT Company affiliated with human rights organisations) set up the Kosovo Privacy Project, which allowed Serbians, Kosovans and others reporting on the situation in Kosovo to download tools to hide their identity when e-mailing, accessing information or joining discussion groups. Secondly, the Internet has all the audio-visual qualities of television, radio and newspapers combined. For example, in Belgrade an independent radio station's transmitter was linked to a British Broadcasting Corporation (BBC) satellite and transmissions were re-sent from there all over the world, including to 35 other independent Serbian local radio stations. Thirdly, encryption technology, which can be downloaded for free from the Internet, makes it difficult for dissident messages to be intercepted. In the case of Belgrade, tunnel encryption was used to hide the radio channel, making it invisible from the outside. Fourthly, key to the Internet's ability to further dissident causes is the fact that it is not mass media in the traditional sense of "one-to-many" like newspapers, television and radio, but "many-to-many". It allowed friends and family to report on their situation from Kosovo to relatives and acquaintances abroad. These means of communication are often seen as more credible information sources than Western media reports. (Time International, 1999).

Cumulatively these characteristics of the Internet make it a difficult medium to bring under government control. Governments can try to block access to certain sites (for example, the Chinese government has blocked access to such sites as Human Rights Watch, the *New York Times* and *Playboy*) or to require anybody who signs up with an Internet Service Provider (ISP) to register with government security agencies. In China unregistered Internet cafes are shut down and monitoring equipment is installed on all of China's major sites. (Pomfret, 2000). Similarly, in Burma (Myanmar) unauthorised possession of a computer with network capability is punishable by as many as 15 years' imprisonment. These efforts are, however, not insurmountable challenges. It is for example still possible to access prohibited sites periodically as the dozens to hundreds of 'hits' received from China each week indicate. Furthermore, Chinese Internet surfers reportedly get around the electronic barriers by linking up to computers outside of China. (Dobson, 1998).

Conclusion

The understanding of modernity and technology have both presented intriguing debates in social sciences and made strides in political discourse. This chapter has demonstrated how they overlap in their concerns, since it is imperative to understand modernity in order to have regard to an adequate account of the technological developments that make it possible. For how can one study specific technologies without an understanding of the larger society in which they develop?

The concept of modernity relies on the key notion of rationalisation to explain the uniqueness of modern societies. Rationalisation, as the generalisation of technical rationality, reduces the normative and qualitative wealth of the traditional social society, exposing its reality to technical manipulation. Rationalisation depends on a broad pattern of modern developments in technology.

Technology indicates the social complexity of the multiple actors involved with its creation, and the consequent richness of the values in other social phenomena.

Over the last years there has been a transformation in communications that has moved much of the public discourse and agenda setting for society at large. With these information and communication technologies people are reclaiming their communications power and are geared toward building citizen-based efforts that work to ensure that the shift toward communication increases their capacity for participation in democracy, and that the strategically organised use of information technology by citizen-based efforts makes an important contribution to improve democracy. To begin with, information technology holds the potential to raise awareness about political process, of which the ultimate benefit could be a more democratic society – a society where more people are able to hear and listen to each other, have a public voice in agenda setting, and have an increased ability to contribute toward the resolution of public problems. It is generally held that if parliaments and other elected bodies do not institute reforms to develop e-democracy mechanisms there will be severe political consequences, such as the non-election of political candidates seeking office who do not use online technologies to deal with the

voters. These views are based on the belief that the technology-inclined society expects its leaders to communicate with them in this new generation's medium of use.

These arguments assume that there are a host of citizens arming themselves with the tools to have a direct influence on legislative and policy development, and who also have the will, resources and desire to engage in the emerging e-democracy process. Citizen-based electronic democracy (e-democracy) has been able to create the online public spaces for interaction among citizens and organised interests that are for the most part only focused on using electronic communication to further their own goals. In a simple sense, there is a creation of an open and on-going arena for public expression, development of opinion, and accountability.

This chapter has illustrated how e-democracy in the context of information and communication technology is explored as a subset of the greater, and more important, philosophical topic of democracy itself. It set the support for an appraisal of whether or not e-democracy can be an extension of representative and liberal democracy, consequent to the modernisation process as practised in most countries today. It is evident that e-democracy practices, such as online consultations, enhance the modernisation process in the current system whereby the policy governs society, and continues to have limited and controlled inputs from the citizen, as such presenting a new form of democracy. These are pressing issues for modernised governments as the new technologies are contributing to the creation of faster communications, the sharing of information and knowledge, and the emergence of new forms of modern societal cultures. It has also been demonstrated that the political mobilisation and action coordination by members of the society and of pro and anti-political movements as networked communities have quickly evolved through the Internet. They are increasingly using the new technologies to organise themselves so that their voices can be heard, and to develop tools to attempt to influence government policy and programmes at political level.

As modernisation is not static, there are different schools of thought as to whether information and communication technologies will change the nature of democracy, or

if it will simply result in an extension of the democracy we now practise and understand.

The important issue at hand is that there should be a vigorous debate and discussion about the nature of democracy and how technologies can be used to produce a more engaged and interactive society. To make significant changes that would draw the public more widely into the process requires commitment and change of attitude. Cost factors also come to bear on this, as well as the question of how to engage people for their input and opinion. This raises an even more fundamental question of whether the public wants to be more engaged in government, or do they simply want the opportunity to make their views known? And if governments do engage the public more frequently into public debate over issues of the day, how often do they do this? What mechanisms will be available to facilitate this process?

The challenge of governments in years to come will be to set out mechanisms on how to embrace more of the public into the decision-making process. More importantly, governments, especially the elected representatives, need to take a leadership role in engaging the public in wide debate on how information and communication technology can change the current dynamics of democracy. There is a need for society to become partners in an issue on the nature of modern democracy, which will then show the way to how the information and communication technologies can be strategic tools for the democratic process. For instance, governments are concerned about the decline in public participation in the democratic political process. Officials in the United States, Canada, and the United Kingdom are seeking ways to combat voter apathy, especially because of the declining engagement amongst young people. Some argue that this is rather a political problem, and that there will not be significant shifts to new forms of democracy or participation by the citizenry because of information and communication technologies. They suggest instead that the new information and communication technologies will serve only to strengthen existing democratic institutions, but not dramatically change the legislative bodies of public sector institutions. There are tools available that can help reverse this attitude – it is now a question of how extensively these tools can be used to effect this change.

There is a suggestion that the evolution of e-democracy could take society into a new form of democracy, which would reflect a wider voice of the public. But there is no clear vision of what such a democracy would entail, and how it would differ from current practices or reflect the overall society.

In the current system of democracy, elected officials, and the institutions adopted from this system, have been governing as usual in the interests of society. So the question is: will information and communication technologies and the tools that continue to be developed enable people to have access to more information and to communicate better with government? This is often a negative if there is too much information or a lack of organisation or critical skills to assess the importance of the information that can then be turned into knowledge. Both these abilities could be a result of the rapid modernisation of societies as a result of the emergence of these information and communication technologies.

Technology is one of the mediums and a driver of the modernisation process, bringing in new and important trends in society to the extent that they are driven by new ideas, conceptual constructs that contain innovation, and creativity. It facilitates change, its access and usage result in enlightening evolutions because societies organise and administer themselves, but they are never the driver of ideas, only the facilitator. Original ideas come from the mind of one person or from collective debate which then drives philosophical, cultural, societal, organisational, and administrative change. Thus the use of information and communication technologies for the purposes of e-democracy principles, as articulated to date, is only the beginning, and simply a driver on the road to possible new forms of democracy. It is how it is being used as a medium and the way in which society frames the debate that will result in these new forms and an extension of the current structures of democracy.

It is apparent that technology is having some impact on both governments and society, which will bring society to a possible new level of a system of democracy that will reflect its increasingly changing culture, built on the strength of the forms of democracy that have been developed over the past years.

Lastly, when the modernisation process has taken effect and society being at least democratised, a democratic political system must ensure that democracy functions as expected. In order for it to function properly, society must have access to information technology. The advantages of the technology include the fact that information can be accessed from almost anywhere, communications between citizens and the government can be made easier, and that both citizens and the government can enjoy cost advantages if the new technology is employed correctly. More extensive use of government information is possible, without limiting benefits to any one member of society.

Information technology gives the authorities a very powerful tool to strengthen the rule of law. Information technology can – and will – affect democracy in a political system. It is important to note that the benefits of information technology in reinforcing democracy depend, to a great extent, on what facilities citizens have, i.e. computer literacy and access to computers. An increased amount of governmental information available through the new media will not reinforce democracy if there is neither common computer literacy nor easy access to computers for each and every citizen. Instead, the gap between those who have and those who do not have good access to information will increase. Authorities must guard against this in an effort to provide equal access to information technology. Information technology should be able to give citizens an equally better chance to exercise their rights as information provides the basis for decision-making by voting. Information technology will enable citizens to get closer to the ideal of an informed choice. A democratic state should attempt to guarantee all its citizens full and equal access to such technology and the options it offers.

CHAPTER FIVE

INFORMATION TECHNOLOGY AS AN IMPERATIVE FOR SECURING DEMOCRACY IN SOUTH AFRICA

Introduction

The turn of the century has seen many nation states transcending to post-Fordist societies. Information technology (IT) particularly has been diffusing to large numbers of nations all over the world and is now cutting edge of socio-economic development. It has come to be seen not only as a developmental issue in itself, but also as a necessary component of all other developmental programmes.

The ominous characteristic of modern information technology threats to democracy is that they change the proverbial convention of national security embedded in democratic political systems. National security no longer refers simply to the conduct of wars among nations, but rather to the protection of its citizens, interests and property from outside threats of any kind, thus the protection of democracy.

Technology, as in other areas, is a double-edged sword. While it greatly empowers those who would or might threaten South Africa, it also empowers South Africa in the effort to defend itself and harm its opponents. For instance, while technological advances may put missile technology in the hands of rogue states, they may also enable South Africa to defend itself against missile attacks.

There is a need to maintain a balance between threat and opportunity. The nature of threats to South African security and the available means to contend with them are changing with lightning speed, and it is vital to remain conscious of these changes and their implications.

The South African democratic political system no longer views national security as predominantly a military and police problem but rather as incorporating political,

economic, social and environmental concerns. Of paramount concern is the security of its people. Security is thus an all-encompassing condition in which individual citizens live in freedom, peace and safety, where society participates fully in the process of governance and enjoys the protection of fundamental rights; have access to resources and the basic necessities of life; and inhabit an environment that is not detrimental to their health and wellbeing. The objectives of security policy therefore encompass the consolidation of democracy and political stability. Stability and development are regarded as inextricably linked and mutually reinforcing. (White Paper on Defence, 1996).

The development of technology has been inextricably linked to national security concerns. Nations' efforts to arm and defend themselves against others have often driven them to engage in scientific research and development, in the hope of making use of the resulting technologies. Computers were first used to direct artillery shells against moving targets. The Internet was created by the Pentagon to safeguard vital communication in case of nuclear attack. Advances in most forms of technology have been carried out in the name of national defence.

The genie of technology is difficult to contain once released, and others can soon turn advances made by a nation against it in their own defence. A country may, for instance, create the atomic bomb as deterrent, but other countries may copy its efforts, thus threatening its security. The Americans, for instance, created the Internet but must now face the possibility that rogue states or even individuals could use it against them.

The expansions in personal electronic media along with the exploitation of computer-telecommunications convergence have paved the way for the creation of a worldwide web of networked computers. Expansion of cyberspace into virtually all spheres of human activity and the growing number of Internet users worldwide exacerbated the concept of information technology, which has changed the world. The nature of these changes is, however, contentious with conflicting explanations of the impact of the information technology revolution and the relationship between technology and national security, which invariably underlie the character of threats and vulnerabilities in a democratic society. In this respect it is deserving to review the nature and character of national security as presented by the challenges in information

technology. Given the national security aspects and its relationship with information technology, it is imperative to note that, other things being equal, democracy is usually prevalent where threats and vulnerabilities are minimal. This study investigates and departs from a self-constructed hypothesis that advance in information technology may enhance political stability in a democratic political system, and that where stability is maintained, threats and vulnerabilities are minimised and thus consequently a perennial national security can be enhanced. Therefore the absence of threats and vulnerabilities also reduces the high level of insecurity in a democratic political system.

The nature and scope of information technology²

Information technology (IT) is the term that describes the disciplines encompassing systems analysis, programming, telecommunications and multimedia (combining audio, text and video information) applications. It came into common use in the late 1980s, supplanting other terms such as electronic data processing, management information system, information resources management, data communication, etc. (<http://govt.ghana.gov.gh/story.asp?ID=68.02/07/19>). The term could also be credited to former US Vice President Al Gore, who coined the phrase in the early 1990s as a piece of political rhetoric to capture the imagination of the US electorate. (Tsagarousianou, Tambini and Bryan, 1998). Information technology is the concept that is generally used to refer to the use of computer, electronics, and telecommunications equipment for processing and distributing information in a digital form. Martin 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. (Martin, 1988).

Information technology is deeply seated in computing, telecommunications and microelectronics technologies and its distribution from the Worldwide Web network, from individual to industry services, which includes television broadcast and electronic mail service. According to the United States Commission on National

² The terms information technology (IT) and information and communication technology (ICT) are inextricably bound and are used interchangeably in most literature resources. However for the purpose of consistency in this study, the term IT will be used throughout, unless otherwise specified.

Security in the 21st Century, the entire world will be linked by 2025, so that from any stationary or mobile station it will be physically possible to send and receive near-instantaneous voice, video and other serial electronic signals to any other stations. (USCNS, 1999).

To have a comprehensive approach as to how these technological capacities could have an influence on national security, it is important to perhaps outline developments in these areas, i.e. information, communication and technologies (ICT).

The development of ICT has undergone several stages, encompassing to capture, store, process, transport and display information. Eventual constraints upon the distance, speed, volume and reliability of information handling have progressively been reduced. The current stage in the development of information and communication technologies is marked by the substitution of more powerful, reliable and flexible digital systems. The technical foundations of this process lie in the innovation of a common language of microelectronics for both computing and, later, telecommunications. (Schiller and Fregoso, 1991). With the development of digital switches and digital transmission facilities came the transition from analogue to digital networks. The process accelerated, and by the late 1980s most of the office telephone switches in the advanced industrial market economies had been digitised.

Information and communication technologies (ICTs) encompass 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.

There is the general view held by many scholars that the basis for the current information revolution has been the advent of the radio or television, or even computers. However, the basis was the magnitude of transformation of the microchip, and its impact of microelectronics on computers and on telecommunication devices has been compact, cheap, reliable and disposable (Martin 1988). Microelectronics has been the basis for the developments both in computing and in telecommunications. Bankes and Builder (1992) maintain that it was the developments in solid-state electronics that brought all of these devices, i.e. telegraph,

telephone, radio, television, and electronic computers, into practical form that could be mass-produced and distributed to individuals throughout the world.

The developments in information and communication technologies did not occur separately from one another. Digitisation meant that all the media became translatable into each other (Brand in Saxby 1990) and this has been fundamental to the information revolution. Convergence, that is the ease of interaction between information and communication technologies, occurs at different levels and in different directions. Martin (1988) asserts that convergence is not only the marriage of two technologies but also the erosion of functional barriers as between data processing and communications as well as the vertical integration of industries. As voice (traditionally the terrain of telecommunications), data (computing), text (publishing and library services) and video (broadcasting) are translatable into one another, service suppliers become more interrelated. (Cowie 1989).

The information technology is not only about developing the broader scope for ICT but the fact that it has been diffusible to societies. The scope of information and communication media that are available for personal use and to an extent controllable by individuals, has expanded tremendously from TV sets and citizen band radios in the 1940s to desktop and laptop computers, personal fax machines, handheld video cameras, cellular telephones, cable television and satellite uplinks in the 1990s. (Ganley 1991).

These expansions in personal electronic media along with the exploitation of computer-telecommunications convergence have paved the way for the creation of a worldwide web of networked computers. In the late 1960s the US Department of Defence embarked on a research project that would be the precursor of the Internet, as it is known today. A decentralised computer network was established to link several research sites, universities and other institutions conducting experiments to maintain military communication in the event of a nuclear attack. Because the Internet was never linked to any critical military application or system and was burdened with security classifications, black budgets, or secret technical specifications, Chapman (in Pretorius, 2001) suggests that it is precisely the research character of the Internet that explains why it was so easily absorbed by the civilian sector and commercial enterprises.

The spread of modems and networked computing in 1990 brought the Internet to average citizens and commercial enterprises. A wide range of interactions became possible in cyberspace, such as browsing information stored on other computers and searching databases, exchanging electronic mail, participating in discussion groups on a multitude of topics, and increasingly engaging in e-business. (Kitchin, 1998). Expansion of cyberspace into virtually all spheres of human activity and the growing number of Internet users worldwide exacerbated the concept of information revolution that has changed the world.

The information technology (IT) sector is unique because it represents a scientific discipline and industry in its own right, as well as cutting across all other sectors. Even a cursory glance at the other sectors reveals the all-pervasive role of IT at the close of the 20th century. The IT sector is also unique in its pace of change and the rapid convergence of 'traditionally' distinct areas of human endeavour - broadcasting, print media and telecommunications. Indeed, it is almost impossible to construct a definition of IT that will last longer than about six months. The boundaries shift continually. While other manufacturers and energy suppliers are presently the largest global corporate players, new IT conglomerates are challenging this position. (Hamelink, 1997).

The nature of these changes is contentious however. Conflicting explanations of the impact of the information technology revolution can be traced to different theoretical approaches towards the relationship between technology and national security, which invariably underlie the character of threats and vulnerabilities in a democratic society. The democratic South Africa cannot be discounted from developments in information and communication technologies that did not occur separately from one another. The country's exposure to this digitisation means it is also party to fundamentals in the information technology.

Information technology in South Africa

The South African democratic political system operates in very challenging circumstances as a result of dynamic social, economic and technological developments. One of the challenges it faces is the challenge of advances in information technology that can expand or impede democracy. Information technology can make it easier for people to follow up on bureaucratic decisions, party politics, economic policies, welfare agenda, legislation, etc., to express their will and keep check and balances on the government, and can also mobilise and rally support for specific interest. ICT can make policy-making a more participatory approach. Numerous failures of democracy in some African states have been cited as being directly linked to the inability of some African parliamentary democracies to generate enduring popular support among their populace, which is seen as incomprehensible and distant. (Lyons and Lyons, 1999).

The technology as panacea approach misses key elements of the circumstances facing some African states. A case presented in this regard is the World Bank's effort in which US\$6,5m has been spent since 1995 on establishing a long-distance learning capacity that will obviate the need for local teachers, libraries, and even paper. Yet an established fact is that the sporadic delivery of electricity power in (South) Africa creates obstacles to the Internet's reliability and utility. (Alden, 2001).

In order to have a clear focus on the South African environment it is also important to have a global overview of ICT circumstances that influence the socio-economic and political perspectives that are a potential for the conflict.

The nature of global conflict has changed during the past century. The bloody battles of the First and Second World Wars were followed by the Cold War in which the tensions shifted from a military to a political nature. A more recent shift is that the world is currently embroiled in a global economic battle. One of its consequences is that economic security will become an increasingly important part of national security. (Pistorius, 2001). Economic changes also affect productivity output as influenced by advances in information technology.

The new mode of production, which is centred around information technology and instantaneous worldwide electronic communication, has become dominant in the era

of multinational capitalism. (Louw, 1994). South Africa took interest in strengthening its information and communications capabilities. It is understood that the technologies that had lifted the advanced industrial countries to exceptional economic and material wealth could be used to accomplish the same results in South Africa as an emerging economy.

Perspective on information technology and democratisation

Looking at the accounts and lessons from other spheres it is interesting to note that most developing countries' policies were concerned with the availability of technological products, rather than with the more complex problems of the associated political, economic and cultural integration of such products. In South Africa a different approach was followed, and ample attention was given to meeting the infrastructure needs for an industrious adaptation of technology. Policies regarding technology choice were identified, as well as problems in implementation, as the democratic nature often requires over-stretched public consultation on alternatives.

Policy-making was characterised by an emphasis more on the national system of innovation as a framework of policy and policies set out in the White Paper than on the promotion of effective distribution of available knowledge as a critical function in this context. (White Paper on Science and Technology, 1996).

Another critical issue to draw from developing countries is that in these countries, where mostly the transferred technology increased considerably in volume such that it usually consisted of end-products rather than of technology as such, much of the transfer took place as intra-firm movements, that the conditions under which transfer took place were often disadvantageous, and that much of the technology was inappropriate, obsolete, over-priced, or all of these together. (Hamelink, 1997).

The introduction of IT, such as telephony, television and satellite communications, in developing countries, began to show a specific pattern of social benefits in the 1970s. Various studies suggested that the primary beneficiaries were the companies that provided the equipment, like the telephone companies, banking consortia providing the financial resources, and local administrative leaders who used the new technology.

Often unforeseen negative secondary effects occurred, such as serious balance of payment problems associated with the capital intensity of the new technologies. (Clippinger, 1976). In the same period employment and economic growth were covered by the acquisition and adaptation of manufacturing technology, which brought rapid growth in employment and incomes, particularly in the Republic of Korea, Malaysia and Singapore. The industrial revolution was triggered by technological change, and most economists argue that technological progress plays a pivotal role in sustained long-term economic growth. Cross-country studies suggest that technological change accounts for a large portion of differences in growth rates. (UNDP, 2001).

During the 1980s these countries took a stand to share the expectation within industrial nations that innovations in telecommunications and computer technologies could markedly improve industrial performance and increase economic productivity. There was a common belief among them that ICTs in fact enable developing economies to leapfrog over industrialisation into a post-industrial society. With this hope, developing countries began to launch policies and programmes to acquire a share in international satellite communications and trans-border data flow networks.

There was also anxiety concerning the possibility that ICTs might imply serious social risks. People were concerned about issues like the potential for cultural colonialism, the replacement of jobs by machines, and the erosion of individual privacy, national sovereignty, hence national security as such. Towards the end of the 1980s these fears seemed to have abated, and the general view on the relation between ICTs and national security entered a third and current phase. This phase is driven by a very strong fear of being left behind and being cut off from the emerging global digital highway. Therefore the "digital divide" is on to create and broaden ICT links. (Hamelink, 1997).

The current levels of IT amongst South African citizens tend to be weak and proportionate to levels of income, education, race and gender. The use of ICTs in South Africa presents a challenge that should be viewed as an important agent for change in overcoming social problems and closing the information gap.

The advance rate of information technology has influenced the social, economic and cultural changes, which have stretched the resources of the strongest economic sectors.

As South Africa has adopted a National System of Innovation (NSI), many argue that technological innovations, particularly in the information and communications technology (ICT) sector, are the main drivers of these changes. Some authors refer to an emerging 'knowledge society' as the fundamental cause. The operational meaning of information and communications technology covers digital technologies facilitating the acquisition, processing, presentation, management and communication of information. These technologies include the microelectronics, computer and telecommunications industries, etc. The ICT sector is dominated by the rich countries and a few large, international corporations, while on the other hand small entrepreneurs with the right niche products are able to enjoy rapid growth with reasonably modest start-up costs. Over half of the growing worldwide information processing market is related to software production. Growth areas include software packages and systems integration services.

South Africa is the 20th largest country market for ICT products and services, accounting for 0,6% of worldwide revenues. 60% of PCs are connected to networks, which compares favourably with OECD norms. In the Financial Services sector there are 74 PCs per 100 employees; with around 24 in Wholesale and Retail; 17 in Manufacturing, and 7 in Government. (IMD, 2002).

Over 95% of hardware revenues by distributors are from imported products and components. South Africa contains a third of all main lines and 85% of all cellular subscribers in Africa. Telkom, 70% state-owned, is the 28th largest telecommunications operator in the world. Its expansion is being financed on the international bond markets with the intention of reaching undersubscribed peri-urban and rural areas and becoming the primary international African hub for telecommunications, computing media and international services.

South Africa is regarded as the largest global system for mobile communications (GSM) market outside of Europe, and the fourth fastest growing GSM market in the world. By 1997, 20% of the country's telephone volume were mobile units. In 1993/4 the telecommunications industry was estimated to have a turnover of roughly R3-billion, employing some 7 200 people. ICT professional services had a turnover of R2,3-billion in 1995, but little of this was spent on cutting edge research and development. (IMD, 2002).

The Industrial Revolution produced a social pact among governments, workers and employers, which sustained growth in capitalist economies for over a century and spawned competing ideologies to the right and left. That balance is now being challenged by a shift to new ICT-mediated modes of producing goods and services. The new paradigm is enabled by ICTs, while simultaneously driving the development of new ICTs.

Distance and time are no longer limiting factors in production. Companies locate operations based on local labour skills and costs, taxation and incentive arrangements. Concentration on 'core business' provokes outsourcing and the creation of 'virtual business entities'.

Within the economic perspective, the ICT deployment challenges the bureaucratic/industrial organisational model. For instance, the "7 x 24 working" is replacing the working week with part-time, more flexible hours and shifts to short-term flexible contracts. The service sector is becoming dominant in the marketplace. Labour market flexibility may reinforce insecurity and isolation in the industrialised world and lead to less tolerance of different conditions and value systems.

The information technology industry resounds with great expectations for a profitable all-digital future and an exponential increase in consumer purchases of digital devices. Chipmakers such as Intel, in particular, in 2001 spent \$7,3-billion on capital investment to help build manufacturing capacity and increase manufacturing efficiency. They expect enormous growth in the market for digital consumer electronics: digital set-top boxes and decoders for satellite and cable television; video-

game consoles; digital videodiscs and small-size dishes for direct digital broadcast television. (Intel, 2002).

There is a clear indication in most literature that in hardware, the most important trends of the recent past have been increasing speed, miniaturisation, more efficient energy use, greater capacity, and lower costs. These tendencies may continue. But in addition there may well be completely new developments, such as the optical computer that processes information through light waves instead of electrical pulses. Universal digital fibre optic networks may combine with wireless networks to expand communications capacity enormously. Meanwhile, one of the latest developments in digital convergence is the symbiosis of television sets and personal computers that creates new forms of interactive television, a recent example being with DSTV interactive, making the television act as a personal computer to be able to shop, send e-mail and use the TV. (DSTV, 2002).

ICTs are dominant in the global market. Trade in ICT products and services was worth over \$1 trillion in 1995. On the one hand the G7 countries and a few large, international corporates dominate the ICT sector, while on the other hand small entrepreneurs with the right niche products are able to enjoy rapid growth with reasonably modest start-up costs. The trend amongst the major world economic players is to extend their markets into developing countries.

The world competitiveness yearbook ranked South Africa's investment in telecommunication at number 4 out of 47 countries, where 1,165% of the GDP was spent on telecommunications with 118 people per 1 000 number of mainlines per inhabitants of the country in 1999. The number of mobile telephone subscribers in 2001 was 234,2 per 1 000 inhabitants. (IMD, 2002).

Challenges and disparities in information technology

Concern about the information gap between rich and poor, and rural and urban communities, is well founded. There seems to be a wide-ranging perception in the scientific literature and in public policy statements that the ICT gap between the haves and the have-nots in South Africa is widening, and that this hinders the integration of the country into the global information society.

The hype and fervour about the digital divide makes it difficult to gain an overall understanding of the problem, the different approaches to solutions, and, what is really making it difficult, the fact that there are multiple definitions of the "digital divide", conflicting reports of whether it is growing or shrinking, and a range of opinions on the key factors affecting it. What is clear is that the disparity between the "haves" and the "have-nots" is growing, and that the potential impact on society, whether good or bad, will be exacerbated by technology. In fact, the digital divide is a complex problem that manifests itself in different ways in different countries. It presents both practical and policy challenges. Moreover, it is apparent that solutions that work in one country cannot simply be transplanted to another country's environment. Solutions must be based on an understanding of local needs and conditions. (Bridges, 2002).

The infusion of ICT in South Africa paints the existing landscape of poverty, past discrimination and division onto the new canvas of technology use. Because ICT can reward those who know how to use it with increased income and cultural and political advantages, the resulting digital divide shows up in increasingly stark contrast. Therefore, ICT disparities usually exacerbate existing disparities based on location (such as urban-rural), gender, ethnicity, physical disability, age, and, especially, income level, and between "rich" and "poor" communities.

The gravity of the ICT gap in South Africa can be presented by posing the question whether communication technology is leading to globalisation or polarisation? Current access to ICT runs along fault lines of society, dividing the educated from the illiterate, men from women, rich from poor, young from old, urban from rural. (UNDP, 1999.) This is clearly confirmed by the situation where only 11 percent of

black/African families have telephones in their homes, compared with 43,6 percent of Coloureds, 77,2 percent of Asian/Indians, and 89 percent of whites. (Cape Times, 7 Sep 1999:3).

The widening gap in information technology capacity raises serious questions about whether the poorer communities will be able to overcome the financial obstacles that hamper their access to information technologies.

Since reducing the IT gap requires a major financial effort, one central concern is whether the foreign and local business communities are ready to provide the massive investments needed for the technology innovation and the upgrading and expansion of networks in South Africa. To understand the magnitude of the challenge, it is useful to remember that the world competitiveness yearbook 2002 has ranked South Africa 39 out of 49 countries, with the number of Internet users per 1 000 people being 67,53, compared to 267,96, and the number of computers per 1 000 people being 79, compared to the 309 of the 49 countries ranked. (IMD, 2002).

Total reliance on international initiatives and foreign investment poses some serious concern, while being self-sufficient requires massive capital investment. For instance, South Africa's telecommunication investment of 1,165 percent of the GDP is hardly sufficient to compete globally and enhance socio-economic development. These international initiatives coincide with continuing concern about the appropriateness of the technologies being transferred and the capacity of recipient countries to gain control over them. In fact, there is at present no convincing evidence that the owners of advanced technologies will change their attitudes and policies towards the international transfer of technology. Throughout the past decades, the prevailing international policies in this field have erected formidable obstacles to the reduction of North-South technology gaps. There is no indication that the current restrictive business practices, constraints on the ownership of knowledge, and rules on intellectual property rights that are adverse to developing country interests are radically changing. And, in this case, there are no realistic prospects that the relations between ICT-rich and ICT-poor communities will change in the near future.

Furthermore, the key actors in international ICT policy-making have expressed a clear preference for leaving the construction of the global information infrastructure to "the forces of the free market", and there is room for doubt as to whether the institutional arrangements of a corporate-capitalist market economy allow for the development of an equitable information society. At any rate, it is important to think carefully about whether, given the realities of the existing international economic order, there can be any serious reduction in existing ICT disparities. It may well be an illusion to think that ICT-poor countries can "catch up" or keep pace with advances in the most technologically advanced societies. In the North the rate of technological development is very high and is supported by enormous resources. This is certainly not to say that poor countries should not try to upgrade their ICT systems. But they should not do so in the unrealistic expectation that those who are ahead will wait for them. The situation may improve for poorer countries, but the information divide between North and South is not likely to go away. (UNISRID, 2001).

South Africa, having taken on the concerns of the "digital divide", through President Thabo Mbeki's initiatives in October 2001 organised the first meeting of the International Presidential Advisory Council on Information and Communication Technology, where global corporate and other leaders in the ICT environment met to advise on the complex, dynamic and exciting area of human activity. The first task of the Council is to close the digital gap that already exists between the world and South Africa. (Mbeki, 2001.) There is a general belief that, without adequate access to the system, South Africa cannot hope to be economically competitive. Therefore the "digital rush" is on to create and broaden links with electronic networks in the fields of trade, finance, transport and science. Such a position is inspired by recognition of the obvious benefits that digital information and communication technologies have to offer in a number of ways.

There is also the preponderance of educational problems in South Africa. Education facilities, for example, could be improved by using ICTs to facilitate distance learning and development through the use of online library access. In this regard, there are very promising pilot projects in schools that have been linked electronically for the provision of a host of online services. Electronic networking has also been used to improve the quality of health services, since ICTs permit remote access to the best diagnostic and healing practices and, in the process, cut costs. (Durant, 1996). Digital

technologies for remote resource sensing can provide early warning to sites vulnerable to seismic disturbances, and they can identify suitable land for crop cultivation.

South Africa is in an extremely precarious position with regard to international competitiveness. According to Pistorius (2001), the country's sustained poor performance in the competitiveness domain is a national threat. The growing ICT demand in South Africa finds expression in waiting lists for telephone connections, growing use of cellular systems and rapidly expanding numbers of Internet users. To meet this demand, consideration of information and communications technologies is increasingly becoming an integral part of national development agendas. The planned increase in telephone lines in South Africa has presented challenges, which resulted in Telkom experiencing continued growth in data and multimedia revenues largely from the corporate sector. During the 2000/2001 financial year Telkom installed approximately 2,1 million lines, taking the total to 5 million fixed lines in the country. According to BMI-TechnKnowledge and IDC, it is estimated that revenue from the provision of telecommunication services has reached R48-billion, approximately US\$4bn, and it is expected to grow at a rate of 10,5% per annum. With the approval of the second national operator (SNO) and as South Africa's approach to the gradual liberalisation of the telecommunication industry, it has undertaken to sell a portion of its share in Telkom in an initial public offering (IPO). (SNO, 2001).

This is expected to be achieved largely through a massive inflow of foreign capital. And, to encourage the latter, countries are deregulating and opening their markets for equipment manufacturers and service providers. A rapidly increasing number of developing countries are scheduling the privatisation of their telephone companies.

Looking at this phenomenon, South Africa has over the past five years inaugurated its cellular networks, of which the cellular industry has been described as an economic miracle generating more than R15-billion worth of economic activity. The growth in this market has been spectacular, with a current subscriber base of over 8 million (Vodacom 55% and MTN 45%) and extensive infrastructure rollout. The high growth

in cellular phone use by both high and low-income communities has seen a third cellular operator (Cell C) being licensed in 2001. (SNO, 2001).

A holistic approach which aims for real access to technology is needed that will be effective and sustainable so that people can put it to use to improve their lives. Improving the lives of people through the diffusion of ICT may raise societal concern, which may not be overlooked in attempting to bridge the digital divide, particularly when concerns become issues of national security.

Balancing the discourse on democracy and information technology

Information technology is important not only because of its value in advancing science and technology but because it has very laterally changed almost every aspect of life in an astoundingly short period of time. The ways in which society works, governs, educates, shops, entertains, communicates and maintains aspects of national security are dramatically different from those of the last century. Information technology has democratised nation states and has also shaped the strategic environment in political systems. It has dramatically increased the interconnectedness of people around communities, societies and the world.

The implementation of information technologies has now made it possible to monitor millions of people in their daily activities around the clock, to store information about their misdemeanours forever, and to re-create their experiences through information manipulation.

The ethical challenges posed by information technologies are rooted in conventional questions such as privacy and intellectual property, which are more pressing in the context of information and communication technologies. With more information available there will also be more information that people would prefer to have censored. Although this has always been the case to some extent, the total velocity and flexibility of information transmission now make border controls less realistic than ever before.

Information technology also obscures dividing lines between the mass media and the private sphere. In fact, this convenient division between regulatory domains is disappearing. Private e-mail can be broadcast to a million receivers, most of whom never asked to receive the message. In addition, information technologies have made the manipulation of data, images and sound so easy that it is possible to use and reuse all sorts of materials without consulting the initial author-owner. Rules against piracy activities cannot always be legally enforced, and a large grey area of contested intellectual ownership emerges. It is precisely for this reason that issues of security are necessary, and where the line can be drawn with regard to the protection of privacy.

An additional threat to privacy involves the use of medical and biological information. The collection of sensitive personal data through diagnostic techniques like genetic screening is becoming a reality; and these techniques can generate information about future diseases. The potential for the exclusion of "high-risk" persons from employment or health insurance is great under such circumstances. A real prospect looms that firms may sell genetic profiles to insurers and employers. The violation of privacy will follow the spread of advanced digital technology around the world. Admittedly, people have very different conceptions of privacy. The protection of privacy is important not only for individual citizens but also for nations. Information technology creates transparent societies and "glass-house" countries that are very vulnerable to external forces which can undermine their sovereignty. (De Vries, 1990).

Not only does information technology magnify security concerns, it also raises completely new security issues that are intimately related to specific features of these new technologies. Questions arise, for example, in connection with its reliability at a time when it is depended upon. Information technology involves risks. If the technology is tampered with, airline passengers may die in a crash, patients may be seriously injured, companies may go bust, or enemy forces may gain advantage. Should the information technology fail and cause great social and political harm, the responsibility of the different actors involved must be defined, e.g. hardware manufacturers, software designers, and users,. This becomes especially complex, however, when in the course of events electronic agents, smart robots, or other

intelligent software makes decisions, or when decisions are based on the information provided by expert systems. Increased vulnerability to technology failure in many aspects of life is reinforced by the unreliability of digital computers. Forester and Morrison (1990) argue that computers are inherently unreliable as "they are prone to catastrophic failure; and secondly, their very complexity ensures that they cannot be thoroughly tested before use".

National security issues are raised by the possibility of combining human beings and electronic systems in cybernetic organisms. The dividing lines between humans and non-human systems begin to blur, and questions arise about the moral quality of this new existence. (Schroeder, 1994). What are the implications of creating software robots that might permit an information resurrection of the dead? What enormous power does this bestow upon those who can create such personality constructs? And how can this power be socially controlled? To what extent can the information technology power be polarised? (Schroeder, 1994).

Edward Luttwak (1998) maintains that during the cold war local and regional conflicts were often instigated or at least encouraged and materially supported by the rival great powers. Now by contrast it is the absence of the functioning great powers that is the cause of the world's inability to cope with violent disorders that persist even in the absence of instigation, encouragement or military support by the great powers. The result is that not only aggressive small powers, such as Serbia or even Burundi, not only an armed secessionist of all kinds, but even mere bands can now impose their will or simply rampage from without in today's world, even when there is neither the danger of great power wars nor the relative tranquillity once imposed by each great power within its own space of influence. (Luttwak, 1998). IT has changed South Africa as an emerging economy in fundamental ways. Its mechanisms, both powerfully revolutionary and subtly insidious, will continue to change the landscape of communication, commerce, national security and community, for years to come.

The relevance of information technology in defence research and development to sustain democracy in South Africa

The South African defence industrial complex in 1995 achieved a sales turnover of R678 million with direct contribution to the economy. (NRTA, 1998.) The defence industry in general is a repository of technology and its technology strategy should be seen in the context of the National System of Innovation (NSI) that the development and application of science and technology in South Africa should be central to the success of the Growth and Development Strategy as it seeks to address the needs of all South Africans in the maintenance of political, constitutional, social and economic changes introduced by the government. The NSI as an enabling framework for science and technology is intended to support the government's Growth and Development Strategy. This is imperative as it will be central to the empowerment of all South Africans as they seek to achieve social, political, economic and environmental goals. The development of innovative ideas, products, institutional arrangements and processes will enable South Africa to address the needs and aspirations of its citizens. This is particularly important within the context of the demands of global economic competitiveness, sustainable development and equity considerations related to the divided society of the past apartheid system. (White Paper on Science and Technology, 1996).

The preservation of a strong technology base is a requisite of the defence strategy and must serve to maintain the capability to detect threats, being aware of trends in military technology and their implications for the defence. The technology base should be able to produce technology demonstrators that can rapidly be turned into military technology if necessary, be capable of providing expert advice for procurement purposes, provide test and evaluation services, and support upgrade and maintenance activities.

The essential concern of defence technology in South Africa has been whether sufficient spin-offs can occur for the Defence Research and Development budget to have a positive effect on high-technology development in the civilian sector. The spin-off paradigm focuses on the military products, processes and organisational innovations, including national technology infrastructures and firms that transform

and enhance the civilian economy. However, there are also instances of "spin-on" technologies, that is technologies developed in the civil sector that have found military applications.

There is increasing predominance of dual-use technologies in the defence arena, where performance requirements for commercial markets have caught up with military specifications, and the increasing development costs can now be supported as easily by the volume of sales of consumer products as by the guaranteed markets of military procurement. Product life cycles in competitive markets are considerably shorter than those for military systems. In this sense, the civilian economy has proved itself an even more voracious consumer of technology-intensive products than the military.

It is clear, therefore, that the future of the South African defence industry cannot be seen as distinct from that of its civilian manufacturing counterpart and that dual-use concepts should be understood and applied. The view that defence technology should be phased out in favour of civilian technology, or converted into it, is not tenable. Instead, the defence industry must make special efforts to leverage spin-offs in the civilian sector and to develop relationships with civilian institutions in the NSI to promote spin-ons. It is via this partnership route that the defence industry will achieve its rightful place in the mind of the South African public. (White Paper on Science and Technology, 1996).

Information and communication technologies will not by themselves change existing institutional settings. This will need processes of political decision-making that are guided by the genuine aspiration to bring about sustainable and democratic social development. The UNESCO World Science Report warns that the use of ICTs within conventional social and institutional frameworks may not only hamper the realisation of possible benefits, but may also reinforce the possible social risks (UNESCO, 1996).

Conclusion

The arguments presented in the preceding sections suggest that a number of issues require extensive research conducted on national security and information technology. The main purpose of further study and debate would be to provide policy makers with analytical perspectives and empirical data that create a better match between technological potential and preferred futures. It is assumed that these futures should be both sustainable and democratic.

The first area could be concerned with the design of democratic and pro-active policies and programmes that make it possible to realise the socio-economic development potential of information technologies. Among other things, this entails studying the roles that public and private sectors should play in the design and execution of these policies and programmes; the forms of public intervention that are conducive to shaping technological change in accordance with desirable social goals; and the establishment of new and more democratic relations between producers and consumers of ICTs, so that technological progress becomes much more responsive to social needs.

A second area of concern is centred around the definition of those social and institutional changes that are required to maximise the social benefits and to minimise the social risks associated with the adoption and deployment of information technologies. This entails considering various ways of adjusting the organisational structures that are relevant for economic productivity, political participation, and cultural diversity in line with preferred social scenarios; and the cultural appropriateness of educational methods and training materials required for the realisation of the technological potential. Again it is important to discuss the design and adoption of information technologies that strengthen sustainable national security. This involves creating information technologies that reduce the threat and vulnerabilities, and encouraging environmentally sustainable applications of IT.

The future of information technology and national security is compounded by uncertainty – no one knows how the technological advancement will continue to unfold. The goal for the future will be to somehow bridge the theoretical possibilities with technological capability. Research focused on the goal of ubiquitous information

technology will be concerned with a number of important technological obstacles, such as how society could enjoy the benefits of information technology without nation states being too worried about its impact on national security, and society that is ready for a pervasive system that surrounds its communities and monitors their day-to-day activities as there is a worry that ubiquitous networks will present new and emerging challenges to personal privacy which may destabilise security.

Some scientists suggest that the most powerful 21st century technologies, for example robotics, genetic engineering, and nanotechnology, could threaten to make humans an endangered species. Bill Joy predicts that as technology advances, humans will increasingly delegate responsibility to intelligent machines able to make their own decisions and, referring to the writings of Theodore Kaczynski, known as the Unibomber, wonders whether these same machines might not reduce humans to "the status of domestic animals". (Joy, 2000).

Information technology is shaping the strategic environment in which a conflict may take place. For instance, revolutions in military affairs are the dependent variable driven by mostly the political, economic, social and ethical dimensions of the information technology. Given that IT has contributed to the dramatic increase in the interconnectedness of the South African society and people around the world, it is imperative that there should be good entrepreneurship, and government policy that encourages and supports equity, development initiatives and sufficient funding to finance them. The major problem in the South African situation, particularly in deep rural areas, is that without basic electrical and telecommunications infrastructure programmes and universal service initiatives by government, information and communication technology companies will have little incentive to develop new products to meet the needs of people who cannot use or afford their existing services. And, government policies will become ineffective without ground-level programmes to take advantage of them.

Finally, information technology could in future greatly benefit society if its advancement is harmonious with the needs of the people.

CHAPTER SIX

SOUTH AFRICA WITHIN THE CONTEXT OF A DEMOCRATIC POLITICAL SYSTEM

Introduction

This chapter explores the need for, and development of, a model for the analysis of the democratic political system within the context of South Africa. A core approach is advanced which allows for the realisation of a democratic political system as well as other imperatives that motivate and affect democracy and the existence of links that exert their influence within a political system.

In this chapter the three components of the core approaches, namely democracy, political system and South African democracy, are expanded and examined separately. This part of the chapter will look at the elements that exist in a political system and later at what constitutes a political system to be democratic as a whole, together with its subsystems as its analytical component. It will also explore the political processes as subsystems. It is therefore necessary to explain the political system and processes in assessing how far these elements can be linked in upholding democracy.

Explaining and defining democracy

The origin of the term democracy can be traced back to ancient Greece. The word democracy is derived from the Greek word *kratos*, meaning power, or rule. The word therefore means “rule by the *demos*”, the *demos* referring to the “the people”, although the Greeks originally used this to mean “the poor” or “the many”. (Heywood, 1997). Democracy in essence means to designate a government where the people share in directing the activities of the state, as distinct from governments controlled by a single class, select group, or autocrat. The definition of democracy has been expanded, however, to describe a philosophy that insists on the right and the

capacity of a people, acting either directly or through representatives, to control their institutions for their own purposes. Such a philosophy places a high value on the equality of individuals and would free people as far as possible from restraints not self-imposed. It insists that necessary restraints be imposed only by the consent of the majority and that they conform to the principle of equality.

Democracy is an expression often used to describe Western democratic political systems, such as Australia, the United States, Britain, New Zealand, Canada and other nations. It refers to political systems in which there are attempts to:

- defend and increase civil liberties against the encroachment of governments, institutions and powerful forces in society
- restrict or regulate government intervention in political, economic and moral matters affecting the citizenry
- increase the scope for religious, political and intellectual freedom of citizens
- question the demands made by vested interest groups seeking special privileges
- develop a society open to talent and which rewards citizens on merit, rather than on rank, privilege or status
- frame rules that maximise the wellbeing of all or most citizens.

It is generally agreed that liberal democracies are based on four main principles:

- A belief in the individual, based on the idea that the individual is both moral and rational.
- A belief in reason and progress, based on the belief that growth and development are the natural conditions of mankind, with politics the art of compromise.
- A consensual theory of society, based on the belief that society is a kind of mutual benefit association, based on the desire for order and cooperation, rather than disorder and conflict.
- A suspicion of concentrated forms of power, whether by individuals, groups or governments.

Accordingly, liberal democracies are organised in such a way as to define and

limit power in order to promote legitimate government within a framework of justice and freedom:

Power: Efforts are made to define and limit power, usually by means of a written constitution. Checks and balances are instituted, such as the separation of legislative, executive and judicial power. There are conventions of behaviour and an equitable legal system to complement the political system.

Legitimacy: The notion of a legitimate government with a mandate/authority to rule is crucial. Governments require a high degree of popular support, derived from an electoral system that allows for popular, free and frequent elections with the highest possible franchise.

Justice: This is achieved by the full implementation of the equitable things already mentioned so that citizens live in a climate where representative democracy prevails, tempered by constitutionalism, free elections and restraints of power, so that all citizens are treated equally and accorded dignity and respect.

Freedom: For freedom to exist there must be the freedom to make decisions, to learn from them and to accept responsibility for them. There must be the capacity to choose between alternatives and the freedom to do what the law does not forbid. Prohibitions should exist for the general good and there should be respect for political and civil liberties. Liberal democracies often experience disputation about the appropriate role of government in economic matters, some groups arguing for a totally free market, whilst others support varying degrees of regulation and intervention.

A democratic political system

Democratic political systems have been varied, from those of the Greek-political system to the more contemporary complex structures, with common structures to every democracy, freedom of opinion, expression, press and organisation, as well as institutions whereby the people decide on behalf of others through an election in which voters have a free choice, an independent court system and a respected legal system, and minimal violence in a political system. Freedom and equality – the two-pronged approach to democracy – are inextricably bound and there cannot be much of one without the other. Freedom can be assured in a democracy, and the need for political rights is inseparable. (Diamond, Linz and Lipset, 1988)

Democracy means popular control and, to that effect, the then President of America once defined democracy as "government of the people by the people". Government of the people means government on behalf of the people, government by the people means representative government, and government for the people implies that government should be carried by the persons responsible in that nature. It is the responsibility and nature of the government that it is encompassed within different components, legislature, executive and judiciary, in which the distribution of these components concretises the degree of democracy. (Held and Pollit 1993)

Essential characteristics of the political system

Aristotle (384-322 BC) maintained that man is by nature a political animal. The essence in this notion is that of social existence as to politics, by implication, two or more human beings interacting with one another are invariably involved in a political relationship, hence human beings, as they try to define their position in a given society, try to extort personal security from available resources and also try to influence their fellow men to accept their point of view, they find themselves engaging in politics. Thus the only way to maximise one's individual capabilities and to attain the highest form of social life was through political interaction with others in an institutionalised setting in which a political system is able to provide an environment for conversion to take place. (Rodee, Christol, Anderson and Green 1983)

From the above it is clear that there is a need to analyse so as to avoid an oversimplified assumption. Consequently, before any conclusion can be drawn it is important that the environment in a political system should be taken into consideration so as to validate the fact that an analysis of all factors is significant in a political system. The central concept in this discussion is that the political system and its components, like the political processes, exist as subsystem.

The notion of the political system derives from the recognition that the purpose of government is to make and implement decisions for society. The process of decision-making involves the process of allocating goods and services to members of the society, and the allocation of values as policy-making is concerned with values and authority because the political system needs to be acceptable to the society for the

implementation of its policies.

Political system as an analytical concept suggests that the authoritative allocation of values goes through a series of phases that arise from the fact that the political system is the mechanism by which policies are decided. It is this idea of policy making which implies the existence of a succession of phases. It is in this that policies will first be initiated, elaborated and then implemented (input – conversion – output).

Conversely stated, the political system converts demands and support in the form of input, which corresponds to the initiation phase as output, and the conversion process takes place in between, i.e. in the main or core. (Easton 1969 and Almond and Coleman 1960).

The inputs are the responses of all kinds exercised on the system which is activated by way of the demands and which can then elaborate on decisions which will become outputs and be presented to society.

The sequence, input, conversion and output could be divided. The input can be described as having an articulation of demands as an activity consisting of ideas that are presented for discussion and in due course for decision, and the aggregation of demands as an activity which consists in bringing these demands together in a bundle, like policy guidelines to decrease problems by reducing inconsistencies.

Various activities correspond in the output phase, in which rule-making or initiating is the most general, and the first aspect of the conversion process – the rule implementation details, rule-making and rule adjudication – takes place when there is a conflict over rules. These phases, which are called functions, suggest that there is a sequence in which there is articulation and aggregation of demands, rule-making, rule implementation and rule adjudicating, in which they are generally referred to as institutions to describe components of the political system. (Almond and Powell 1966)

Succinctly stated, a political system is a system that deals with political matters, being a structure with interdependent parts which, like any system, has activities that are interrelated and which all define the inner boundary of the system. It is an attempt to

view the political arena in the organised form of a system, hence it possesses the input, conversion and output functions. In any given political system, it is taken that the inputs in particular circumstances are public interests and demands of various types, be it substantive inputs which are more of demands, and support or functional inputs which constitute the expression or articulation of various interest. Citizens may link themselves to the government as active participants or by way of input as to taking part in the work of an organisation. Demands do not always seek change but they do seek government action. (Easton, 1979)

Demand and support are marked out as inputs to the decision-making system; they are essential to the system because they feed definite information into the main or core system. The core or main of the political system is the democratic decision-making representatives or mechanism; they convert input into output. Government is the decision-making instrument that receives inputs and emits outputs since it constitutes the formal government structures. Output from the democratic decision-making mechanism is public policy, which is understood to be laws and government proclamations that are made, enforced or adjudicated. (Hanekom, 1987)

In the political system demands and support of input do actively give one an understanding of the manner in which the environment influences the workings of the system. Demands combine a broad scope of subjects and activities that are transmitted to the system. Without ignoring the importance of support in the input, one would consider demand, in that the flowing into a system constitutes one of the major sources of stress behaving on its important variables.

A demand may be defined as an expression of opinion that an authoritative allocation with regard to a particular subject matter should or should not be made by those responsible for doing so. As such a demand may be quite narrow, specific and simple in nature, as when grievances and discontents relevant to a given experience are directly expressed. For example, exposure of corruption in government may give rise to a demand for control. Broad pleas for better government without specification of the exact steps to be taken represent a highly generalised demand. (Easton, 1975).

Demands have a built-in direction towards the authorities. Directionality of demands

is important as demands are specified and produce accepted binding decisions. They may be expressed or implied.

Every political system function in an environment and certain characteristics of its particular environment contribute materially towards determining both its form of government and its policy output. In a political system the form of government can be understood only against the background of the environment in which it operates. It is generally assumed that a democratic government is likely not to survive in a nation whose people are bound to non-democratic modes of thought and behaviour; hence it is important to give meaning to a democratic political system, and even though the form of democratic political systems has been varied, there are common aspects prevalent to the existence of democratic political systems. (Ranney 1975).

Description of a democratic political system

Ever since the time of Plato and Aristotle, most political scientists have sought to discover universally valid descriptive statements that accurately describe and explain political systems and processes. A general characteristic, which tends to suggest that a political system is democratic, or non-democratic, constitutes a standard principle. It is standard because it explains the way in which the government that runs the country has decided to frame the political system, and as such the manner in which the government runs the country is based on the recognition that government itself constitutes a system, i.e. a political system, because it is engaged in an activity in which a number of elements are interrelated, through which policies are initiated, developed and implemented. (Easton, 1969) These elements include structures that are established by the constitution.

Essential elements of a democratic political system

The political system is composed of sets of institutions, organisations or groups, some of which are set up by a constitution as political processes, and many of which are not. These components and elements together form the framework within which decisions are taken. It is only by understanding how these institutions, organisations and groups can allocate values in a society that these elements and components can exist within a political system. Hence it is essential to describe these elements and components to be able to obtain a detailed picture of what a democratic political system is.

A democratic political system is more than a set of constitutional rules and procedures that determine how a government functions. In a democracy, government is only one element coexisting in a social fabric of many and varied institutions, political parties, organisations, and associations. This diversity in a political system is referred to as pluralism, and it assumes that the many organised groups and institutions in a democratic society do not depend upon government for their existence, legitimacy, or authority.

The following are what most authors would consider to be reasonable, essential elements of democracy:

- Sovereignty of the people.
- Government based upon consent of the governed.
- Majority rule.
- Minority rights.
- Guarantee of basic human rights.
- Free and fair elections.
- Equality before the law.
- Due process of law.
- Constitutional limits on government.
- Social, economic, and political pluralism.
- Values of tolerance, pragmatism, cooperation, and compromise.

Many organisations operate in a democratic society, some local, some national. Many of them serve a mediating role between individuals and the complex social and governmental institutions of which they are a part, filling roles not given to the government and offering individuals opportunities to exercise their rights and responsibilities as citizens of a democracy.

In an undemocratic society, virtually all such organisations would be controlled, licensed, watched, or otherwise accountable to the government. In a democracy, the powers of the government are, by law, clearly defined and sharply limited. As a result, private organisations are free of government control; in fact, many of them lobby the government and seek to hold it accountable for its actions. Other groups, concerned with the arts, the practice of religious faith, scholarly research, or other interests, may choose to have little or no contact with the government at all. In this scope of democratic political system, citizens can explore the possibilities of freedom and the responsibilities of self-government, unpressured by the potentially heavy hand of the state.

The character of a political process in a democratic political system

It is understandable that within a political system the political process is based and concentrates on the organisation and operation of institution which makes the law, enforces it, and settles controversies arising from different interests and various interpretations of the law.

Political process, being generally accepted, implies a recognition that legislatures, executives, and the judiciary do not operate independently of either one another or of the other political organisation in society; they include political parties and interest groups which together with the more formal institutions of government, constitute the political system, which implies that politics involves citizens' attitude and interests, group organisations, and implementation, interpretation of law and policies. It is in the attitudes and interests that different elements and components necessary in achieving a democratic political system are discussed below. (Sainsbury, 1988 and Rodee et al., 1983)

Democratic political process refers to a set of requirements that applies to the institutions and that makes it possible for the citizens to participate in political decision-making processes within a political system. In absolute terms, support for democratic efficacies is widespread. One becomes content at significant levels of endorsement of democratic elections, rights and liberties, political equality and democratic forms to be prevalent in most countries. Most of the criteria used to determine conditions for democratic political process correlate, which leads one to postulate the existence of a general underlying dimension of democratic efficacies. Various conditions of the democratic political system go naturally hand in glove; it is therefore necessary to effectuate a functional meaning of democracy. The triad of democracy, freedom, and equality are inextricably bound in approach and functional meaning. There cannot be much of any one without the other; only in a democracy can freedoms be assured. The demand for political rights is also inseparable from the call for freedom. Again broad political participation is the best evidence of equality in a democratic political system. (Nwabuzor and Mueller, 1987).

It is for this reason that Montesquieu (1689-755) presented and argued that all

functions of the political system could be encompassed within the separation of power that is basically a reflection of what happens in the political world. It is fairly a clear description of the proper function of the government in any democracy where liberty is best assured by the distribution of these different functions among separate institutions of government. (Renwick, 1980).

Given this perspective, from Montesquieu's presentation of the political process, they do not operate and function independently from one another or of the other political organisation in society; primarily, they include political parties, interest and pressure groups, which together with formal institutions of the state constitute the democratic political system, which means that politics, complex as it is, involves citizens' attitudes and interests measured by the public opinion for the formulation, implementation and interpretation of policies. (Maidment and McGrew, 1986).

The effect of public opinion in a political system

The wide acceptance of the democratic thinking led to the idealisation of the role of public opinion in the democratic political system, as to the public being interested in making the laws of the country, the public having the right to know, deliberating and reaching national consensus. Rationally conceived, individual opinions would be held unvaryingly throughout the social order. Having reached consensus as to the democratic political process, the public would make its will known at the polls and in one way or the other, the will or views of the majority would be enacted into law, and continued surveillance and constant criticism would ensure the maintenance of an enlightened public opinion and consequently a public policy will be based upon the environment in which there is demand for democracy and justice.(Budge, 1994).

In any given society, when responding to the challenges of the environment in which one finds oneself, it is one method by which an individual adjusts to the demands of day-to-day life. It is rare that a day passes that an individual does not express his or her views either for or against many subjects. Taking no account of particular case or exception, it is believed that opinions are the end product of the interrelationships between a person's values, beliefs and attitudes, which do not exist in isolation but among others members of the public. (Rose-Ackerman 1978).

As such the public cannot be regarded as a conglomerate and undifferentiated mass of people. Essentially, a public is a segment of society comprising many different types of publics which may be identified by a specific geographic base, such as political system, nation, country, city, peri-urban or rural, and may share common interests. Most authors maintain that "public opinion" is the expression of all those members of a group who give attention in any way to a given issue. Public opinion represents the collectivity of individual opinions of a designated public, thus each issue has its own public. (Dye 1978).

The foundation of an individual's opinion rests upon his or her value systems that represent the objective one wishes to achieve. It is through one's attitude that the belief system finds expression. They structure and focus on beliefs, serving as a frame of reference to guide our thinking and behaviour in a political system.

Political behaviourism in a democratic political system

Naturally men have developed methods by which they can resolve disputes among themselves and agree upon goals, which they wish to pursue by cooperative action. The existence of a common procedure for resolving disputes and reaching common decisions is an important requirement in any political system. Such agreements can be reached by surrendering the right to decide to one person or by fighting to determine whose will shall be reached by either arriving at an agreed view, consensus or by accepting the decision that commands majority support in different situations involving different types of issues. One may wish to insist on a unanimous vote or approval by more than a simple majority. (Elcock, 1976).

A variation upon this decision procedure is for the public to elect representatives who will make decisions for them and who they will hold periodically accountable for their decision by requiring the representatives to submit to re-elect at regular intervals. Thus, a political decision procedure involves discussions and debates followed by a decision which is broadly acceptable to all parties, or is at least not so unacceptable to any party that members decide to oppose it to the point of disrupting the system. This led to the in-depth study of behaviouralism, which most social

scientists found to be more meaningful in reaching a national political decision. (Lindsay, 1992).

The reason why behaviouralism has developed in politics is that it has been the growth of other social sciences. The main reason has been a reaction against the traditional approaches to politics, legalistic study of formal political institutions and a normative and speculative political theory. (Stadler, 1987).

Political institutions are traditionally observed by examining the contents of a country's constitution and law, and interpreting them, rather than by considering how political actors conduct themselves in the context of constitutional law. Of importance is that appearance does not necessarily bear much relationship to reality, the crux is what are individuals' attitudes and informal relationships, rather than the formal structure of power. (Held and Pollit, 1986).

The behaviouralists wanted to see how people carry on with their activity, whatever the formal rules of the constitution and the law might say, and they sought to do so by looking for objectives and indisputable facts which could be analysed systematically. It is given that in any political system political behaviour does affect facts, which are objectives and can be verified by anyone who wishes to check them. There is no question of reality being determined by the observer's viewpoint or ideology. (Lindsay, 1992).

Political behaviour may affect politics in any political system; it raises issues of central importance and it also enables us to answer questions such as the nature of consent, the operation of representatives in government and the extent to which public officials will execute policies as having a bearing on the political socialisation of communities which make up their political culture, the political attitudes, values, feelings, information and skills possessed by the political community, and in political life, on the basis of protecting their interests. (Nwabuzor and Mueller, 1987).

Political culture as a variable in the political system

The characteristics of political socialisation and a close group of opinion, attitudes and beliefs that make up a society are in turn part of the society's political culture and

are important variables in helping to answer some fundamental and enduring questions as to what accounts for a society's political stability or instability. The answer is partly in terms of the extent to which the actual conduct of politics and the moral tendency of citizens coincide with the norms of behaviour prescribed by the political system. (Jaros, 1973).

Some centuries ago, one author declared that, since force is always on the side of the governed, the governors have no support but opinion. When minority groups command the means to destroy millions of people, one may, to qualify this, in a political system, say it is still relevant to say that the people of a country can render it ungovernable, more especially when their grievances are not being investigated so as to institute correctional measures. (Parry and Moran, 1994).

If that being the case, one can safely say that the political system depends on the support of the people. Stable government can be assured only if it is able to retain that support, thus increasing an understanding of the link between the structure of a society and the attitudes of its members on the one hand and the political process on the other. If people are used to running their private lives democratically, they will expect the political system to be run on the same lines and will be able to accept the problems and responsibilities that go with such a system, coping with the continual presentation of contradictory proposals. (Parekh, 1992).

Fundamentally the political culture of any society is made up of the political attitudes, values, feelings, information and skills possessed by the members of the political community. It is reflected in a nation's ideology, in attitudes towards political leaders, in the duties of citizenship, in the conduct and style of political activity, in what is considered to be political or not. (Almond and Verba, 1963).

Basic aspects to any political culture would involve the cognitive knowledge and beliefs people have regarding the various characteristics of the political system: How much do South African citizens know about their national political structure? Does their knowledge begin and end with President Mandela? Do Americans living in South Africa understand the way of doing things in the South African political system or are they more informed regarding the US? This has an effect in that it involves

people's feelings about various characteristics of the political system. For instance, do the people of Rwanda feel loyalty or patriotism towards the regime in Rwanda? Do most South Africans feel admiration for the personality of President Mandela? Lastly, it is also evaluative, in that this involves judgements and opinions regarding the political system and occasionally involves a combination of values or standards with information, i.e. cognitive aspect and affective feeling aspect. How do citizens evaluate their government's performance?. Their judgements are likely to rest on the leading members of the regime as well as on certain values or moral criteria. Thus the cognitive and effective orientations are important aspects in evaluating the cultural way of a political system by integrating the various political substructures, components or elements. Taking it from the history of South Africa, it is necessary to transform the political culture so that it fits the evolving democratic political system. (Almond and Powel, 1966).

Members of a political community can never share the same orientation towards the political system, importantly so for the stability of any political system, that there should be common assumptions and beliefs that will be shared so that the political culture can evolve into relatively political toleration at all angles. Political toleration should be able to resolve dividing issues as in any political system, outputs, as policies, which are popular with some section of the citizens, are bound to be extremely unpopular with others; and the result will be political strife and instability, which will render the executive institutions ineffective.

Political tolerance as an imperative in a political system

A democratic political system requires relatively moderate tension among its contending political forces. And political moderation is facilitated by the process capacity to resolve key dividing issues before new ones arise. For instance, if the issues of religion, self-determinism and the role of the traditional leaders are allowed to accumulate, they reinforce each other and the more reinforced and correlated the sources of cleavage, the less the isolation from heterogeneous political stimuli; the more background factors pile up in one direction, the greater the chance that the group or individuals will have an extremist perception. These two relationships are joined by the fact that parties reflecting accumulated and unresolved issues will

further seek to isolate their followers from conflicting stimuli. (Macridis, 1983).

Within these relationships, similarly, peoples working in isolation are likely to find the world outside their settlement and their business strange, intimidating or at best irrelevant, and will therefore tend to be apathetic towards the political system or alienated from it. Generally toleration depends on the extent to which people mix with a varied selection of their fellows and on their level of affluence, which can include a societal level and the amount of education available. Education should also give a person a deeper understanding of his own views and position in life, besides giving him more information about other people's background. He will become more tolerant of others who have origins, beliefs, attitudes or accents different from his own.

Education is often, not always, an important determinant of levels of toleration. In Germany and Italy, both problematic in terms of the congruence of their political system within the attitudes of their people, education made little difference to the low levels of allegiance to the political system.

Political attitudes, not ignoring toleration, are linked with other attitudes and these are formed by the social activity groups of which the citizen is a member. Opinions and group membership are either superimposed one upon another, presenting the individual with a series of competitive views of the world which support and strengthen one another, or cross-cutting, presenting a variety of different and possibly incompatible views. This latter collection of attitudes and affiliation is more likely to lead to toleration, since it will accustom citizens to dealing with and reconciling different points of view within their own minds. Superimposed opinions or membership will confirm the individual's rightness of existing convictions. Hence the degree of exposure of an individual, a group, or society to either superimposed or cross-cutting opinions or activities will have important consequences for his or their level of toleration.

A particular interesting set of social institutions, from the point of view of the creation of political tolerance or dogmatic political attitudes, is the churches. Most churches are authoritarian structures and their members tend to be associated with one party or

another – social groups and organisations clearly have a considerable influence upon political attitude and the extent to which the citizen is exposed to diverse or consistent opinion will help to determine the strength of his party self-image and the extent to which he is prepared to tolerate the opposition being active and winning power. Thus they have a large role in determining whether conflict in a given society is of intolerance and is sufficient to render the political system unworkable.

A meaningful democratic political system will also be impossible if there are insufficient expressed differences of opinion to give rise to a political debate about which members of society can care sufficiently to involve themselves in or at least to give it a reasonable share of their attention. (Gibson, Duch and Tedin, 1992).

It is therefore imperative that in any political system there has to be a level of political toleration that will in effect help either to facilitate or deepen democracy. It suffices to mention that there are certain conditions necessary for attaining a meaningful democratic political system.

The South African democratic political system

South Africa's National Party apartheid regime can be mapped out back before 1948 when it came into power. The 1910 apartheid Constitution of South Africa provided for an all-white government and gave a continued system of discrimination and oppression. A number of discriminatory measures were taken during this time, including the enactment of the 1913 Land Act which effectively deprived African people of their land. This was also the time of the birth of the African National Congress (ANC), which provided the largest mass-based forum for the freedom struggle in South Africa. The struggle for freedom reached its height in the 1970s and 1980s, when State repression and internal opposition intensified and international attention was focused on the plight of South Africans. One of the significant developments in this period was the adoption of the 1983 Constitution, which unsuccessfully attempted to restructure racial and political arrangements while keeping power in the hands of the white minority. It created a tri-cameral parliament that sought to co-opt Coloureds and Indians into the national parliament in separate houses. The African majority were excluded from this political system and were

relegated to black local authorities in their townships and the so-called 'independent' homelands and self-governing territories. While South Africa was isolated from the international community, this period also saw the rise of the United Democratic Front, a mass-based umbrella body, which identified itself with the African National Congress in exile.

The beginning of 1990 saw the unbanning of the ANC and the release of political prisoners. In 1993 the ANC, as the chief negotiator on behalf of the liberation movement, the government and other political parties came together to negotiate South Africa's transition to democracy. A number of organisations and structures that formed the broad liberation movement worked together in developing policy positions and determining priorities for a new South Africa democratic political system.

One of the priorities for the new South African democratic political system was to have a constitution. An interim constitution was implemented and then later the final Constitution. One of the most important reasons for the success of the process of drafting the final Constitution was the use of technology. The Constitutional Assembly's public awareness and education campaign strategy used several ICT platforms to engage the public in its campaigns. The campaigns were designed to educate the public on constitutionalism and basic rights, as well as to elicit the views of the public on the content of the new Constitution. The use of technology involved several strategies which were used during the campaign and whereby thousands of public meetings were held, covering nearly every town and village in South Africa, both to educate and allow people to give feedback and make submissions. These meetings were advertised widely, especially through television and radio.

Participatory workshops were organised. Members of the Constitutional Assembly participated extensively in this campaign, and travelled across the country, to townships, informal settlements, rural villages, churches, schools, etc. to consult with the public about the constitution-making process. The media technology was also used extensively; over 10 million people a week listened to the Constitutional Assembly's show on the radio in one of the official languages, and an estimated 160 000 people received a copy of the newsletter "Constitutional Talk", also published in the 11 official languages, each fortnight. In addition, an Internet site was launched, providing information on the constitution-writing process. Through the use of ICT a Constitutional Talk Line was set up to enable people to make submissions

over the telephone. Members of the public could make submissions in their own languages, and approximately 2,5 million written submissions were made. Public meetings were held with many organisations representing a number of diverse interest groups.

After the 1994 general elections and during the negotiation process, South Africa experienced a diverse compelling political system. There was first the politics of transitional arrangements, which brought a lot of uncertainty, tension and mistrust between different negotiating parties, and at that time there was ongoing violence in the country. Many concessions had to be made which were based on the will to make the political negotiations work. These involved some form of persuasion in politics, as the need to win the public support became essential together with the international community that played a vital role throughout the negotiation process. For all intents and purposes, it was important to build a transitional facet into changing from a shun-orientated apartheid status quo to the new political system, which was a good way of ensuring democratic political consensus.

The intensity of the political reform process increased, particularly after the April 1994 elections and those of 1999. South Africa assumed a new political order when the general election gave birth to a democratic, popular and legitimate government.

South Africa's new political system qualifies as a genuine democracy. It has now run two largely peaceful national elections, in 1994 and 1999 respectively, judged to be free and fair. It has the Constitution that encapsulates features like the National Council of Provinces, a range of independent watchdog agencies and commissions, like the Office of the Public Protector, Youth Commission, Gender Commission, Human Rights Commission, the Equality Court, etc. guaranteeing a wide range of classic political rights as well as an array of socio-economic rights, all guarded by a relatively strong Constitutional Court. A constitution and elected representative institutions do not necessarily complete the democratic picture. No matter how well designed its political institutions and processes are, in order to sustain and consolidate democracy there is a need for society to support the democratic sustenance practices.

The South African political system should be understood in the realm of a sovereign

state that makes formal provision for the entitlement of every citizen to citizenship and franchise. The legislative and executive organs of the State at all levels of government are bound by the application of fundamental human rights, which apply to all the laws in force and all the administrative decisions and acts. Every citizen has the right of equality before the law and to protection of the law, and to human dignity, freedom and security. The South African political system is characterised by far-reaching administrative, social and political changes that have left virtually no governmental structure unaffected

Conclusion

The 1994 elections in South Africa presented a new democracy that delivered not only a universal right to vote but also formal equality before the law, channels for citizens' participation in governance, and institutions strengthening democracy. The second democratic elections in 1999 took place amidst large-scale societal transformation and reform and presented the first major opportunity to determine the extent of the impact of technology in a democratic South Africa.

South Africa made the transition from a minority-ruled country to an inclusive majoritarian democracy in 1994. A special feature of this transition was that it was pact-driven, i.e. negotiated between and among the major political stakeholders at the time, namely the National Party government and the African National Congress. The pact-driven phase commenced with FW De Klerk's "reform speech" of February 1990. From that point onward, apartheid legislation was systematically scrapped, while the major political role-players engaged in multiparty negotiations on a new constitutional order. This process was completed in 1993 when an interim constitution was adopted that led to the introduction of democratic rule in 1994 under the political leadership of the ANC, which had won the elections of April 1994. Then a final constitution was negotiated, under which the ANC won by a landslide. The principle of the constitution when interpreted makes provision for characteristics of liberal democracy. (Breytenbach, 2000).

South Africa's two constitutions drafted during the nineties, that is the Interim Constitution of 1993 and the final Constitution of the Republic, adopted in 1996, are

fully-fledged "liberal democratic" constitutions as presented by Breytenbach (2000).

He also presents salient features, as follows:

- The supremacy of the constitution, making South Africa a typical "rechtstaat", with an independent judiciary, Bill of Rights and Constitutional Court;
- Although the head of state is the President, South Africa does not have a typical presidential system. Instead, South Africa has a parliamentary - really Westminster system, where the Executive is formed only after elections and represents the strongest party in parliament and is therefore accountable to parliament, as in the UK parliamentary system;
- Unlike the UK/ British system, South Africa's electoral system is not based on geographical constituencies as basis for representation in parliament. It is based instead on the typical, continental, European system of Proportional Representation (PR) based on party lists;
- Division (in the Constitution) of functional areas of concurrent and exclusive competencies between national and provincial powers. The central level has stronger exclusive powers than provinces; it also takes precedence over provincial powers in the case of concurrent powers, making centralisation stronger than provincialisation. This suggests that South Africa has a hybrid system ("regionalism") between federalism and unitarism (very much like Canada);
- Elections at all three levels of government – national, provincial and local – every 5 years, and equal and full participation for all adult citizens in public institutions where citizens normally participate in liberal democracies. So, institutionally, the system provides for "contestation" and "participation" which is a typical "polyarchy" (in Dahl's terms), otherwise known as "plural" system.

But is it "plural" (or "liberal") in all respects?

Polyarchy and pluralism and a liberal constitution, Breytenbach (2000), in South Africa are the product of two major forces: a pact-driven negotiated settlement

between the former NP government and the ANC. The negotiated settlement made for a pact-driven process emphasising shared rule during the transition.

The word transition literally means the passage from one condition or stage of development to another. Transitions are said to exist for a particular duration, usually medium to long term. Transitions from authoritarian rule to democracy are usually referred to as transformations. In transformation the passage from one condition or stage of development should be interpreted as structural change affecting especially the political, social and economic spheres of state and society, and resulting in a fundamental change or the relations of power, which existed prior to the transition. In this respect, transition resembles managed revolutions over time. (Roux, 2000).

Transitions may take on many forms, in some instances present in one and the same country as in South Africa. South Africa faces the daunting challenge of having to manage the passage from one condition to another on three levels: politics, society and economics. South Africa is trying to get through its transition under very difficult economic circumstances. The Nedcor/Mutual scenario-team (1990), after having studied a variety of transitions, become convinced that South Africa's transition is probably more far-reaching than any other which has been attempted. It was stated by the team that "poor social conditions, poor economic performance, and violence could well disrupt the transition or create a situation in which a new government would find it impossible to govern successfully" (Nedcor/Old Mutual, 1992:14), thereby creating "political instability".

O'Donnell and Schmitter (1986:7) in Roux (2000) display three stages that form part of South Africa's transition:

Liberalisation, where the incumbent government cedes power to, and recognises additional rights of, citizens.

Democratisation, where the loser of an election cedes power to the winner while at the same time government acknowledges and respects the full rights and obligations of citizenship.

Socialisation, where democracy is consolidated into a way of life which has broad support among the populace. (Nedcor/Old Mutual Scenarios, 1992).

The Nedcor/Old Mutual scenarios also described a successful transition as one where a stable democracy becomes entrenched; where rising incomes earned are experienced; where a reasonable distribution of incomes takes place; and stable social fabric is in existence. Roger Southall (indicator SA, 16(1), 1998) refers to six factors, as identified by *Przeworski et al*, which can be used to determine whether or not democracy will survive, i.e. the existence of democracy itself; parliamentary, as opposed to presidential democracy; the level of economic development; positive economic performance; narrowing income inequality; and a favourable international climate. (Roux, 2000).

It is within the context of South Africa's level of economic development and positive economic performance that technology could have an impact on democracy. It is given that South Africa is in a more fortunate position as it has mostly relatively well-developed infrastructure, good financial and banking institutions, a functioning bureaucracy, efficient security forces and, importantly, a private sector and entrepreneurial class which are both the envy of many entrenched first-world democracies. These beneficial issues can only strengthen long-term development if they are maintained and properly managed. In any democratisation process elections are a mere event; they are an essential, but not sufficient, condition for the consolidation of democracy, for "stability and development". Given the transition in South Africa, this period of a democratic political system also provides an opportunity to examine whether advances in technology can enhance democracy in South Africa so as to validate the claim that political stability and development can consolidate democracy.

Political stability and sustainability of a democratic political system cannot be taken for granted. Robert Dahl, in Muthien, Khosa and Magubane (2000), points out that the number of democracies increased from 21 in 1950 to 51 in 1996, and that 30 countries achieved democratic status between 1993 and 1996. However, between 1900 and 1985, non-democratic regimes replaced democratic regimes 52 times.

Democracy in South Africa has delivered the franchise to the disenfranchised majority. It also put in place the key pillars of democratic constitution, i.e. a functioning multiparty parliamentary system; a strong sense of constitutionalism and the rule of law; mechanisms of accountability; a professional civil service functioning

on the basis of constitutional values; mechanisms for civil participation in government; and an integrated and highly developed economic infrastructure. The democratic political system meets the requirements as an indisputable democracy. It has also run two national elections, which were judged to be free and fair. It has the Constitution that encapsulates features like the National Council of Provinces, a range of independent watchdog agencies and commissions, guaranteeing a wide range of classic political rights as well as an array of socio-economic rights, all guarded by a relatively strong Constitutional Court. A constitution and elected representative institutions do not necessarily complete the democratic picture. Despite how well designed its political institutions and processes are, in order to sustain and consolidate democracy there is a need to determine the level of democratic sustenance (Idasa, 2000) by assessing the effectiveness of transformational public policies in a democratic political system.

An important aspect of transformation in South Africa during the first term of office of the democratic state was the democratisation of public policy-making, particularly the science and technology policy. The new political environment introduced processes and practices that differed radically from those that marked policy-making during the apartheid era. In particular a more transparent public and answerable policy-making process replaced the previously semi-secretive, technocratic, authoritarian mode of policy-making.

The most significant example of this new political culture was demonstrated by the number of inputs received during the discussions on the Science and Technology Green Paper. Popular participation in the policy-making was made possible by encouraging the citizenry to make submissions, resulting in many written submissions.

This new policy-making approach created opportunities for a greater and more active role of communities on issues of governance. It also proved the desire for transformation of the relationship between technology and political democracy.

CHAPTER SEVEN

SOUTH AFRICAN DEMOCRATIC POLITICS OF TECHNOLOGY

Introduction

Technology and democracy are two interrelated variables in the South African political system. The relationship between technology and democracy in South Africa is an essential component of government's strategy for growth and economic development in creating a better life for all. The advent of democracy in South Africa has seen initiatives taken by government to review and reform the country's technology approach. In 1996 the government published South Africa's Science and Technology Policy, which envisages a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture.

The South African government's technology approach highlights concerns about improving the wellbeing of society. Such concerns inversely question the certainty of whether technology can support democracy. In view of these concerns, the scope for assessment, monitoring and evaluating the impact of technology has grown enormously in response to the demand for democratisation and the increasing challenges for the provision of goods and services in meeting the basic need.

Technology is one of the main drivers of economic growth and prosperity [in a democratic political system]. (Pistorius, 1996). It is also widely recognised as being one of the most important contributors to competitiveness, whether at international level, national level, or organisational level. Numerous studies have been performed to investigate the effect that technology has on [society's] productivity, and one can safely say that there is general consensus that technology can, in principle, contribute significantly to [national] productivity.

The purpose of this chapter is not, however, to expand or elaborate on technology itself. It is to put the role of technology in perspective vis-a- vis the extent to which

South Africa as a political system is playing a role in creating a conducive and enabling environment for political decision-making in terms of the science and technology policy in order to support an endeavour to enhance democratisation. In other words, the role of technology is investigated to determine whether political decisions on science and technology policy have any influence on democracy in South Africa. In order to do so, however, it is necessary that the concept of technology and democracy be considered in context and not interpreted narrowly. It will be shown that technological advance is one of the central aspects that can enhance democracy in a political system.

A general overview of technology approach

There is abundant literature available on technology policy. Since early in the 1980s technology approach in developing countries centred around the concept of "appropriate technology" where there was a need to move away from capital intensive technologies towards more labour-intensive technologies which were more suited for local environment. (Chang and Cheema, 1999). The debate around the concept went through transformation and was more about why some countries were more successful than others in absorbing imported technologies. There is a common understanding that there is a need for a technological capability in order for countries to be successful in choosing their approach to technology. It is also emphasised that there is a need for investments in building technological capability, and that policy actions have an important role to play in the process of supporting a particular policy decision. (Fransman and King, 1984).

There is a more advanced understanding, especially as presented by Nelson and Winter (1982), and also by Freeman (1982), which emphasises the importance of institutional and policy factors in the evolutionary nature of technological process. (Dosi et al (eds.), 1988) These developments in technological evolution culminated in the introduction of the concept of "national systems of innovation", and emphasised the importance of institutional factors, and the inter-relationship between the constituent parts of the institutional complex, in the determination of technological progress. (Lundvall, 1992, and Nelson (ed.), 1993).

The concept of a national system of innovation is also embedded in the South African science and technology policy which seeks to harness the diverse aspects of science and technology through the various institutions where they are developed, practised and utilised.

The above theoretical concept influenced, and was also influenced by, the literature on technology policy, which produced a new breed of theoretically sophisticated and empirically well-grounded literature that may demand a clearly focused policy execution. (Lall & Teubal, 1998).

South Africa, having adopted this concept, may have difficulty in generating a socially desirable degree of technological progress and the type of policies that may be necessary to resolve this problem of having a clearly defined policy execution. The reason for this problem can be related in two areas that have been relatively ignored in the existing literature, namely the political and the institutional aspects of technology policy design and implementation.

It would be wrong to suggest that those who have contributed to the debate on technology policy in developing countries have completely neglected these two aspects. However, it would not be too much of an exaggeration to say that most literature has paid relatively little attention to the political aspect of technology policy design and implementation. Likewise, it would be wrong to suggest that institutional factors have been neglected in most literature, especially given the numerous writings on national systems of innovation. However, it would be fair to say that far more attention has been paid in the literature to the institutions related to knowledge generation and diffusion (e.g. the educational system, linkages between firms and research institutions), rather than to those directly related to policy design and implementation (e.g. bureaucracy, industry association).

In determining the impact of technology on democracy, this study puts emphasis on the analysis of the political and institutional aspects of technology policy design and implementation in South Africa.

South Africa's technology policy approach

The technological skills and the ability of a nation to improve are important to its overall development and have led governments to adopt more comprehensive and forthright policies with regard to technology. The purpose of a national (science and) technology policy is defined by UNESCO (1990:9) as "...the development and fruitful use of national scientific and technological resources in order to promote the advancement of knowledge, encourage innovation, increase productivity and to attain the objectives of the country's economic, social and cultural development more quickly and surely". Much emphasis is on the structure in terms of methods and legislation. (Kaplan, 1995). In South Africa's context technology policy has three principal concerns, which are:

- to enhance capacities for invention and innovation;
- to ensure access to international technology; and
- to enhance the diffusion of new and appropriate technologies and technological best practices.

The democratisation process in South Africa has seen the transformation of the science and technology community. The transformation involved that the government departments, in particular the Department of Arts, Culture, Science and Technology (DACTS), had to restructure and transform their structures and implement policies and programmes. In January 1996 DACTS published a Green Paper on Science and Technology. This was the result of consultation with stakeholders in the science and technology community. A further process of consultation culminated in the publication of the White Paper on Science and Technology in September 1996.

The above process took account of , among other things, the results of two studies of the science and technology policies of five decentralised states, viz. Belgium, Canada, Germany, India, and the USA, in which the HSRC (Prinsloo and Pienaar, 1993) investigated the functioning and implementation of science and technology policy. The study noted that:

- In countries where the private sector involvement in science and technology was less than that of the government, the country's science and technology system was generally inadequate. All five countries display systematic and concerted efforts to encourage the private sector to invest more in science and technology research so as to achieve a higher level of technological advancement.
- The creation of a solid and effective education system to provide the required number and quality of scientists and technologists is a *sine qua non* of science and technology development.
- There is a trend to a greater centralisation of science and technology policy. This trend is mainly the result of worldwide recession and thus economic constraints, and brings with it the risk of the politicisation of science and technology policy, generally regarded as undesirable.
- Financial constraints are compelling industrialised nations to actively increase the pace of international scientific and technological collaboration.

The Council for Scientific and Industrial Research (CSIR) commissioned a study of science and technology policies in sixteen countries (CSIR, 1991). The sample included the USA and Canada, countries in Eastern and Western Europe, the former USSR, some Pacific Rim countries, and Botswana and Kenya. In the process a number of policy instruments were identified that directly affected science and technology. These instruments all have a direct influence on science and technology policies and ultimately on economic prosperity and development in general. From a national economic development perspective, the study also highlighted the fundamental importance of the following aspects:

- Distinction between technology and science, and the fact that competence in the former may not be dependent on, or even related to, competence in the latter. Indeed it is possible in the short term for a country to be competent in utilising and adapting technology development elsewhere without itself having a strong science base.
- The strategic capacity to manage technology effectively at the level of overall economy as well as that of the individual (and sometimes at sectoral and

regional levels). The most successful economies are those that use technology best across a broad spread of industries – as exemplified by Japan and the former West Germany.

- An efficiently functioning national innovation system properly connected with outside systems, and in which the science, technology, market and finance "pole" interact readily with one another. (The market refers not just to regular commercial markets, but also to all applications opportunities in sectors such as health, education, environment, and national security where commercial markets may not exist.)
- The role of government in exercising overall leadership, in creating a macro-economic and regulatory framework conducive to technological innovation, and in affecting, within the overall pattern of resource allocation, the appropriate volume and quality of investment in education and training in physical infrastructure. In some cases government can become the driving force for innovation in a particular industry at a particular time.
- The role of the private sector in identifying and responding to applications opportunities and, especially in the case of large companies, in participating in the policy process. The private sector is usually, but by no means always, the principal engine of the technological innovation process.
- A rapport between government and the private sector, which allows each to play its role appropriate to evolving circumstance of the industry in question.

Developments towards formulating the South African science and technology policy began by re-examining its science and technology policy with the publication of a report in 1992 entitled "Towards a science and technology policy for a democratic South Africa", which was sponsored by the International Development Research Centre (IDRC), Canada. Its findings were that:

- There was a crisis in the educational system at all levels and this crisis was at its worse when it affected the teaching of mathematics, science and engineering.
- South Africa should see itself as a participant in joint ventures in S & T on the continent of Africa, but not as an automatic leader.

- In various individual institutions in South Africa R&D funds tended to be allocated for inappropriate activities.
- There was vacuum in leadership on issues dealing with science and technology at ministerial level.

The government's policy approach was intended to meet the challenges of stimulating development and overcoming the biases and entrenched ideas prevalent about the nature of science and technology, while on the other hand it was also the government's role to promote and develop the science and technology sectors. The process of implementing government's policy approach included numerous programmes, *inter alia*:

- The formation of the National S&T Forum (NSTF) composed of members from all sectors, including business, acting as an advisory to the Minister of Arts, Culture, Science and Technology.
- Appointment of the National Science and Technology Council from government and private sector.
- The commissioning of the National Research and Technology Audit for South Africa in late 1995, as a national stocktaking exercise of all science and technology skills and capabilities resident in South Africa, taking January 1996 as the base date.
- In 1996 the government established the Academy of Science of South Africa, its purpose being to ensure that leading scientists, acting in concert and across all disciplines, can promote the advancement of science and technology and provide effective advice, and can facilitate appropriate action in relation to the collective needs, threats, opportunities, and challenges of all South Africans. (Document circulated by the Facilitating Committee, 28 Nov. 1992).
- A National Research and Technology Foresight programme was completed in 2000.
- Establishment of the National Advisory Council on Innovation (NACI), whose role will be to support the Minister of Arts, Culture, Science and Technology.
- The review of the science councils and related institutions (SETI) in South Africa was completed.

- The tabling of the White Paper on Science and Technology, preparing for the 21st century (SA Department of Arts, Culture, Science and Technology, 1996).

The White Paper on Science and Technology saw the promotion of the effective distribution of available knowledge as a critical function of a national system of innovation; a well-functioning process of technology diffusion which could boost progress in South Africa through appropriate combinations of domestic and imported technologies. But it was expected that this in turn would be highly dependent on the ability of South African firms to absorb such technologies (DACTS, 2000-2001).

The White Paper on Science and Technology

As discussed earlier in this chapter, the White Paper on Science and Technology presents a salient feature, which is its most important aspect. It deals with the concept of “National System of Innovation (NSI)”, which is concerned with ensuring a sufficient supply of new knowledge and new technologies, as well as supporting and promoting the attainment of national objectives. (DACTS, 1996). The concept of a national system of innovation is an important basis for policy formulation. The use of this concept as a framework for policy was influenced by the 1994 Report of the Auditor General of Canada, which highlights South Africa’s courage which she would like to see spread through the science and technology policy. (DACTS, 1996). The government introduced a new view of the role and status of the sciences, engineering and technology in the context of socio-economic development. Many countries have accepted that technological change is the primary source of economic growth, which means that economic and science and technology policies have to recognise that innovation and technology diffusion are central concerns as they are the agents driving that technological change.

The national system of innovation is described as a set of functioning institutions, organisations and policies that interact constructively in the pursuit of a common set of social and economic goals and objectives.

There are three key interests that the government described in the White Paper:

- to ensure that South Africa has in place a set of institutions, organisations and policies which give effect to the various functions of a national system of innovation;
- to ensure that there is a constructive set of interactions among those institutions, organisations and policies; and
- to ensure that there is a set of goals and objectives which are consonant with an articulated vision of the future which is being sought.

The White Paper is the result of five basic requirements that are in line with a vision for innovation in South Africa intended to achieve excellence in serving the national objectives. These basic requirements are priority areas that a sound science and technology policy needed to cover:

- Promoting competitiveness and creating employment.
- Enhancing the quality of life.
- Developing human resources.
- Working towards environmental sustainability.
- Promoting an information society.

There are also crucially important dimensions of science and technology that inform South Africa's strategies:

- The importance of knowledge generation.
- The role of the human sciences in innovation.
- Finance, management and performance.
- Promoting competitiveness and creation of employment.

Promoting competitiveness and creating employment

These are the most important requirements that recognise that, in the face of the

growing globalisation of the world economy, technological innovation and support for South African enterprises need to be encouraged; that business is the driving force behind the economy, and that government must provide the leadership, incentives and support that the business sector needs to meet the new challenges posed by highly competitive markets. This will involve developing a shared vision of South African innovation, and its support structure for creating and sustaining micro-enterprises and small businesses will require a strong technology component. Public investment in R&D needs to be redistributed away from the support of activities within the government's own facilities and towards more comprehensive support of R&D executed in the private sector.

This long-term need must be seen in the light of the government's current responsibilities, namely to take a lead in pre-competitive research, until a culture develops in the private sector where such research is seen as a business imperative where entry barriers relating to equipment and human resources are high in areas where the activity is considered to be a service which the government has a duty to provide, and in areas of public good in which, to achieve the greatest benefit, the research results and technology transfer need to be placed in the public sector.

A prime objective of the NSI is to enhance the rate and quality of technology transfer and diffusion from the science, engineering and technology (SET) sector by the provision of quality human resources, effective hard technology transfer mechanisms and the creation of more effective and efficient users of technology in the business and governmental sectors.

The development of entrepreneurship needs to be fostered throughout South African society, particularly among those historically excluded from the formal economic sector, and this entrepreneurship needs to be linked to the promotion of innovation. Government, via the Growth and Development Strategy and the Macroeconomic Strategy, is seeking to achieve an annual economic growth rate of 6%. In a country which is currently under-investing in science and technology and innovation, this target will require a greater than 6% per annum growth rate in the national investment in these activities. In particular, those sectors destined for export growth will not achieve their targets if this investment does not occur (DACTS, 2000-2001).

Enhancing quality of life

The means must be established to ensure that the governmental research portfolio gives due attention to those areas of R&D with the capacity to affect quality of life, and specifically in domains where market failure is high, such as environmental sustainability, provision of health care, meeting basic needs at community level, reducing the total cost of infrastructure provision and providing safety and security to all who live and work in South Africa.

It is imperative for the government to ensure that an appropriate portion of the money it spends on science is utilised in these areas. Urban and rural communities need to be assisted and encouraged to adopt social and technological innovations to assist them in decision-making and to enhance their ability to make informed choices.

Developing human resources

In line with a dynamic vision for innovation-assisted economic growth, greater equalisation of income and economic opportunities need to be facilitated and the legacy of apartheid-based disempowerment of individuals and institutions needs to be addressed within a national system of innovation.

The lifelong processes of scientific and technical education, training and learning among the workforce and among South Africans in general need to be promoted as an essential response to the forces created by the dynamic changes of the global economy. This is a necessary response to enable those made redundant in one circumstance by these changes to continue making an active and creative contribution to the economy, their own wellbeing and that of society.

New approaches to education and training need to be developed that will equip researchers to work more effectively in an innovative society. This will require new curricula and training programmes that are comprehensive, holistic and flexible, rather than narrowly discipline-based. Education and training in an innovative society should not trap people within constraining specialities, but enable them to participate and adopt a problem-solving approach to social and economic issues within and across discipline boundaries.

Working towards environmental sustainability

South Africa's economic growth must be reconciled with considerations of environmental impact, resource constraints and conservation, and must further be determined by human needs and safety. Sound regulatory mechanisms are necessary to ensure that the positive aspects of technology introduction, transfer and diffusion are maximised and the negative aspects minimised.

Environmental research, monitoring and control require ongoing support and encouragement, as do the development and improved availability of environmental technologies. Economic and environmental efficiencies are interrelated, thus innovative practice needs to include environmental management. It is important that South African enterprises are able to adopt and implement best-practice technologies for environmental management and waste minimisation.

A national strategy is required to implement the terms of agreement on environmental sustainability adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1994 (Agenda 21), and specifically to develop an understanding of the problems of climatic change, desertification and loss of biodiversity.

Promoting an information society

Development of the South African vision of the information society is necessary and should seek to ensure that the advantages offered by the information revolution reach down to every level of society and achieve as best a balance between individuals and social groups, communities and societies as is practically possible. The vision would seek to ensure that there is the creation of an equitable information order nationally, regionally and internationally. It should take into account the potential of communities at various levels to cooperate, to bridge differences, to work for mutual upliftment and meeting basic needs, and to redress the social imbalances of underdevelopment. The development of such a perspective would aim to ensure that the information revolution benefits society as a whole.

The potential of information technology (IT) needs to be captured to serve people issues such as supporting education, providing household services and enabling social

development. As a developing country, South Africa needs to determine what should be done to prevent it from being marginalised by the accelerating rate of innovation in information technology. How can she participate globally without merely throwing open her markets to foreign products, thus increasing her dependency on the developed world? How can she empower herself with a capacity for technology innovation?

The importance of knowledge generation

The wellbeing of scientific activity in South Africa is intimately linked to material factors. There is a clear trend worldwide for curiosity-driven research to increase as a function of national per capita income. There is also a danger of adopting too economic a viewpoint. Currently though, there is a need to recognise the importance of the knowledge-generating function of research, particularly in the higher education sector. Human curiosity and the ability to recognise unexpected discovery account for much of scientific progress. Basic enquiry, as opposed to a formula-driven approach, is absolutely essential, particularly at the universities and technikons. It is important that fundamental research activity not to be regarded as impractical, because it is the preserver of standards without which, in the long term, the applied sciences will also die. Scientific endeavour is not purely utilitarian in its objectives and has important associated cultural and social values.

The role of the human sciences in innovation

The importance of the human sciences in South African society needs to be documented. The four important roles in the context of innovation that need to be highlighted are human resources in understanding the social processes and problems as a source of social innovation, in facilitating appropriate technological change within society and within the economy, in providing the basis of policy analysis, and as a source of new knowledge and informed critique of the transformation of South African society and its economy.

Finance, management and performance

The limitations imposed on research, technology development and technology transfer by the fiscal problems of the day need to be addressed. This will require a co-ordinated approach, which recognises in general the less wasteful nature of a simpler fiscal policy, while appreciating the absolute necessity of encouraging innovation in the private sector.

There is also a need to identify a framework to promote linkages between universities, science, engineering and technology institutions (SETIs) and the private sector, with a view to sharing risks, resources and insights with respect to pre-competitive research. There is also a need to meet the internal challenges of governing a healthy science and technology system. This includes managing the problems of big science, fundamental research and service-oriented science and their relationship with technology development, infrastructure, the provision of basic needs and human resource development. It also includes the comprehensive measurement of the inputs and outputs of science and technology research and development, and its impact on the goals of national policy objectives, both in science and technology and in other fields.

International cooperation, interaction and institutional arrangements

Since 1993 South Africa has on a regular basis entered into bilateral agreements with foreign countries in the fields of science and technology, as well as agreements that include cooperation in science and technology. A policy framework to guide South Africa's participation and cooperation was to formalise and promote bilateral co-operation so as to derive maximum benefit from such interaction. The policy framework proceeds from the basic view that science and technology cooperation is crucial in the age of globalisation and that its impact on South Africa's democracy would be positive for the development of science and technology human resources, socio-economic development and the optimisation of financial and other resources for research and development.

By the end of 1993 bilateral scientific and technological agreements had been concluded with most countries in the world. Science and technology cooperation with these countries are being pursued in a wide range of fields that include material science, manufacturing technology, biotechnology, information technology and

systems, sustainable management of the environment, exploitation of natural resources and minerals, medical research, and public health, engineering science and advancement of technologies, water supply projects, agriculture, mathematics and science education, amongst others.

International cooperation, in science and technology, is enhanced by the funding of lead programmes that reflect national priorities. South Africa identified five priority fields:

Biotechnology – food production, agriculture, health;

Development of new materials and manufacturing;

Information technology and systems and the information society;

The sustainable management of environmental issues and of natural resources; and

Mapping and exploitation of natural resources and minerals.

The first, multilateral, meeting of the European Commission-South African Joint Science and Technology Cooperation Committee was held in Brussels on 3 June 1998. Co-operative ventures were highlighted and included the participation of South African scientists in projects under the Fifth Framework Programme, and the involvement of European researchers in South African science and technology programmes. Multilateral and multinational cooperation was promoted as well, inter alia with UNESCO in the areas pertaining to regional policy development and co-operation in science and technology within the context of the Southern African Development Community (SADC). Science and technology cooperation was also under discussion at the Summit of the Non-Aligned Movement (NAM) held in Durban from 29 to 3 September 1998. South Africa has been afforded observer status in the Committee for Scientific and Technological Policy of the Organisation for Economic Cooperation and Development (OECD). Observer status gives South Africa access to a considerable pool of expertise in S&T policy development, implementation and evaluation.

Institutional arrangements: In support of the NSI the following institutional initiatives were undertaken by government: the National Advisory Council on Innovation Act no 55 of 1997 (NACI Act), in terms of which the Council would advise the Minister on issues of science and technology policy. The members of the Council comprise

individuals from industry, academia and science councils. The human resources capacity has clearly been identified as one of the key constraints in South Africa's goal of establishing a truly democratic country based on equity and human rights (DACTS, 2001-2002).

The National Research Foundation (NRF) was established, which will promote research through funding, human resource development and the provision of the necessary research facilities in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby to contribute to the improvement of the quality of life of all the people of South Africa. It was created by bringing together institutions and programmes that dealt with scientific human resource development along interdisciplinary structures. It is believed that the most important innovations occur at the confluence of and interface between disciplines.

With regard to the funding of the science councils, over the past years the government has been able to redirect and redistribute approximately 49% of the Parliamentary research grant funding to science councils, approximately 10% of which has been re-directed to the broader science and technology community. The framework within which science councils secure funding, both from the state and private sources, is set out in terms of a three-stream funding approach in the White Paper on Science and Technology, September 1996. This approach was later incorporated into the Financing and Reporting System (FRS) for science councils and was adopted by Cabinet in April 1998. In addition, the Ministers Committee on Science and Technology, chaired by the Deputy President, accepted the phasing in of the proposed approach of the White Paper. In terms of this, councils receive support for core responsibilities and have to compete for support of programmes that could be undertaken by other research bodies with the same competency. (White Paper 1996.)

In terms of the funding framework, the science councils can access parliamentary grant funding for their mandated core activities. The framework requires that the core activities for funding be identified and subjected to a medium term, cyclical review by the peer-research and technology development and user/stakeholder communities, while at the same time the institution is subjected to a management efficiency

assessment.

Competitive funding

The White Paper on Science and Technology states: "A national system of innovation benefits from knowledge practitioners being located in multiple knowledge generating sites and institutions such as higher education institutions, government and civil society research organisations, private sector think tanks and laboratories." (White Paper 1996.) A major initiative introduced through the White Paper is the establishment of the Innovation Fund. It promotes large-scale projects, involving participation from throughout the National System of Innovation, and focuses attention on the major themes of competitiveness, quality of life and environmental sustainability.

The third stream of funding from the public takes the form of "contract income". Government departments from time to time put out to tender projects that are essential for the fulfilment of their organisational objectives but for which they do not require long-term capacity. The nature of the contracts is typically short term with a highly specific performance contract, and the performance capability is not confined to the science council community. Science councils therefore have to compete for this source of funding and are expected to adopt a "full-cost-recovery" approach when tendering.

The White Paper emphasises the need for policy instruments to give effect to the concept of innovation. The Innovation Fund offers a new lead in encouraging and enabling longer-term solutions to problems that are serious enough to impede socio-economic development or that affect our ability to compete in products and services.

The principle objectives of the Innovation Fund are to permit a reallocation of resources from the historical patterns of government science towards the key issues of competitiveness, quality of life, environmental sustainability and the harnessing of information technology, to increase the extent to which funds for the activities of government science, engineering and technology institutions are obtained via competitiveness processes, and to promote increased networking and cross-sectoral

collaboration within South Africa's national system of innovation.

An annual call is made for proposals to be submitted for support from the Fund. The proposals must involve projects that generate products/processes for commercialisation or new methodologies for development programmes orientated towards service delivery (DACTS, 2000-2001).

The Innovation Fund was first piloted in the area of Crime Prevention in 1997/98 after it was officially launched with a limited amount of R30-million in 1998/99 in support of the three focal areas of crime prevention, promotion of an information society and value-adding for products and processes. An amount of R10-million was used for the pilot programme. The end results of some of those projects were very useful. For example, in KwaZulu-Natal the police utilised entomology techniques to provide an accurate time of death of a badly decomposing corpse that was found in a sugar-cane field. The accurate time of the crime was vital to the police in solving the case.

In the second term the Innovation Fund has been increased to an amount of R75-million. The thrust areas for round two are the promotion of an information society, biotechnology; and advanced technology for materials and manufacturing(DACTS, 2000-2001).

The South African technology approach also ensured that, in addition to making funding resources available, the government also makes provision for institutional support, which will enhance democracy. Such enhancement should be through the involvement of these institutions that have been created by government, which are also intended to enhance South Africa's democratic aspirations.

Enhancing democracy through technological involvement

Technology diffusion programme: The South African Government expressed a strong commitment towards strengthening the capacity and capability of the small, medium and micro enterprises (SMME) sector to contribute to higher economic growth rates. Access to technology and an innovative mindset are crucial for small and medium

enterprises to become more competitive and to shape out niche areas. One of the concerns expressed in the White Paper was the poor capacity of small, medium and micro enterprises in technology assimilation. Efforts to promote a culture of research and development through other programmes such as the Innovation Fund will be bolstered if the market has the technically absorptive capacity for application of research results.

Technology stations programme (TSP): The government has established a TSP involving a shared-use cooperative arrangement with technikons, in terms of which the technikon's facilities are used for the diffusion of technology through demonstration and other stimulation techniques. For management of the programme, a Technology Advisor works with the technikon, with shared-use aspects as regards the equipment and arrangements for students to acquire hands-on experience in the selected SMME sector. The following technikons were selected in SMME sector specific areas: The Technikon Free State for metal works/value-adding; Mangosuthu/North West for chemicals, and Technikon Pretoria for electronics.

The German experience in technology transfer programmes was drawn on to refine the TSP concept and operational framework. It is anticipated that the German Economic Co-operative Development Programme will be making technical assistance available during the life of the pilot TSPs.

Innovation centre, technology demonstration centre & technology incubator: As part of its wider strategy of technology diffusion, government has secured support from the European Union (EU) for testing the feasibility, sustainability and replicability of SMME-targeted technology transfer models such as Innovation Centres, Technology Demonstration Centres and Incubators. The Innovation Centre will be established with the focus on optimising and commercialising newly developed technologies.

The Technology Demonstration Centre will be established in a particular manufacturing area. It will accommodate the dual purpose of training students in the practical applications of courses for which they are registered and providing SMMEs with levied access to equipment in cases where they intend moving into new markets and need to do market testing first.

The Technology Incubator will provide a protected environment for an industry-focused cluster of new technology-based start-up entrepreneurs and enterprises. Tenant enterprises will be nurtured for a definite period by way of easier access to technical assistance and training and support services such as assistance with market development. In addition, communal facilities will mean lower overheads, which in turn will improve cash flow in these enterprises.

CAD/CAM/CAE facility: An initiative in this area involves providing seeding support to a pilot computer-aided design/computer-aided manufacturing/computer-aided engineering (CAD/CAM/CAE) facility established by the “Make-it South Africa” initiative. This will enable the development of technical expertise, infrastructure and capacity for rapid prototyping. As a follow-up of the workshop, a market survey was conducted amongst a number of companies within the South African automotive industry in response to a question as to what the companies perceived in 1997. Companies in the automotive industry identified the CAD/CAM as their most urgent technology requirement.

The CAD/CAM/CAE facility will provide a range of services, aimed at addressing the needs of the South African manufacturing and design industry. In particular, through the establishment of a number of regional resource centres, the initiative will focus on assisting the industry to develop world-class computerised product design, engineering and manufacturing expertise. A “hub” operation is located at the CSIR Manufacturing Excellence Centre. Regional outreach centres are located at: Technikon Witwatersrand; Eastern Cape Technikon or Port Elizabeth Technikon; and Mangosuthu Technikon.

Establishment of a satellite laser ranging (SLR) system: The National Aeronautics and Space Administration (NASA) in the United States offered to provide an SLR system to South Africa, including initial training support and ongoing maintenance. South Africa will have to provide and fund the personnel to operate the SLR station (approximately R1-million per annum). It was decided to accept the offer of NASA and the SLR system will be established at the Hartebeesthoek Radio Astronomical Observatory National. An SLR is used, inter alia, for mapping changes in global ocean levels. Such data are vital in following the potential effects of global climatic

change and for long-term weather predictions (e.g. with regard to El Niño events).

Southern African large telescope (SALT): To fully exploit our advantage of being in the Southern hemisphere, the building of a new large telescope was commenced at Sutherland. Owing to substantial developments in the field of astronomy, South Africa's capacity, previously on the forefront, is lagging behind. The government committed R50-million over 5 years to the establishment of a 10-m class Hobby-Eberly telescope. A further R50-million will be raised internationally. Both South Africans and international researchers from the Northern Hemisphere will utilise the facility.

Pro-active approach to international S&T cooperation: With a view to effectively targeting specific countries or regions for possible S&T cooperation, a survey was initiated in 1998 to establish the potential for such cooperation. An understanding of the S&T strengths and weaknesses of these countries or regions will be of assistance in making strategic decisions on new areas of cooperation or redirecting areas of cooperation.

Automotive manufacturing initiative: In 1997 a workshop on the automotive engineering sector was held with South Africa and international partners, industry, institutions from research, technology transfer and automotive manufacturing companies from Germany.

Public understanding of science, engineering and technology (PUSET): The public understanding of science, engineering and technology (PUSET) is identified in the White Paper on Science and Technology as a fundamental requirement and a key thrust for establishing a successful National System of Innovation in South Africa. To kick-start the programme for public understanding of science, engineering and technology, the government declared 1998 the Year of Science and Technology. This involved running a major national awareness campaign involving all stakeholders in order to generate the nation's interest in science, engineering and technology.

The Year of Science and Technology: This project was an initiative of the Parliamentary Portfolio Committee on Science and Technology, Language, Arts and

Culture. The year was launched on 5 February 1998 and on this day the then Deputy President, Mr Thabo Mbeki, accepted patronage of the project. A focus week of activities in a particular month was dedicated to each of the nine provinces, during which close to 200 000 learners, teachers, families and individuals were reached. These activities were kick-started in the Western Cape and concluded in Gauteng. Various stakeholders, science councils, the Science Councils Communication Forum and embassies formed partnerships and assisted the Department of Science and Technology to realise the Vision of the Year, which was to create a special period during which much of the attention of the nation and the media focused on science and technology.

The Department of Arts, Culture, Science and Technology, in addition to provincial activities funded four major initiatives to celebrate the Year of Science and Technology. These ranged from television and radio programmes to the conference on Women in Science and Technology, the second national conference on Puset and the science journalism awards. Details of the above initiatives were captured in TV and radio programmes. A major publicity and promotional campaign was also undertaken through radio programmes on science and technology in partnership with the SABC. The main focus was on community radio stations, while others were also taken on board. The aim of these programmes was to reach the wider community, especially women, rural communities and people previously excluded from science, engineering and technology activities.

South Africa's involvement in technology saw her taking initiatives towards the Conference on Women in Science and Technology in September 1998. The purpose of the conference was to create an enabling environment for women in the science and technology fields, to contribute to the promotion and improvement in terms of access, communication, knowledge transfer, training and quality of life, and to raise awareness and public understanding of gender issues with regard to science, engineering and technology. Commissions on Agriculture, Business, Education, Energy, and Health also focused on issues of access, training, knowledge transfer and quality of life. The outcomes of the conference informed the Department to develop a policy framework on gender issues in science, engineering and technology programmes and opportunities that raise awareness and promote the role of women,

and to develop a framework and guidelines for implementation. The main recommendations arising from the Conference focused on policy, strategy and programme development.

The South African Science Journalism Awards 1998 were another area of involvement. These awards are in recognition of the pivotal role of the mass media in promoting public awareness, understanding and appreciation of science, engineering and technology, and are presented to those journalists who have made outstanding contributions to this field. Awards in seven categories were presented to journalists on 12 March 1999 for excellence in science, engineering and technology reporting during 1998. This initiative is in keeping with the vision of the Year of Science and Technology to engage the media in science and technology activities.

The *Foundation for Education, Science and Technology (FEST)* is an organisation created to render a vital service to scientific societies by publishing research results in sixteen widely distributed journals. It contributes in many ways to the goals of Puset. It does so by popularising science and technology, especially in disadvantaged communities, and providing enriching educational material in support of science education. FEST initiated a process of establishing a comprehensive national science centre at the existing Museum of Science and Technology, where enhancing courses are offered for science teachers in the classroom and laboratory practice.

Conclusion

It is evident that the South African technology approach departs from the premise that knowledge and development of capacity in science, engineering and technology are central to promoting social, environmental and economic well-being in a democratic political system. The vision, the role and contribution of science and technology in achieving South Africa's national democratic objectives remain priorities. (DACTS, 1996.) An analysis of the White Paper has highlighted sensible standards for government and society to consider when investing in technology to meet basic needs, develop human resources, build the economy and democratise the state and society. The broad technology policy approach as outlined, presents a clearly defined vision

for a democratic South Africa. Given the imperatives of the White Paper and in order to achieve any objective in the approach, it is imperative that South Africa should ensure that democratic values are prevalent and that citizens have access to technology with a view to the provision, availability and accessibility of basic services such as health, education, water, housing, etc. Through technology the availability and accessibility of these basic services will give South Africa a basic ground to consolidate its democracy.

CHAPTER EIGHT

CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter deliberates on the framework of technology in a democratic society. The study drew closely on relevant literature review with emphasis on and relevance to the South African democratic political system, as well as on the experience of other countries, with specific lessons to be learned.

In the final analysis, it is necessary to return to the initial research problem and research objectives as formulated. The aim of the study was to evaluate the plausibility, viability and feasibility of technology as an approach to enhance democracy. This aim underpinned three research objectives, namely (1) to review the technology policy as an approach to a democratic political system by contextualising it within the framework of other approaches to democratic politics of technology, (2) tracing the theoretical origins of the democratic itself, and (3) outlining it as a phenomenon in world politics. Secondly, it aimed to examine the claim that technology enhances democracy in a political system. Thirdly, it endeavoured to assess claims, by authors of technology and democracy texts, that there are causal relations between technology and democracy and between democracy and political stability, applying deductive logic to reach a conclusion about the correlation between technology and democracy. Fourthly, the study aimed to recommend ways in which technology should be employed to harness the political stability and direct it towards concretising democracy in South Africa. The latter objective is normative in nature inasmuch as it goes beyond an examination of what is likely to occur in the technological advancements in order to prescribe concrete steps that would enhance the probability of sustainable democracy.

The study adopted the working definition of technology as the systematic application of knowledge to resources to produce goods or services. (Stilwell, 1994).

Since the first democratic elections in 1994, South Africa has simultaneously been faced with a number of challenges and opportunities. South Africa undertook the transformation of a divided society and opened the economy to global competition. The rapidly unfolding global agenda has provided opportunities for direct foreign investment and technology transfer; it has at the same time introduced challenges coupled with open markets and trade barriers. Advanced microelectronics-based information and communication technologies (ICTs) are at the centre of current social and economic transformation in South Africa. The costs of the ICTs are continuing to fall. As their capabilities increase, they are being applied throughout all sectors of the economy and society. The increasing spread of ICT opens up new opportunities for South Africa to harness these technologies and services to serve their development goals. In addition to its current transformation, South Africa also has to face a transition from an industrial society to one that is knowledge-based.

During the industrial revolution, technological developments and industries emerged. The main elements of these technology developments included energy, chemicals, manufacturing and communications. The impact of these technologies in shaping the South African socio-economy is such that doubts have been articulated with regard to the notion of “digital divide”, that is the comparison between the “wired” and “non-wired” communities and the comparison between the poor who may not afford technology at all and the affluent communities. It is possible that an echelon of highly mobile knowledge workers who share a global work ethic and perhaps even “global” values will overlay large numbers of marginalised working class. However, technology does not stand still and many rural communities may be able to seize the opportunities that these technologies present and be able to “leapfrog” into the future.

As far as technology is concerned, any definitive claim whether it is utopian or a Luddite when it comes to democracy, can only succumb to technological determinism. Based on the evaluation of the relationship between technology and democracy, though, there is reason to believe that advances in technology provide favourable opportunities for democracy. There are two sides to this argument. Firstly, social movements and groups devoted to progressive issues and social change use technology to improve democracy. Technology does not only divide the haves

and the have-nots, but also is important to facilitate democratic transitions by creating a more open political culture. Furthermore, technology is increasingly in use to overcome the crisis in socio-economic development in South Africa, primarily as a result of a lack of infrastructure. Creating public spheres where citizens can deliberate on public issues and communicate with their political representatives and make inputs directly to parliament does this. The phenomenon of public spheres is replicated at a national level where the civil society engages in deliberation and acts to influence the outcome of national issues.

The other side of the argument is that new advances in technology can be distinguished from the media that preceded it as it is relatively cheap, easy to use, difficult to control and interactive. For example, the Internet user can be both a sender and receiver of information; the information era provides unprecedented opportunities for participatory media forms and democratic uses of IT. The threats posed by state and corporate control and use of IT are duly noted as challenges to democracy in the information era. However, there have been substantial societal movements to expose and counter this. The Internet also provides unique ways to inform and mobilise civil society, which should be of some consolation for political economists concerned about the expansion of global capitalism in the information era. Another challenge to democracy in the information era is the extent to which the digital divide in and between countries can be closed. This is one of the key concerns for striking a balance between state, market and societal control of IT, where the state and society emphasise equality of access, while the market emphasises efficient development of technology and production.

The way in which IT impacts on democracy has a direct and important bearing on the research problem of the study, inasmuch as the second postulate of the propositional logical deductive model states that the information revolution is likely to enhance democracy. Establishing the probability that IT will provide favourable opportunities for democratisation, the quality of democracy and the globalisation of democracy, is thus an essential step in inferring that the democratic peace is more likely to exist in the information era. But, the research problem also probes a normative objective, namely to propose ways in which IT should be employed to enhance world peace. In this respect the challenges for democracy in the information era as identified here, should be key concerns if the democratic peace is to be a plausible, viable and feasible approach to world peace in the information era.

Technology is ubiquitous within South Africa's democratic political system. It has both benefits and disadvantages, and this poses a difficult choice for society and government in policy approach. The social dichotomy of this nature raises the need for further inquiry as to the reasoning and application to technology as the systematic application of knowledge to resources in addressing democratic imperatives.

The review of the literature demonstrated that technology could influence a democratic political system. It is evident that technology can shape challenges in the political, social, military and economic environment of the political system. The review of the literature further made it clear that technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

It addressed the important question of whether technologies are substantively democratic, and whether technology policy decisions are compatible with perpetuating a democratic political system. The review investigated and appraised democratic theories and analysed approaches and challenges of technology in democratic politics, which could be applied in South Africa. Specifically the focus examined the character and crisis in technology and considered what theoretical and practical resources were available for democratisation in South Africa.

In essence, if democracy is impacted by technology by way of a systematic application of knowledge to resources to produce goods and services, it will enhance stability and equality. Therefore, it can shape challenges in the environment of a democratic political system by maintaining stability and order. It will also deliver material prosperity, and foster democratic rule.

It is evident that the South African technology approach departs from the premise that knowledge and development of capacity in technology are central to promoting social, environmental and economic well-being in a democratic political system. The vision, the role and contribution of science and technology in achieving SA's national democratic objectives remain priorities. (DACTS, 1996). The White Paper highlighted some practical values for government and society to consider when they invest in technology to meet basic needs, develop human resources, build the economy and democratise the state and society. The broad technology policy

approach, as outlined, presents a new vision for the twenty-first century. Given the imperatives of the White Paper and in order to achieve any objective in the approach, it is imperative that South Africa should ensure that democratic values are prevalent and that citizens have access to technology with a view to the provision, availability and accessibility of basic services such as health, education, water, and housing. Through technology the availability and accessibility of these basic services will give South Africa a basic ground to consolidate its democracy, as it is a process preconditioned by stability and equality. It is a process that will improve the stability of democracy through the creation of capabilities by the systematic application of knowledge to resources in order to produce goods and services.

The arguments presented in the preceding sections suggest that a number of issues require extensive research conducted on national security and information technology. The main purpose of further study and debate would be to provide policy makers with analytical perspectives and empirical data that create a better match between technological potential and preferred futures. It is assumed that these futures should be both sustainable and democratic.

The first area could be concerned with the design of democratic and pro-active policies and programmes that make it possible to realise the socio-economic development potential of information technologies. This mainly entails studying the roles that public and private sectors should play in the design and execution of these policies and programmes; the forms of public intervention that are conducive to shaping technological change in accordance with desirable social goals, and the establishment of new and more democratic relations between producers and consumers of ICTs, so that technological progress becomes much more responsive to social needs.

A second area of concern is centred around the definition of those social and institutional changes that are required to maximise the social benefits and to minimise the social risks associated with the adoption and deployment of information technologies. This entails considering various ways of adjusting the organisational structures that are relevant for economic productivity, political participation and cultural diversity in line with preferred social scenarios; and the cultural

appropriateness of educational methods and training materials required for the realisation of the technological potential. Again, it is important to discuss the design and adoption of information technologies that strengthen sustainable national security. This involves creating information technologies that reduce the threat and vulnerabilities and encourage environmentally sustainable applications of IT.

The future of information technology and national security is compounded by uncertainty - no one knows how the technological advancement will continue to unfold. The goal for the future will be to somehow bridge the theoretical possibilities with technological capability. Research focused on the goal of ubiquitous information technology will be concerned with a number of important technological obstacles, such as how society could enjoy the benefits of information technology without nation states being too worried about its impact on national security, and society that is ready for a pervasive system that surrounds its communities and monitors their day-to-day activities as there is a worry that ubiquitous networks will present new and emerging challenges to personal privacy, which may destabilise security.

It has been suggested by some scientists like Bill Joy (2000) that the most powerful 21st century technologies could threaten to make humans an endangered species. He predicts that as technology advances, humans will increasingly delegate responsibility to intelligent machines able to make their own decisions and, referring to the writings of Theodore Kaczynski, known as the Unibomber, he wonders whether these same machines might not reduce humans to "the status of domestic animals". (Joy, 2000).

Information technology is shaping the strategic environment in which a conflict may take place, where it would be driven by mostly the political, economic, social and ethical dimensions of the information technology. The fact that IT has contributed increasingly to the interconnectedness of people and states around the world is an indication that there should be leadership in government policy that encourages and supports equity, development initiatives and sufficient funding to finance such initiatives. The major problem, especially in deep rural areas without basic electrical and telecommunications infrastructure programmes and universal service initiatives by government, is that information and communication technology companies will have little incentive to develop new products to meet the needs of people who cannot use or afford their existing services. And government policies will become useless without ground-level programmes to take advantage of them.

Finally, technology could in future greatly benefit society if its advancement is harmonious with national democratic imperatives and if it is intended to serve the needs of the people.

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**UNIVERSITY OF PRETORIA
ABSTRACT**

**THE IMPACT OF TECHNOLOGY ON A DEMOCRATIC POLITICAL
SYSTEM IN SOUTH AFRICA**

by EP Mokgobu

The democratisation process in South Africa has subjected the country to the global effects of the challenges that culminated in a nation that is facing the demands for socioeconomic needs coupled with technological advancement. Advances in technology in the global arena present both opportunities and threats to the South African democracy and its concomitant socioeconomic imperatives.

The democratisation process in South Africa is consequential to the inextricably bound relationship between technology, modernisation and democracy. This triad pattern precipitates the South African democratic political system.

Advances in technology are also imperative for human and national security, but the intensity of pervasiveness may have serious ramifications for the appraisal for political stability in a democratic South Africa.

Technology is one of the major sources underpinning and strengthening democracy in a political system. However, technology also affects the daily life of the ordinary citizen, depending on the manner in which decisions are made to implement a technology policy. The South African government through its technology approach has an action plan for growth, which aims to set the economy on a more competitive footing. The action plan engages major technological projects to benefit the broader society but overlooks a major factor in the "democratic theory of technology", namely the imperative that communities be consulted about technology decisions. These efforts are concerned exclusively with democratic procedures in making policy decisions about technologies.

The South African government in 1996 reformed its technology policy approach so as to ensure that democratic values are prevalent and that citizens have access to technology. This policy approach raises concern about improving the democratic and the socioeconomic wellbeing of society, while inversely there is the uncertainty whether advances in technology can support and enhance the intended policy approach in the democratisation process in South Africa.

This problem of whether technologies are substantively democratic, that is whether technology policy decisions are compatible with perpetuating a democratic political system, resulted in the need to investigate and appraise democratic theories and further critically analyse approaches and challenges in democratic politics of technology within the South African democratic political system.

The study looks at the role and magnitude of technology in a democratic South Africa. It presents and argues the hypothesis that “*greater advance in technology tends to enhance the democratisation process in a political system*”. Much of the argument is devoted to providing evidence that technology influences both human and national security and as such demonstrates how technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

Technology is ubiquitous within South Africa’s democratic political system and it may be considered a boon or bane. It encompasses both benefits and disadvantages such that it poses complex options for a democratic political system in both its approach and implementation within a policy framework. The social dichotomy of this policy framework raises the need for further inquiry as to the reasoning and application of technology in addressing socioeconomic imperatives for concretising democracy, thus creating “a better life for all”. The democratic imperatives within the policy framework dictate an analysis to the ventured hypothesis that “advances in technology will enhance democracy in a political system”, and it is in this regard that

South Africa is used as an archetype to disembark at a logical deduction to validate this hypothesis in the study.

**UNIVERSITEIT VAN PRETORIA
OPSOMMING**

**THE IMPACT OF TECHNOLOGY ON A DEMOCRATIC POLITICAL
SYSTEM IN SOUTH AFRICA**

by EP Mokgobu

Die proses van demokratisering in Suid-Afrika het die land onderwerp aan die wêreldwye uitwerking van die uitdagings wat uitloop het op 'n nasie wat voor die eise van sosioekonomiese behoeftes en gepaardgaande tegnologiese vordering staan. Vordering op die gebied van die tegnologie in die wêreldarena hou sowel geleenthede as bedreigings in vir Suid-Afrika se demokrasie en sy bygaande sosioekonomiese imperatiewe.

Die demokratiseringsproses in Suid-Afrika vloei voort uit die noue verband tussen tegnologie, modernisering en demokrasie. Hierdie drietal presipiteer die Suid-Afrikaanse demokratiese politieke stelsel.

Vordering op die gebied van tegnologie is ook noodsaaklik vir menslike en nasionale sekerhied, maar die intensiteit van die verspreiding daarvan kan ernstige vertakkinge meebring vir die beoordeling vir politieke stabiliteit in 'n demokratiese Suid-Afrika.

Tegnologie is een van die hoofbronne wat demokrasie in 'n politieke stelsel steun en versterk. Tegnologie raak egter ook die daaglikse lewe van die gewone burger, afhangende van die wyse waarop besluite geneem word vir die implementering van 'n tegnologiebeleid. Met sy benadering tot tegnologie het die Suid-Afrikaanse regering 'n plan van aksie vir groei, wat daarop gemik is om die ekonomie meer mededingend te maak. Die plan van aksie span groot tegnologiese projekte in om tot voordeel van die breër gemeenskap te strek maar misken 'n groot faktor in die "demokratiese teorie van tegnologie", naamlik die noodsaaklikheid dat gemeenskappe oor tegnologiebesluite geraadpleeg moet word. Hierdie pogings is uitsluitlik gemoeid met demokratiese prosedures om beleidsbesluite oor tegnologieë te maak.

In 1996 het die Suid-Afrikaanse regering sy tegnologiebeleidsbenadering hersien ten einde te verseker dat demokratiese waardes oorheersend is en burgers toegang tot tegnologie het. Hierdie beleidsbenadering wek egter kommer oor die verbetering van die demokratiese en sosioekonomiese welvaart van die gemeenskap, terwyl aan die ander kant onsekerheid bestaan of, in die demokratiseringsproses in Suid-Afrika, vordering op die gebied van tegnologie die beoogde beleidsbenadering kan ondersteun en verbeter.

Hierdie probleem, naamlik of tegnologieë substansieel demokraties is, dit wil sê of besluite oor tegnologiebeleid versoenbaar is met die voortbestaan van 'n demokratiese politieke stelsel, het gelei tot die behoefte om demokratiese teorieë te ondersoek en te takseer, en verder om benaderings en uitdagings in die demokratiese politiek van tegnologie in die Suid-Afrikaanse demokratiese politieke stelsel krities te analiseer.

Die studie bekyk die rol en omvang van tegnologie in 'n demokratiese Suid-Afrika. Die hipotese dat "*groter vordering in tegnologie daartoe neig om die demokratiseringsproses in 'n politieke stelsel te verbeter*" word in die studie voorgestel en geargumenteer. Die argument bestaan grotendeels daaruit om bewys te lewer dat tegnologie die menslike sowel as die nasionale sekerheid beïnvloed, en sodoende word getoon hoe tegnologie as 'n sistematiese aanwending van kennis op hulpbronne as 'n goeie instrument kan dien om demokrasie in Suid-Afrika te handhaaf.

Tegnologie is alomteenwoordig in die Suid-Afrikaanse demokratiese politieke stelsel, en dit kan as seën of vloek beskou word. Dit behels voordele sowel as nadele in soverre dit komplekse keuses vir 'n demokratiese politieke stelsel stel, beide in die benadering en in die implementering daarvan binne 'n beleidsraamwerk. Die sosiale tweeledigheid van hierdie beleidsraamwerk gee aanleiding tot die behoefte om verder ondersoek in te stel na die redenasie en aanwending van tegnologie in die hantering van sosioekonomiese noodsaaklikhede ten einde demokrasie te konkretiseer, om sodoende "'n beter lewe vir almal" te bewerstellig. Die demokratiese imperatiewe binne die beleidsraamwerk dikteer 'n ontleding van die gewaagde hipotese dat "groter vordering in tegnologie demokrasie in 'n politieke stelsel sal verbeter", en dit is in

hierdie opsig dat Suid-Afrika as 'n argetipe gebruik word om by 'n logiese afleiding te kom om hierdie hipotese in die studie te staaf.

EXECUTIVE SUMMARY

The impact of technology on democracy has presented a plethora of literature dissonance and has equally stimulated challenges in the global political arena. It is commonly noted that technology has precipitated itself and is continuously effecting the modernisation process in South Africa; and as such any patterns of modernity in the political system warrant an analysis of concern.

South Africa has moved from a shun-orientated status quo towards a nation that is growing economically, scientifically and technologically after democratisation, and subsequent competition in the international arena presents great opportunities but also threats to societal needs. South Africa is confronted by critical needs that are intimately connected with advances in technology.

The advent of a democracy in South Africa has also seen initiatives taken by government to review and reform the country's technology approach. In 1996 the government published the Science and Technology Policy, which envisages a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture. This future should ensure that democratic values are prevalent and that citizens have access to technology as regards the provision, availability and accessibility of basic services, which in turn will give the government a basic ground to strengthen democracy.

Democracy is preconditioned by stability and equality, which improves capabilities that advance technology as a systematic application of knowledge to resources in order to produce goods and services.

The government's concern about improving the democratic and the socio-economic wellbeing of society, inversely questions the certainty of whether technology can support and enhance democracy.

Global debates on the notion of technology as an aspect capable of enhancing democracy and its impact on socio-economic development are also imperative for national security in a political system. Preponderant challenges are to comprehend

how technology is being perceived in the unevenly distributed socio-economic resources in South Africa. The intensity of its pervasiveness in relation to time and space, and the opportunities and threats are also presented to determine how technology, particularly information and communication technologies (ICT), can pose theoretical and conceptual change that has serious ramifications for the assessment of human and national security in a democratic South Africa.

Technology is regarded as one of the major sources underpinning and strengthening democracy in a political system. However, technology also affects the daily life of the ordinary citizen, depending on the manner in which decisions are made to implement a technology policy. The South African government unveiled its new action plan for growth, which aims to set the economy on a more competitive footing. The action plan engages major technological projects to benefit the broader society but overlooks a major factor in the "democratic theory of technology", namely the imperative that communities be consulted about technology decisions. These efforts are concerned exclusively with democratic procedures in making policy decisions about technologies.

This study addresses the problem of whether technologies are substantively democratic, that is whether technology policy decisions are compatible with perpetuating a democratic political system. The study will investigate and appraise democratic theories and further critically analyse approaches and challenges in democratic politics of technology in South Africa. The study examines the character of and crisis in technology, and considers what theoretical and practical resources are available within the South African democratic political system.

Furthermore the study intends providing evidence that technology influences both human and national security, which forms part of the conditions for a democratic political system.

The literature review is conducted and assessed to reflect aspects pertinent to technology, and which relate to issues that are considered most important for democratisation in SA. The data reviewed assisted in developing practical solutions for the application of technology in enhancing democracy in South Africa.

The study further presents and argues the hypothesis that “*greater advance in technology tends to enhance stability in a democratic political system*”. Much of the argument is devoted to demonstrating that the systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa. It also provides a useful critical review of how technology can assist in shaping challenges of human security in the political, social, military and economic environment of a democratic political system.

As this study is intended to look into the role and magnitude of technology in a democratic South Africa, it may not necessarily apply universally.

ABBREVIATIONS

ANC	African National Congress
COSATU	Congress of South African Trade Unions
CSIR	Council for Scientific and Industrial Research
DACST	Department of Arts, Culture, Science and Technology
DoC	Department of Communications
DSTV	Digital Satellite TV
DTI	Department of Trade and Industry
ESKOM	Electricity Supply Commission (South Africa)
GDP	Gross Domestic Product
GEAR	Growth, Equity and Redistribution
GIS	Geographical Information Systems
GNP	Gross National Product
HDI	Human Development Index
HSRC	Human Sciences Research Council
ICT	Information and Communications Technology
IDC	Industrial Development Corporation
IDRC	International Development Research Centre
ILO	International Labour Organisation
IMF	International Monetary Fund
IPR	Intellectual Property Rights
ISP	Internet Service Provider
IT	Information Technology
ITU	International Telecommunication Union
JSE	Johannesburg Stock Exchange
NGO	Non-Governmental Organisation
NITF	National IT Forum
NRF	National Research Foundation
OECD	Organisation for Economic Cooperation and Development
R&D	Research and Development
RDP	Reconstruction and Development Programme
RSA	Republic of South Africa
SA	South Africa
SABC	South African Broadcasting Corporation
SADC	Southern African Development Community
SANDF	South African National Defence Force
SATRA	South African Telecommunications Regulatory Authority
SBDC	Small Business Development Corporation
SITA	State IT Agency
SMMEs	Small, medium and micro-enterprises
UNCSTD	United Nations Commission on Science and Technology for Development
USAID	United States Agency for International Development
UNDP	United Nations Development Programme
Unesco	United Nations Educational, Scientific and Cultural Organisation
WTO	World Trade Organisation
Y2K	Year 2000

CHAPTER ONE

INTRODUCTION AND PROBLEM STATEMENT

Introduction

South African politics have in the last quarter of the twentieth century presented a baffling array of complex transitional political dynamics. These multifaceted political issues include, among other things, the role of technology, which is seen as a benefit factor that is presented against the risk and dangers of those who uphold and cherish advances in technology. This confrontation poses very difficult choices for society and government when it comes to making policy decisions, particularly decisions that are technology related. Some of the most challenging issues result because of the ability of technological advancements and deployment to outpace the capacity of the institutions to determine the extent of the impact that technology has on democratic society. In many cases the rate of technological advance has far outstripped the capabilities to assess and evaluate implications and those of institutional monitoring and control.

Technology is regarded as the sum total of human tools and methods, devised by human beings to control the environment for societal net benefit. It is regarded as a systematic application of knowledge to resources in order to produce goods and services (Stilwell: 1994), because it is fundamentally instrumental and is itself morally neutral, usable for both good and ill. There are, of course, dangers of abuse and misuse of technology and the tendency to technologically divide society, but these appear to be problems not of technology but sometimes of policy implementations and of its human users, which needs to be addressed appropriately in general. And, besides abuse, misuse and policy implementation, there is a genuine problem of technology itself: the unintended and undesired consequences attending its proper use. There is temptation to question whether the problems of technology can be dealt with, on the one hand, by technology assessment and careful regulation - to handle side

effects and misuse, and, on the other hand, by goodwill, compassion, and the love of humanity – to prevent abuse. This combination will enable us to solve the problems technology creates, without sacrificing its delightful fruits. (Kass, 1993.)

The development, advances and use of technologies are a driving force in socio-economic prosperity and national security. Maintaining the strength and competitiveness of technological enterprise is vital.

In the current climate of intensifying global competition, technological advancement, and political uncertainties, there is a need for identifying critical technological approaches as the concentration of effort becomes even greater. (National Critical Technologies Report, 1995.)

South Africa undertook transformation to assume the strength and competitiveness of technology approach to intensify global competition and further address political imperatives for a democratic society. The 1994 elections ushered in a new democracy in South Africa, with the ANC-led government winning the elections on the basis of a vision of "A Better Life for All". This vision was highly structured in the Reconstruction and Development Programme (RDP). This programme served as the guideline for the technology policy, which in 1996 was published as a White Paper on Science and Technology. The policy is built upon the twin concepts of innovation and national system of innovation. This developmental approach and application of technology contained in the policy are central to the growth and development strategy of the government as it seeks to address the needs of a vision of a better life for all.

To achieve this vision there is a need to make provision for basic needs such as housing, education, safety, security, job creation, environment, and international trade, and to remain globally competitive, thus ensuring that a favourable socio-economic climate exists that can attract investments in technology.

The level of investment in technologies also has an influence on its advancement, which can extend or hinder democracy's reach. For example, technology can make it easier for people to track legislation, express preferences, ensure accountability by officeholders, and rally support for a specific political cause of action. Technology holds out the promise of giving the masses a stake in the political process and drawing the disenchanted back from political cynicism. But for that to happen, technology will

have to be appealing and accessible. And policy-makers will have to make democratic participation as important a goal of technology policy as consumer convenience and economic growth. (Benton Foundation, 2000.)

Challenges abound for a democratic political system in ensuring that democracy functions properly and citizens have access to technology and information about it. Other information, e.g. on rights and obligations concerning health and education, are also important. The government must guarantee that the information is available and accessible. On the other hand, information technology gives the authorities a very powerful tool to strengthen the rule of law. New technology can and will affect democratic societies. Information technology does not, however, change the fundamental principles of law and ethics. (Magnusson, Olich, Gudmundsson and Sigurdardttira: <http://www.statskontoret.se/gol-democracy/iceland.htm>.)

People have benefited enormously from invention, discovery and technical advances, ranging from electricity to vaccines, from advances in food production to information technology designed to advance democracy. Considering the beneficial effects of technology on the nation's quality of life and general prosperity, government has a vested interest in maintaining a strong infrastructure for innovation and research, a responsibility it shares with other stakeholders such as business and labour and the education, industry and non-governmental sectors. Traditionally governments have focused on ensuring that the basic needs of citizens are met, involving for example housing, education, product standards, safety, security, infrastructure, environment and international trade, and on ensuring that a favourable climate exists to attract investments in technology and innovation. Economic growth, job creation and sustaining the quality of life and the environment require continued public and private investments in technology. The high level of technological change in the global village demands short-term policies of government to reflect the changing nature, skill requirements and location of jobs, in response to the introduction of new technologies. Longer-term organisational and institutional changes are also required for the society to experience the full benefit of such technologies. Such policies and actions need to take into account the impact of the digital divide in a society and the resistance to fear of technology, which is mostly due to the absence of a proper national technology culture.

There are claims that the South African society is divided by severe forms of inequality that coincide with racial differences and also by the notion of the digital divide, that is the technology and information gap between rich and poor, and between rural and urban communities. Van Dijk (in Hacker and Van Dijk 2000) questions whether the ideals of digital democracy transcend the purported inequality of information access attending socio-economic gaps. It would be unrealistic to expect that democracy by itself will lead to harmony in inter-group relations amidst inappropriate technological advancements. Democratisation under such conditions may even exacerbate the adversarial problems of societal integrations. Since knowledge is regarded as power, some groups in society may start thinking that by virtue of their having access to information through the use of technology they are more advantaged than another group who may not be privileged to have access to information technology. The compilation of firmly entrenched inequalities, which undermine the rational basis for democracy, gives rise to the antithesis of a full or complete democratisation. It is anticipated that if all political spheres, particular those characterised by the degree of inequality, are simultaneously and evenly subjected to a process of democratisation, society will gradually be transformed. Most theories of modernisation also assume that differentials will narrow, culminating in the democratic state characterised by harmony and political cohesion.

Problem statement

The problem the study investigates is the impact of technology on a democratic political system. Specifically the study seeks to determine:

- 1) The extent to which the government's technology policy has since its inception influenced the South African democracy. That is, has the policy succeeded in achieving the broad priority areas it covers regarding the promotion of competitiveness and creating employment, political participation, political stability and predictability?
- 2) To what extent, if any, has technology succeeded in enhancing the quality of life; developing human resources, and working towards environmental sustainability in South Africa?

- 3) What is South Africa's level of success in bridging the digital divide and the level of success in promoting a viable information society?

The significance of the study

The study is particularly significant for four reasons. Firstly, the study provides empirical evidence concerning the extent to which the 1996 South African Science and Technology Policy anticipates a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture. Secondly, the study demonstrates the support for theories constructed along the modernisation process. Demonstrating support for such theories assists in the realisation that the world is changing so fast that democracy is endangered unless citizens are continuously involved in policy-making, and possible technology strategy intervention will be suggested. Thirdly, the study adds valuable data to the literature on the democratic politics of technology. In addition, the literature review allows comparisons to be made with earlier studies conducted on the democratisation process in South Africa. Lastly, the study tests the assumption that advances in technology enhance political stability in a democratic political system.

Purpose and objectives

The purpose of the study is to examine the South African technology policy, as well as the relationship between technology and democracy. The objectives are as follows:

- To analyse the proposition that technology influences stability and is regarded as one of the conditions for democracy in a political system.
- To investigate the proposition that a systematic application of knowledge to resources can provide a good tool for enhancing democracy in South Africa.
- To enquire whether technology can shape challenges to the political, social, military and economic environment of the political system.
- To test and analyse whether a thorough process of consultation can culminate in a well-functioning technology policy.

Rationale of the study

Since April 1974 the number of democracies in the world has multiplied dramatically. The number increased moderately in the late 1970s and early 1980s as several states experienced transitions from authoritarian, mostly military, rule to democratic rule. By the end of 1995 the pace of global democratic expansion accelerated markedly.

In seminal formulation, Samuel Huntington termed this post-1974 period the "third wave" of global democratic expansion and its central importance is shown in the regional and international democratisation effects. Huntington defines a "wave of democratisation" simply as "a group of democratic transitions that occur within a specific period of time and that significantly outnumber transitions in the opposite direction during that period". (Diamond, 1999) The trend that began in Southern Europe in the mid-1970s spread to the military regimes of South America in the late 1970s and early 1980s and reached East, Southeast, and South Asia by the mid to late 1980s. The end of the 1980s saw a surge of transitions from communist authoritarian rule in Eastern Europe and the former Soviet Union and a trend towards democracy in Central America as well. The democratic trend spread to Africa in 1990, beginning in February of that year with the sovereign National Conference in Benin, the release of Nelson Mandela and the unbanning of the African National Congress. By 1998 there were more democratic political systems on the African continent.

In South Africa, the 1994 elections presented a new democracy, delivering not only a universal right to vote but also formal equality before the law, avenues for citizen's participation in governance, and statutory institutions bolstering democracy. The second democratic elections in 1999 took place amidst large-scale societal transformation and reform and presented opportunities to investigate the impact of technology on democracy in South Africa.

Democracy in South Africa has seen initiatives taken by government to review and reform its policies, including its technology approach. The 1996 government technology policy envisages a brighter future for all citizens. The policy has since its inception had some impact on the South African democracy, presenting various challenges in terms of the promotion of competitiveness and job creation and the

extent of success in enhancing the quality of life, human resources development, environmental sustainability, and narrowing of the digital divide. Any attempt to address these questions warrants an analysis of the impact of the technology policy on the South African democratic political system.

Within the ambit of the South African democratic political system, the technology approach justifies a policy analysis, which should be placed in the context of the rationalisation of the state and politics as a policy-making activity. The notion that the world is full of puzzles and problems, which could be solved rationally through the application of human reason and knowledge, forms the backbone of this study. Thus the approach in policy analysis in terms of the desire for knowledgeable governance, that is the acquisition of facts and knowledge about problems, is to formulate better solutions.

This technology approach is supported by Lasswell when he suggests that policy science settled on two main approaches which could be defined in terms of knowledge in the policy process and knowledge of the policy process. (Lasswell (1970) Policy analysis is concerned with knowledge of the policy process while the analysis of the policy is concerned with knowledge about the formulation and implementation of public policy.

David Easton (1953, 1959) established a policy approach that provided a model of the political “system” which influenced the way in which the study of policy (outputs) began to conceptualise the relationship between policy-making, policy outputs and its wider environment. His model views the policy process in terms of received inputs – in the form of flows from the environment, mediated through input channels (parties, media, interest groups) – and demands within the political system (with inputs), and the conversion of such inputs and demands into policy outputs and outcomes. (Parsons,1995)

Policy consists of "outputs" of the political process. It reflects the impact of government policy decisions on society, that is, its ability to make things better or to make things worse. A distinctive area of study in policy analysis was developed purposely to examine how the policy was initiated, formulated and implemented, and how the policy process could be improved. Policy analysis is not only concerned with

issues of efficiency and effectiveness, i.e. with the "how" of the policy-making. It also addresses the "what" of policy-making: the nature of government "outputs" and their "outcomes" for the larger society. At the heart of policy analysis is the normative question such as "what is government for" and what is the nature of the "good society". Any attempt to evaluate the performance of government or the political system must therefore consider some deepest political and ideological division in the discipline itself. (Heywood, 1997)

Policy analysis is set to be concerned with improving the methods by which problems are identified and defined, goals are specified, alternatives evaluated, options selected and performance measured. It thus focuses on what Bobrow and Dryzek (1987) term "knowledge based interventions in public policy making".

In analysing the impact of technology, as a systematic application of knowledge to resources, on democracy, the study does not only ask the question how plausible, feasible and viable is technology, but goes beyond this to translate technology in a way that will incorporate the complex realities of democracy. This poses a challenge to expand the theoretical boundaries within which the democracy has traditionally been shaped, a challenge that is intensified by the thematic nexus of technology, democracy and policy studies as a subfield of political science.

The technology policy culminates with the evaluation and review of policy, leading, in theory at least, to decisions being made about the maintenance, succession or termination of some policy aspects. This will complete the policy cycle in the sense that information acquired through evaluation can be fed back into the initiation and formulation stages. This process may show up new policy proposals and help to refine and improve existing policy. For the purpose of addressing substantive issues related to the appropriateness or effectiveness of technology approach in South Africa, evaluation might shed light on procedural issues, such as how the formulation stage is organised, who is consulted and when, and how implementation is controlled.

The South African government is concerned about improving the wellbeing of society. Such concerns inversely question the certainty of whether technology can support democratisation. In view of these concerns and technology-related problems, the scope for assessment, monitoring and evaluation of technology impact has grown

enormously in response to the demand for democratisation and the increasing complexities and challenges of providing goods and services to meet the basic need.

Democracy is predicated by political stability and equality in the distribution of socio-economic needs. Advance towards stability and equality will improve the inputs (demand and supports) where the creation of (technology) capabilities by the systematic application of knowledge to resources produces equitable distribution of goods and services within a democratic political system.

If severe forms of political instability and inequality divide South African society, it would be unrealistic to expect that advancements in technology will by themselves sustain democracy. Democracy under such conditions may even exacerbate the adversarial problems of technology in society. The collection of firmly entrenched instability and inequalities, which undermine the rational basis for democracy, gives rise to the premise of an undemocratic political system. It is probable that if all spheres of the environment in a political system, and in particular those characterised by advances in technology, are simultaneously and evenly subjected to demand and support, the outputs will have an impact on a democracy. Differentials will narrow, culminating in the egalitarian state characterised by prosperity and democratic rule.

The question on the social and economic preconditions for a democratic South African society also refers to conditions for stability. Lou (1983) has indicated that “equality means stability; inequality, movement”. The implication is that an advance towards social economic equality will improve the stability of democracy. The improvement would be the outcome of a process of development. It could also result from a radical redistribution of income, wealth and economic opportunities.

(Haasbroek, 1994)

The study presents a policy analysis of technology by evaluating its impact on South Africa as a democratic political system. It will argue that the South African technology policy as an aspect of politics is directly related to the character of democracy and therefore its performance can only be evaluated in the light of its impact according to what actually happens for good or ill. The study will begin with some contextual conditions that strongly argue for increased attention to the linkage

between technology and democracy. It then briefly explores the meaning, characteristics, and necessary condition of democracy, and next posits some hypothetical linkages between democracy and technology content or design. Most of the work will develop these pathways or linkages as a subject matter for political science.

As a subject matter for political scientists, the role of technology has evoked renewed interest in the wellbeing and vitality of the democratic political system. It is generally agreed that a political system benefits from having a stable democratic rule. Whether or not the South African technology policy has abated or changed the wellbeing of society, there is an apprehension as to whether technology policies can stimulate, diminish, or change the nature of democracy. It concerns the need for strategies in order to bridge the technology divide, requirements for technological advancement, unsatisfactory technological enterprise, and lack of clear channels through which technology can promote social and economic progress in a democratic political system. And lastly, the problems of technology concern not only problems of ends and means but rather the control of unintended consequences, as well as the basic moral and political question.

These issues mar South African democracy, despite several years of seemingly aggressive governmental policies to alleviate them. Rather than disappearing as issues, such technological problems permeate the debates on such diverse subjects as defence, health and welfare, and social and economic aspects. The persistence of these technological problems represents not only a policy failure, but also a misrepresentation of democratic rule. Governance structures have altered dramatically with information and communication technologies. Programmes in which the government plays a critical role have replaced governmental agencies in areas as widely divergent as telecommunications, postal services, broadcasting, health services and provision of water and environmental aspects. Political science principles of governmental accountability through elected leaders may operate poorly where lines of democratic control and accountability are different and less direct. The accumulation of both theory and empirical research linking public policy and institutions with democracy provides a particularly favourable context for further work in this policy area.

The relationship of technology to democracy in the South African democratic political system is an unfinished and open-ended political phenomenon. As John Dryzek (1996) has argued, democratic governance is largely striving to expand the franchise, scope, and authenticity of democracy. Franchise refers to the number of active participants in any political setting, scope concerns the domains of life under public control, and authenticity is the degree to which democratic control is substantive, informed, and competently engaged. None of these ought to take place at the expense of the other. Expanded franchise, for example, must not lead to superficial deliberation that impairs authenticity. Of course, there are many forces apart from policy that affect democratic rule, such as interest groups, political parties, leadership, and the press. However, since the important work of Lowi (1964) and Wilson (1979), which connected the content of policy with patterns of politics, substantial literature has developed that traces the consequences of public policies, including technology, to politics and to democracy.

There are pathways through which technology policy content may influence the character of democracy. There are critical conditions for democracy: there needs to be open field for public discourse in which all relevant points of view regarding technology are expressed; citizens ought to view their role as citizens as important, as involving obligations as well as rights, and they need to be convinced that government has the interest and capacity to solve technology problems; society needs to be supportive of technology policies and be positively involved in formulating shared goals; and there must be means to hold government accountable for its actions. These important conditions for democracy are directly related to consequences flowing from policy designs, namely: the framing of issues; how targets are constructed; the structure of implementation and delivery systems; and transparency of governmental actions and citizens' access to information. These issues reflect how policy affects the framing of problems and their discourse.

Definition of terms

- Science – improvement of natural knowledge. It is both a method by which knowledge is gained and the knowledge that results from that process: the constellation of facts, theories, and methods collected in current text (Kuhn, 1970).
- Technology – the systematic application of knowledge to resources to produce goods and services (Stilwell, 1994), or putting knowledge into practice, to alter and control the material conditions of life, or to “create a reality according to design” (Grove, 1980).
- Technology management – the management process by which organisations identify access and use available international technology to achieve ongoing competitive advantage, profit growth and shareholder value through optimum customer and community benefits.
- Technology strategy – is concerned with exploiting, developing and maintaining the sum total of the organisation’s knowledge and competencies.
- Political system - a network of relationships through which government generates "outputs" (policies) in response to "inputs" (demand and support) from the general public.
- Democratisation - the advance of liberal-democratic reform, implying, in particular, the granting of basic freedoms and the widening of popular participation and electoral choice.
- Functionalism – approaches to the state focus on the role or purpose of the state institution. Its central function being invariably seen as the maintenance of social order and the delivery of social stability.
- Modernisation - refers to the contrast and transition between a ‘traditional’ society organized by hierarchical division by class or caste and the type of ‘modern’ society that is based on trade and industry, organized by function, such that the major functions are performed by modular social systems that include the political system, the public service, the armed forces, the legal system, the economy, religion, education, the health service, the mass media, etc
- Public policy – an action which employs governmental authority to commit resources in support of a preferred value.

- Policy analysis – concerned with improving the methods by which problems are identified and defined, goals are specified, alternatives evaluated, options selected and performance measured.
- Socio-economic public policy - a look at how public policy is the outcome of economic and social factors, which have a major influence on the making of policy and upon its outcome.
- Productivity – the term productivity generally refers to the ratio of output units per input unit. It assumes that there is a process which transforms units of input into units of output.

Delimitations of the study

The study will be confined to available primary information sources, i.e. already existing textual information, such as annual reports, mission statements, memoranda, official documents – including white papers, green papers and press reports, as well as secondary information sources drawn from the library, press reports, discussion papers, comments, debate, and information obtained from the Internet.

Limitations of the study

The study will be limited due to the fact that literature review can, according to Mouton (2001), at best only summarise and organise the existing scholarship. Even a critical review of the literature cannot produce new or validate existing, empirical insight, it can only lead to theoretical insight. Further limitation will be that the study is restricted to South Africa, and within the context of a new democracy, advances in technology and the dynamics of transitional democratic politics progress rapidly. Caution will be taken against generalisation.

Overview of the research programme

As has been stated already, technology is ubiquitous within South Africa's democratic political system. It has both benefits and disadvantages and also poses a difficult choice for society and government as regards policy approach. The social dichotomy of this nature raises the need for further inquiry as to the reasoning and application to technology as the systematic application of knowledge to resources in addressing

democratic imperatives. The second chapter is the review of literature; it discusses and reviews the literature relevant to this topic. Chapter 3 sets out the research design. It provides the key concepts used in the study. It also discusses the methodological premises, justification for the hypothesis, data analysis and interpretation, and the shortcomings. Chapter 4 looks at the role of technology in the development of the modernisation process. Chapter 5 discusses information technology as an imperative for securing democracy. Chapter 6 focuses on South Africa within the context of a democratic political system. Chapter 7 focuses on the national democratic politics of technology, and, lastly, Chapter 8 will present the conclusions and recommendations about the hypotheses and the research problem, and the implication of the policy and practice for both public and private sector analysts and managers. It will discuss the limitations of the research and identify areas for further research.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Introduction

The purpose of the study is to examine the impact of technology on a democratic political system in South Africa. The study investigates the relationship between technology, as a systematic application of knowledge to resources to produce goods and services, and democracy in South Africa's democratic political system. This chapter deals with the review and analysis of the literature relevant to this topic. The chapter provides three themes, which are the core of the theoretical background, of which the objective is to discuss technology in different perspectives where there is a major impact on the democratisation environment in a political system. The following themes are the key constructs: *the historical overview of the literature debates on technology policy; the democratisation process in South Africa; South Africa's technology policy; the democratic politics of technology*, and a summary to conclude the chapter.

The above key constructs in the study correspond with the divisions of works under review. They are central themes of the study and are clearly manifested in the formulation of the research problem. (Mouton 2001) The objective in this particular instance is to determine, through inductive reasoning, the definition and description of the key construct in the study. Each presents a broad context, then current variations and challenges, a review of selected literature, and finally a perspective relating to the hypothesis in this thesis. Each theme presents a set of premises pertaining to each construct in a democratic political system, broadly considered. Some of these find corroboration within other chapters, particularly in relation to the links between them as categories of analysis.

Literature that supports this study

This research is both interdisciplinary and integrative, and therefore draws on areas of study not usually considered connected. Drawing on literature from political sciences and extended analyses of technology means not all relevant studies could be covered. Areas of public administration and management are omitted. Rather than exhausting a narrow area of research, the intent here is to focus and examine broad areas in order to identify patterns that exist across the separate categories of analysis where in-depth analysis normally occurs. The deductive derivation of the research hypothesis suggests links between disciplines; it draws on sources, which are to be found relevant to the processes of technology policy formulation and governance in the South African democratic political system. Crow and Sarewitz (2000) see technology as a force that can transform social structures and create new phenomena. Because this study falls into the general category of a deductive goal, it realises the potential of technology to enhance the democratic political system. The provision of access to information and technology and instituting mechanisms for democratisation at all levels of society is a fundamental assumption of this thesis, and is supported by modernisation theories. Some of the literature below does not share this point of reference, being mostly concerned with non-critical contribution to political science. This is particularly evident in the business literature. Other areas, such as studies of media, technology and society, and in particular electronic governance, are overtly concerned with social outcomes. This study addresses the overlaps and gaps in these approaches in order to accumulate a perspective that is intended to be both a practical and a theoretical contribution. The relevant areas are outlined below, along with the additional perspective provided by the current research.

Themes of the literature review

The following themes are the key constructs in this literature review study. Firstly the chapter looks at *the historical overview of the literature debates on technology policy*; secondly at *the democratisation process in South Africa*; thirdly at *South Africa's technology policy*, and fourthly at *the democratic politics of technology*. A summary of analysis concludes the key constructs, which correspond with the divisions of the works under review.

A historical overview of the literature debate on technology policy

There has been more literature on technology policy approaches in the past two decades. The development of this literature started around the late 1960s and continued to the early 1980s, and focused mostly on the concept of "appropriate technology" or "intermediate technology" as it is commonly known. The concept first originated from the Neoclassical discussion on the "choice of technique", where many social scientists criticised developing countries for choosing the "overly capital-intensive" technologies in their import substitution industrialisation strategy and called for them to choose more labour-intensive technologies which were more suited to their own environment. The concept was subsequently adopted by a more radical school of thought in Schumacher's book "Small is Beautiful" (1973) and the Dependency theories. Both these schools argued that not only were the technologies imported from the advanced countries inappropriate for the local environment, they were also inappropriate for meeting the real consumption needs of the population. (Emmanuel, 1981).

From the late 1970s the debate moved to a more productive phase. Rather than debating at the general level whether imported technologies were appropriate or inappropriate, the debate was on why some countries were more successful in absorbing imported technologies than others. The consensus that emerged out of this debate was that, to some extent, developing countries needed some degree of technological capability if they were to be successful in choosing, adapting, and making incremental improvements of imported technologies. It was also emphasised that irreversible investments were often needed in building such technological capability and that policy actions had an important role to play in the process. (Fransman and King, 1984.) The crucial point in this particular instance is that technology needs to be assimilated in society. Imported technology needs to be invested and must be adapted to local conditions if the appropriate national productivity levels are to be achieved. Where productivity levels are high, other socio-economic imperatives are covered and the standard of living gets boosted.

From the 1980s the literature became more sophisticated. Rosenberg (1982), Nelson and Winter (1982), and Freeman (1982) opened new debates in the study of technology. They laid emphasis on the evolutionary nature of the advances in technology and the importance of institutional and political policy factors in the process. (Dosi et al.1988.) These developments culminated in the birth of the concept of "national systems of innovation" (NSI), which South Africa adopted as its policy approach (White Paper, 1996) and through which the institutional initiatives were undertaken by government in the establishment of the National Advisory Council on Innovation Act, no 55 of 1997 (NACI Act), the primary objective of which is to advise the Minister on issues of science and technology policy. The importance is based on the role of institutional factors, and particular emphasis was placed on the inter-relationship between the constituent parts of the institutional complex in the determination of technological progress. (Lundvall, 1992 and Nelson, 1993).

These two schools of thought differed in their solutions. The former strongly advocated small-scale industrialisation, while the latter also wanted capital-intensive theoretical developments. They influenced the literature on technology policy, producing a new breed of theoretically sophisticated and empirically well-grounded literature, of which the most updated synthesis is that of Lall and Teubal (1988).

Most authors assert that the world markets, especially in developing countries like South Africa, may fail to generate a socially desirable degree of technological progress and that it is only the type of political policies that may be necessary to resolve this problem.

At best this literature review's contribution can be related to two areas that have been relatively ignored in the existing South African literature, namely the political and the institutional aspects of technology policy design and implementation. Succinctly stated, whether a technology's design and its use are compatible with perpetuating democratic social relations. (Scolve, 1995)

It would be a gross injustice to state that authors who contributed to the debate on technology policy in South Africa have completely neglected these two aspects. However, it would not be too much of an overstatement to mention that most of other

literature reviewed was decided rather on the basis of some objective theory diffusion, with little attention to the political aspect of technology policy design and implementation. In the same breath it would also be wrong to say that institutional factors have been neglected in some literature, especially given the numerous writings on national systems of innovation. However, it would be fair to say that far more attention has been paid in the literature to the institutions related to knowledge generation. (White Paper, 1996).

The political aspects of technology policy in South Africa unfortunately lacked a relatively well-developed literature which this study could draw from. Most literature dwells on industrial technology, with technology policy considered as the subcomponent of political sciences.

Having drawn some literature from other developing countries with experience, which were more less in the same situation as South Africa, the earliest stage of the debate on industrial policy was prompted by the success of Japan in dealing with the industrial changes they made towards their technology policy. (Johnson (ed.) and Thompson, 1989.) Subsequent literature was also mostly concerned with industrial policy, for instance the debate that started in the mid-1980s and culminated in the debate surrounding the World Bank's "East Asian Miracle Report". (World Bank, 1993). The debate at this stage was not really fruitful for the purpose of this study as it focused on establishing the existence of industrial policy in East Asia, with little relevant lessons to draw for the South African experience. Most authors argued that little industrial policy existed in both South Africa and the East Asian countries (Shcultze, 1983 and Balassa, 1988), and that its execution was mainly involved in the technical process, without some political elements which would have been useful to compare and analyse with the South African democracy.

Literature on the scope of the democratisation process in South Africa

Since the 1994 elections in South Africa there has been interest in the progress and the extent of the democratisation process. There is now substantial literature on many

aspects of democracy in South Africa, aspects which include issues of national security, socio-economic development, poverty alleviation, etc. The review in this section provides an overview of the issues and answers of various authors and relates them to the above analysis of democracy in South Africa. Most debates on South Africa's democracy justify theories around liberal democracy and the continuation of concerns about democracy in general. MacKinley (2001) argues that the African National Congress (ANC) became the standard-bearer of liberal democracy in South Africa. Since coming to power in 1994 it has followed the liberal democratic formula of institutionalising the combination of individual rights and capitalist market economics. South Africa's smooth transition from apartheid to democracy (Williams 2000) also outlines neoliberalism. Williams also presents the major shifts in the ANC's economic policy and makes particular reference to the role that the neoliberal discourse played in delegitimising alternatives and stifling debate during the transition. Now integrated with the global offensive mounted by internationalised corporate and finance capital, liberal democracy has acquired the mantle of a necessary and natural political product of an equally necessary and natural economic order. (McKinley 2001.)

Other aspects of the South African democracy relate more to opportunities created by democracy. Some authors are pessimistic or critically ambivalent about South Africa's democracy, while others are relatively optimistic. Muthuinen, Khoza and Magubane (2000) give a corresponding review on the democracy in South Africa. They have reviewed the institutional forms and capacities that underpin South Africa's democracy and argue that a new culture of participatory democratic governance has emerged short of addressing prevailing inequalities.

Literature on the South African technology policy challenges

Prevailing technology policy challenges are the same as the insurmountable challenges of social inequalities that still face the South African democratic government. Lamounier (2002) in Tulchin (2000) observed challenges that social inequality present to democratic governments around the world. One of the particular themes which he looked at is the effects of globalisation on the distribution of income and wealth within national frontiers; he also looked at the impact of inequality on the stability and the quality of democratic governance. He thus presented an analysis of the future of democracies as being able to redress social ills of the past. The latter is important for this part of the study as there is a direct link between the effects of globalisation and the advances of technology, and the relative ease with which these travel across national boundaries.

Technology has inevitable political and economic effects. There are empirical grounds, as suggested by most authors, that technology as propounded by the effects of globalisation has more effects that influence the economic performance of a country. This is because the flow of the intellectual phenomenon presents ideas across the border. The intellectual phenomenon is more significant than transporting goods and resources as potential for technology in a democratic political system. It is also more real than in economic and political life, and thus knowledge in this regard plays a vital role in determining technology policy imperatives. The challenges for the South African policy imperative are that it should not be mapped outside the dictates of the globalisation effects. Schimmitter points out that globalisation may not even exist in any material sense but if enough people believe that it is present and potent, it will produce a significant effect by anticipated reaction. (Schimmitter 1999)

The main conclusion that emerged from this literature debate was that, although the policy tools used, such as tariffs, subsidies, tax privileges, etc., were in many ways similar for most countries, there were important differences in the way they were designed and implemented. For example, the Small, Medium and Macro Enterprise (SMME) and the Black Economic Empowerment (BEE) industry policy protection in South Africa come with relatively clear performance targets, like market performance and the extent of advancement given the incentives and non-incentives to the non-

industry performers, which would be penalised in the allocation of related privileges. And what determined these differences were direct factors such as political intervention directed by the government that is willing and able to provide material support.

The study endeavours to develop an analysis of the political and the institutional aspects of technology policy in South Africa, using some of the insights from the industrial policy literature and a very limited literature from technology policy itself. This was not necessarily simply a re-interpretation of the existing literature discussions on these issues in the policy debate. The study does not only seek to provide a somewhat more fine distinction analysis of the political factors in the policy process than what is currently available, but also undertakes to develop a more institutionally-focused analysis of the impact of technology in a democratic political system, with specific reference to South Africa. Before doing that, however, one also needs to identify the main characteristics of technology policy, as these characteristics will affect the way in which a democratic political system functions.

There are generally two extreme opinions presented by different authors: some believe that technology is a boon to democracy, while others believe that it is destructive to democracy. In an effort to demystify the cyber-utopia and the neo-ludite view, most literature makes reference to the fact that both schools of thought are correct in some respect as the policy process is also resultant from the political effect of advances in technology. It defines the ranges of how government communicates with its citizens and how society communicates amongst itself in a nation state given the level of advancement. The impact of technology, and particularly of information and communication technology, is a reflection of the extent to which innovations can be explored, and also gives an indication of the inefficiencies in the political system, which can sometimes be presented as a threat to democracy. Tetty (2001) asserts that even if more people are getting a lot of information, this does not translate into a significant expansion in the numbers and categories of those who engage in, and hence influence, the direction of democratic politics in the country.

There are dominant reasons why some authors see technology as being a threat to democracy. It is, firstly, premised from the fact that global network technologies have

no boundaries, that they do not respect any boundaries and at times undermine the enforcement of the rule of law, which defines the essence of democracy in a democratic political system. Democracy makes good neighbours in an increasingly interconnected world; it has both the means and the motives to promote the democratic process abroad. (Talbot 1996.) For instance, the availability of information and communication technologies (ICT) is the ease with which one can create a public sphere in 'cyberspace' through the use of personal computers, modems and telephone lines, the new global communications which are being established. In most parts of the world different organisations are integrated into the webs of horizontal, non-hierarchical exchange, and have already proved themselves able to counter censorship and disinformation. Interest and pressure groups have to a larger extent made use of the new technologies to advance their course, for example "one of the important tools of the Zapatista movement in southern Mexico has been the internet". The movement's leader, Subcomandante Marcos, carries a small computer, through which he has been able to communicate with the rest of the world in a form that is not easily controlled by the government. (Ferdinand, 2000.) In fact, individuals can even find a way on the Internet to send a message to the Subcomandante. Communication was vital because for the rebel movement to succeed, it needed involvement from oppressed people all over the world, not just from the Chiapas. (Lutz, 1999). Secondly, it is argued that technology is dominated by the English language and as such is seen as eroding cultural differences and giving preference to a new set of national commercialism and consumerism values that thrive on the net; despite the global network that may integrate different communities there is therefore a concern regarding the growth of transnational cultural industries, as well as liberalisation policies pursued by organisations like the World Trade Organisation, which may reinforce current patterns of cultural colonialism. Technological innovations are in fact the enormous growth of international trade, and very supportive, liberal, political climate has facilitated the rapid transnational proliferation of mass market, advertising and electronic entertainment produced by mega conglomerates. A uniform consumer lifestyle is being aggressively marketed across the globe. Thirdly, the private and privatising environment of the Internet in particular is seen as destroying national democratic values. Although the South African economy has distinct positive privatising features in its technology approach, it is also hampered by political uncertainty, poor productivity, an over-emphasis on the

exploitation of natural resources, and consumer-driven economic cycles. Hawkins (1992) maintains that, to achieve rapid growth, South Africa will have to transform its economy to become investment driven and export intensive, with the emphasis on manufacturing and services. Private sector alliances with foreign multinationals could provide South Africa with access to the technology and marketing skills it needs.

Southall (2000) alludes to the fact that South Africa's first universal suffrage election of 1994 inaugurated a transition from apartheid to democracy. Yet there are continuing debates about the quality of that democracy that promised a better life for all during those first elections. He is cautiously optimistic to note that, although South Africa faces several problems and long-term challenges that could easily erode its democratic potential, democracy is acquiring a basic strength. The transition, which transformed South Africa from a pariah nation into a progressive multicultural democracy, is identified as a model throughout Africa and a symbol of hope for struggling democratisation processes elsewhere. Jung and Shapiro (1995) have a worrying notion that there is a possibility that the South African democracy may lack some of the basic ingredients of a viable democracy due to the fact that the transition has been negotiated between the ANC and the apartheid government. The exploration and evaluation of the conjecture of the dynamics of democratisation presents challenges for the political system to concretise a democratic order.

South Africa's consolidation of democracy must be judged according to its own society's political involvement in the policy decisions and how it meets its achievement of social democratic vision. Under such provisions, South Africa is not a consolidated democracy but an emerging one; its transformation has been more political than economic. South Africa has witnessed considerable institutional and representational change, but certain behavioural and attitudinal elements continue to hinder its democratisation. Specifically, there is a technological divide in society, particularly between the rich and the poor, and the urban and rural communities. There is also a considerable allegation of corruption among the levels of government officials, which has led to the disillusionment of the population. (Dreijmanis 2000.)

In an attempt to enhance democracy, the first democratically elected President of South Africa, Nelson Mandela, encouraged all the citizens of South Africa to take the

national project of accelerated and fundamental transformation of the country very seriously. He also encouraged the people to unite in a new patriotism in order to achieve the goal of creating a new society. He suggested some investment challenges that needed to be met, some new roles for local government, and some ways in which democracy could be promoted. Finally, he encouraged citizens to work together to make their country a winning nation. (Mandela 1996.)

The objective of this call was primarily the recognition of concerns about poor performance as regards the provision of socio-economic services in South Africa. Simkins (1996) maintains that South Africa's economic future depends on moving towards the conditions for cooperation, where all facets of the social services will be intertwined with the economic aspects. He had looked at the problems associated with the state's reconstruction efforts in terms of housing, health and education, the development context, taxes, spending, and poverty, and the move towards cooperation with business. He is doubtful whether, in the absence of political policy interventions, the delicate political balancing act required to achieve cooperation can be sustained long enough.

Currently different policies coexist in South Africa, for instance those that deal with individual human rights and with traditional communal obligations. Diverse political communities propagate different models of citizenship, even as citizens act out simultaneous membership in multiple groups. South Africans thus adhere ambiguously to conflicting notions of transformational society as is dictated by modernity and tradition, and economic needs. Society has to reconcile itself with those vestigial subjugations and disparities of privilege that continue to bother it. (Ramphela 2001.) The repercussion of these disparities in a diverse political community is also symbiotic to the technological divide which has been clearly documented as dividing society along the technological lines. Hence in an attempt to bridge the gap, South Africa has to recognise the importance thereof. President Mbeki, through the International Presidential Advisory Council on Information and Communication Technology, has taken wide initiatives to solicit advice in order to cover all elements of the information and communication technology sector in order to monitor rapid changes and keep track of the application, thus keeping pace with inevitable advances in technology and its applications. (ANC 2001.)

Technology policy in South Africa has been debated across a broad spectrum of society with vastly different interests. During the literature debate process it emerged that caution should be taken as the inherent power of technology application could lead to abuse in both government and society. For this reason Christianson (1990) presents an argument about certain inherent characteristics of technology which might be abused and with which a state may instil fear in its society and its neighbours. He specifically makes reference to nuclear power capability, which he says may undermine the public accountability of decision makers. He contends that there is a strong case for the demand that public policy decisions meet clearly defined criteria for rationality. He demonstrates that irrational policy decisions pose a distinctive threat to liberal democratic principles in South Africa; for instance, he says that nuclear power has been mooted as the answer to South Africa's long-term electricity requirements. However, nuclear power is controversial, and there is increasing awareness worldwide of both adverse environmental implications and its costliness. There are also other issues that demand careful consideration, and public policy decisions, such as the decision to launch a nuclear power programme, need to take account of clearly identified standards of accountability and rationality. Advanced technologies like nuclear power pose distinctive problems. These are discussed with specific reference to the nuclear option in South Africa. (Christianson, 1990).

There are some aspects of technology, especially information and communication technology (ICT), that present another level of power and control in a political system. Willett (1995) agrees that this level of power and accountability should be able to identify the beliefs, myths and values attending to the notion of democratic accountability. He asserts that this will show how the basis for the right to communicate should be established, as well as the strategies necessary for this right to be recognised, understood and accepted, and thereby legitimising the democratisation process. Challenges abound for ICT as an instrument to fast track a democratic process.

The South African Parliament also faces challenges that are posed by an increasing reliance on ICT; it has to have the ability to uphold the values and principles of an

inclusive participatory democracy for all South African citizens. The potential value to Parliament of harnessing increasingly sophisticated ICT vests in the ability of such technologies to play a critical role in facilitating co-operative governance and overcoming the information gap between itself and the majority of South African citizens. Consideration does however become important when there is an increasing dependency on such sophisticated technologies, which needs to be weighed up against the ability of Parliament to uphold, simultaneously, the democratic values of freedom and equality of access for the majority of citizens who may not have access to such sophisticated technologies. (Groenewald, 2000).

Despite all these technological efforts regarding socio-economic and political problems, South Africa has taken a courageous position with its adoption of a policy on the National System of Innovation (NSI) approach. Blake (1996) maintains that if an effective national system of innovation is the main approach of the policy, IT has to play a very central role in the realisation of that policy system. He further alludes that information and technology both enable and depend on a national system of innovation and that the IT industry in South Africa can be a major driver for the economy. He thinks that the information society makes great demands on human resources and that current deployment of IT is hampered by having far too few people with ability for innovation in IT.

Envisaged within the context of NSI is the new mode of production – centred on information technology and instantaneous worldwide electronic communication – which has become dominant in the era of transnational capitalism. There have been arguments around this topic; at the forefront is Louw (1995) who argues that if South Africa's potential is to be realised, the country will need to be fully integrated into the global electronic grid of information. If the challenge of a post-Fordist information economy is accepted, South Africa needs to concern itself with producing a population able to operate within an 'information economy'. This requires critical and aware media producers and users, which, in turn, requires a degree of coordination between media policy and education policy formulators. Contemporary cultural studies should grasp the opportunities offered by the flux of the post-apartheid reconstruction of society to demonstrate that a democratic political system can be built by co-opting the post-Fordist media technologies developed by multinational

capitalism. Louw's argument is also followed by Budlender (1995), who argues in his claim that by providing people with the capacity to use communications they will be able to make their demands more forcefully and successfully, testifying to a deeply urban-biased vision.

Literature on a theoretical construct of the democratic politics of technology

In the last years there has been a momentous continuation of victories in the world arena for liberty, human rights, and market economies. Historically these have been associated with democracy, thus democracy has emerged as a political system of choice around the globe. Within this democratic political system technologies have been exploited not only to enhance society's socio-economic conditions but also to enhance the democratic rule. The impact of technology upon lifestyles (Weeamantry 1993) that have been maintained for centuries, if not millennia, has been profound and widespread.

Tracing back to the genesis, a growing awareness of the problems at the interface between the expanding domain of technology and human rights prompted the General Assembly of the United Nations in 1975 to proclaim its Declaration on the Use of Scientific and Technological Progress in the Interest of Peace for the Benefit of Mankind (resolution 3384 (XXX) of 10 November 1975). This declaration called upon all states to take appropriate measures to prevent the use of scientific and technological developments to limit or interfere with the enjoyment of human rights and fundamental freedoms of the individual as enshrined in the Universal Declaration of Human Rights, the International Conventions on Human Rights and other relevant international documents. The same Declaration called upon all states to cooperate in the establishment, strengthening the development of the scientific and technological capacity of developing countries with a view to accelerating the realisation of the social and economic rights of the people of those countries.

In his book *Democracy and Technology*, Sclove (1995) presents a "disdain from the epistemological inanity of value free technology and the reductionist fallacy of technological determinism". He argues that misunderstanding about technologies enhances their relative structural significance, because it enables technologies to exert

their influence with only limited awareness of how, or even that they do. It is given that technology constitutes an influential social structure. He considers how this particular structure relates to the traditional question of democratic theory. What he ponders is the optimal size of a democratic community, the minimal standards of an informed citizenry, and whether communitarian/cooperative technologies would provide alternatives to today's monstrous business enterprises and public bureaucracies

Sclove (1995) has been brave to confront the possibility of conducting elections through the Internet; he does alternatively give unqualified endorsement to the popular notion that "virtual communities" might one day replace territorially defined states as the predominant locus of democratic politics. The apparent anarchy of the Internet is plainly at odds with the emerging hegemony of corporate control over cyberspace; the outcome of the struggle is as yet unclear. He provides clear illustrations of political and economic alternatives to social gigantism that give practical expression to the belief that technologically alternatives mediated tyranny, while a clear and present danger is not our necessary fate. From cooperative networks of small manufacturing firms to the non-profit centre for technology, democracy and technology are replete with practical illustrations of innovations, which permit the democratisation of technology in small and medium scale context. If this is less than a prophecy of a techno-democratic utopia, so much the better.

With regard to the hegemonic institutions of transitional business and the state, he maintains that "at a minimum they too should be reorganised into federations of quasi-autonomous, democratic divisions and subsidiaries". He is realistic enough to acknowledge that, although some decentralisation is taking place under the sway of strategic planning initiatives and reengineering programmes, any claim that a more democratic ethos is accompanying such organisational restructuring is at best premature. The summary in the Sclove literature is that it is possible to evolve societies in which people live with greater freedom, exert greater influence on their circumstance, and experience greater dignity, self-esteem, purpose and wellbeing.

It is said that the 21st century has promising scientific and technological innovations that were previously regarded as fictitious. Developments in nanotechnology, microelectromechanical systems (MEMS), genetic engineering, cloning, robotics, and

optical and quantum computing are likely to have a great impact upon the future structure of the society. While there is wide dispute as to whether these advances will be a boon or bane to humanity, there is a consensus opinion that change is coming. Joy (2000) sees a future that is frightfully bleak. He maintains that “accustomed to living with almost routine scientific breakthroughs, we have yet to come to terms with the fact that the most compelling 21st century technologies – robotics, genetic, engineering, and nanotechnology – pose a different threat than the technologies that have come before”. He warns that society has become enamoured with the quest for scientific knowledge, that it no longer bothers to consider the impacts of the societal discoveries. Moreover, he is concerned that the self-replicating abilities of novel innovations in genetic engineering, robotics, and nanotechnologies (GNR) could produce dire results, including the end of humanity.

In the light of this potential danger, Joy suggests a controversial solution: verifiable, voluntary relinquishment of dangerous GNR technologies. He writes that “this requires vigilance and personal responsibility by those who would work on both NBC (nuclear, biological, and chemical weapons) and GNR technologies to avoid implementing weapons of mass destruction and knowledge-enabled mass destruction”.

Joy (2000)’s sentiments are rebutted by Brown and Duguid (2000). They use the “ballyhoo associated with the dawning of the nuclear age in the 1950s to make their case”, by referring to the fact that techno enthusiasts had previously predicted the “end of power monopolies, the emergence of the ‘electronic cottage’, the death of the city and the decline of the corporation”. They both believe that much of Joy’s pessimism stems from a tunnel vision that leaves people out of a picture and focuses on technology in splendid isolation. Brown and Duguid hold that the future is only profoundly bleak if one looks at it through the “6D” lenses of: demassification, decentralisation, disintermediation, despecialisation, disaggregation and demarketisation.

Dertouzos (2000) is also critical and troubled by the notion that human logic can anticipate the effects of intended or unintended acts, and the more arrogant notion that human reasoning can determine the course of the universe. He counters that society in

its ability to assess consequences can rely on its humanity, feeling and beliefs when determining the impact of technology. Unlike Joy, who would prohibit certain types of research because of their potential dangers, Dertouzos states that "we should instead proceed, but stay vigilant, ready to stop, when danger is imminent, using our full humanity to make that determination".

Crow and Sarewitz (2000) both see technology and innovations as forces that can remake social structures and create new phenomena, which in turn lead to new institutions and response mechanisms. They believe that nanotechnology has the potential to be another catalyst for sweeping societal change. Their point is not to predict the future of nanotechnology and its impact but to illustrate the direction and scale of thinking that will be necessary if we are to successfully manage the interaction of new knowledge and innovation with society. They warn that the revolution is coming; that we can allow ourselves to be caught by surprise or we can prepare for it in order to enhance the benefit and reduce the disruption and dislocation that must accompany any revolution.

Nowadays it is clear to everyone that there is this problem of technology. It can be argued that no other comparably larger theoretical issue impinges so directly on daily life as does this problem in its various aspects.

It therefore follows that there is an adequate confrontation or reckoning with this issue in its full theoretical dimensions. For the most part this problem comes to light only as the problems of specific technologies. Is it moral and desirable for biological engineering to alter natural species? For example, who has the right to decide whether a foetus should be aborted or a patient disconnected from life-support machines? How are we to deal with the potential dangers of environmental degradation or nuclear war? Different technologies bring different problems, but beneath this apparent variety three practical questions seem to be raised by every advance in shaman power: Is it moral and desirable to do what this new capacity enables us to do? On whom devolves the right to decide this question? And how does one control the unanticipated or unintended consequences that may emerge from the exercise of this power? These are the problems arising from the development of a particular new technology, posed as a difficulty that is usually treated as a technical problem or as

policy questions to be resolved within the context of established moral and legal practice.

Not far beneath the surface of these practical issues, however, hang theoretical questions about the rational coherence, the psychological impact and the moral propriety of technology. The question can be asked if modern scientific rationalism can give an adequate account of the world, and especially of the human world, including the human capacity for science. Is the vision of nature and of man that imposes on society compatible with a truly human life, and does the technological project for the mastery of nature not violate some sacred or perhaps salutary limit on human power established by nature? These questions always cloud the existing policy debates. While escaping their direct attention, they constitute the problem of technology in a deeper and more interesting sense that guides the inquiry.

Amongst the critics of technology, Heidegger stands outside and against liberal democracy, which he sees as merely a political manifestation of technological rationalism. He views liberal politics and technological science from when it began to emerge at about the same time when it sprouted from premises concerning the autonomy of practical and theoretical reason to scriptural or technological absolutes. Critics of technology like him were nourished by shared hopes for humanity's progressive self-improvement through its conquest of political and natural worlds. Crow and Sarewitz (2000) also support each other symbiotically; they see liberalism protecting free and public scientific inquiry, with the latter having generated the technological and economic growth on which the former has depended. Because of this intimate connection, it seems peculiarly difficult for thinkers working within the liberal democratic tradition to confront the problem of technology in its most radical form, as the relative silence on this topic by liberal theorists John Rawls, Ronald Dworkin and Robert Nozick would seem to indicate. But for the same reason it is above all necessary for liberals to address it. The problem of technology is, to a very great extent, the problem of liberal democracy.

A general tone is set by Kass (1993) in specifying problems of technology, and by thinking about its possible implications for liberal democracy. He worries about technology because it provokes anew the age-old question of human happiness at the

same time that it tends to undercut the validity of such questions and endangers society's capacity to lead good and happy lives. According to him, liberal democrats must rediscover the richer, non-technological conception of liberty and dignity, if they are to keep their moral bearings in modern age.

Bimber (2001) asserts that some aspects of democracy appear more sensitive than others to the availability throughout society of political information. Individual-level political engagement poses a puzzle in this regard. An instrumental-quantitative conception of information central to rational theories and also found in some behavioural theories of participation, appears contradicted by historical trends. He alludes that contemporary expansion in political information is made possible by new information technology. He presents a model of the relationship between information availability and political engagement, based on survey data of Internet use between 1996 and 1999. The presentation is relevant to the debate whether the information revolution will prove salutary for participation, and at the same time sheds light on contending theories of information. His finding reveals that little relationship exists; the only form of participation demonstrably connected to Internet use is donating money. This finding fails to support instrumental conceptions of information and instead endorses cognitive conceptions employed in psychological and certain behavioural theories of political engagement.

Miller (2001) maintains that what moderns call technology is essential to liberal democracy, for without the increase of wealth, knowledge and opportunity that technology provides, the ruling majority could not be an enlightened middle class. Nevertheless, critics point to advancing technology's harmful side, with some hope to prevent these harms by tight controls. Others despair that technology lies beyond our control. In a neglected 1858/59 lecture and related speeches, Abraham Lincoln grappled with these issues and their implications for democratic statecraft. Although convinced that "discoveries and inventions" had rescued humankind from savage beginnings, produced abundance, and put genuine democracy within reach, Lincoln recognised that advancing technology alone would not guarantee freedom, but might bring new forms of mastery. Lincolnian statecraft seeks to moderate or limit this advance, not through stringent controls but by a moral teaching that builds on the natural right to oneself and includes a comprehensive doctrine of labour.

The effects of new information and communication technologies (ICTs) on democratic political systems in industrial societies have also been investigated by Chambat (2000), who in his study describes early adoption of ICTs by political institutions, e.g. computerised polling and voting, and evaluates the benefits and drawbacks. Preliminary evidence suggests that ICTs have not been that successful in improving political participation; the reaction of citizens to “teledemocracy” are not what has been said about the hype of technology. Looking at the machinery of government, he concurs that ICTs have been adopted successfully, improving public administration, decision-making, and information management. The role of ICTs in the public space is better off in terms of how it impacts on individuals in a society, the social communication network, mass media use and political function, and community cohesion. Contrary to Chambat, Slaton and Becker in their arguments assert that modern representative democracy was neither intended nor designed to function as a democracy, and progress in the past 200 years has come from the persistence of citizens operating outside established hierarchical power structures (Slaton and Becker 2000). A transformation of modern representative democracy is under way, and information and communication technology (ICT) is a key component in the evolution of more participatory democratic governments. The failings of modern representative democracy are highlighted by the decline in voting turnout rates and a high level of dissatisfaction with and distrust of elected political leaders. While advances in technology and the expansion and availability of information can hinder and harm efforts to advance democracy, a balance is sought to the discourse by emphasizing the potentials and benefits and by seeking solutions to problems in the representative systems. This is approached through the examination of four areas of enormous innovation and experimentation in utilizing ICT to develop new forms of greater citizen participation within representative democracy and for creating more effective direct democracy: voting from home, scientific deliberative polling, electronic town meetings, and direct democracy activities. The main conclusion is that ICT has aided forces that favour a stronger influence by citizens in representative government, which is already in the process of being transformed as nations move toward the global economy and citizens insist on more self-governance.

Stevenson (2000) seeks to tie in arguments that can be connected to the development of a global media culture and concerns around cosmopolitan forms of democracy. This is done by considering arguments for firstly a global human rights initiative in respect of global media conglomerates; secondly technological change in respect of digital cultures; and lastly the arrival of what Castells has described as the culture of "real virtuality." These views and perspectives are assessed in terms of the contributions they are likely to make towards what he calls a "cautious cosmopolitanism". He seeks to make some definite policy reference that helps foster conditions in which cosmopolitan democracy flourishes.

Cherny and Kapkov (2000) present an analysis of the rapid and dramatic changes in the politics and economics of the world during the twentieth century, and reveal that the role of science and high technology becomes extremely important for international development, security, and cooperation. The consequences of fundamental research become critical for mankind, and they determine and define preventive security. International scientific and technological cooperation, coupled with the financial power of the dollar, will make it possible to avoid an "end of history" or a "clash of civilizations", as well as to resolve many world conflicts. The importance that science and technology holds for the future of humanity must be added to the current definition of "democracy".

Catinat and Vedel (2000) contend that public intervention is the key to fulfilment of the promise of digital democracy. He describes liberal and digital democracy by alluding to an argument for government empowerment of digital information dissemination referring to economic, contextual, marketing, and subjectivity issues. Policy considerations are listed, such as privacy protection and access to infrastructure, public information, and services. Details are included of the cultural, educational, and sexual composition of Internet users. There is an examination of international gaps in technological access and changes in information-access policies. Exemplification of ways in which public actions may promote digital democracy includes specific methods for providing information and elucidation of laws concerning public access to data. Also considered are pivotal actions in the liberalisation and sponsorship of telecommunications. A government role in

promoting public awareness and enthusiasm for computer use, system design promotion, and organisation is important.

Barber (1999) argues that there are at least three scenarios for the future relationship of technology and democracy: (1) the Pangloss scenario, which is rooted in complacency and is simply a projection of current attitudes and trends; (2) the Pandora scenario, which looks at the worst possible case in terms of the inherent dangers of technological determinism; and (3) the Jeffersonian scenario, which seeks out the affirmative uses of new technology to nurture modern democratic life. He concludes that uses of technology that will nurture strong democracy require hard and imaginative work for which the political will appears to be lacking.

As in previous cases, Sclove (1995) argues that, insofar as citizens ought to be empowered to participate in shaping their society's basic circumstances and technologies profoundly affect and partly constitute those circumstances, it follows that technological design and practice should be democratised. He presents his argument in three parts. Part I synthesises two disparate bodies of knowledge. One is a corpus of recent research into the social dimensions of technology. The other is that body of knowledge and practice known as democratic theory. Part II develops a provisional system of design criteria for distinguishing technologies that are compatible with democracy from those that are not. Part III elaborates on the concept of the democratic politics of technology. Challenging the foundations of modern economic thought, the author argues that the democratic theory of technology qualifies as a coherent alternative to neoclassical welfare economics. Indeed, reinvigorated democratic politics should largely supersede conventional economic reasoning as a basis for technological decisions.

Hager (1993) revisited the developments in Germany that during the past two decades the mobilisation of grassroots citizen groups has posed a fundamental challenge to institutional politics. One important, often-overlooked aspect of this challenge is the relationship of democratising movements to technology. Grassroots protest arose mainly in reaction to large, state-sponsored technological projects. Citizen movements reopened the question of the citizen's proper role in technological decision-making, which had long been part of theoretical discourse. Grassroots activists challenged not only policy decisions but also the legitimacy of the bureaucratic institutions that

produced those decisions. Informed political participation has raised the technical competence of policy in Germany, while eroding the legitimacy of traditional policy-making institutions. Citizen groups have since directed their efforts toward developing alternative political forms that will reconcile technical competence and participatory democracy. The theories of Claus Offe and Jurgen Habermas illuminate the legitimation problems that lead to citizen protest.

Weinberg (1990) considers two questions: Do the two technologies that represent the highest engineering achievements of this democratic age (nuclear energy and the microchip manifested in instant communication and precise control) threaten the stability and freedom of liberal democracies? Can technologies that pose risks, but are regarded by many experts as necessary for survival, survive democracy? In short, the author asks whether modern technology and democracy can coexist

Summary of the literature review and analysis

Challenges in the political, social and the economic milieu prompted the review of the literature, which demonstrated that technology could have an influence over a democratic political system. It is evident that technology can shape the military and the economic environment of the political system. It is also clear that technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

The important question that was addressed is whether technologies are substantively democratic, and whether technology policy decisions are compatible with perpetuating a democratic political system. The review investigated and appraised democratic theories and analysed approaches and challenges in democratic politics of technology, which could be applied in South Africa. Specifically the focus was the character and crisis in technology, and also the theoretical and practical resources that are available for democratisation in South Africa.

In essence, if democracy is impacted by technology, as systematic application of knowledge to resources to produce goods and services, it also enhances stability and

equality. Therefore, it can shape challenges in the environment of a democratic political system by maintaining stability; it will also deliver material prosperity, and foster democratic rule in society.

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.

CHAPTER FOUR

THE ROLE OF TECHNOLOGY IN THE MODERNISATION PROCESS

Introduction

This chapter aims to recognise the modernisation process within the context of the role technology has played and the wider socio-economic and political changes that took place over the past years, particularly in South Africa. It examines the transitions in political culture in relation to the re-conceptualisation of the role of technology as a factor contributing to the modernisation process, while taking experiences from other countries into consideration. The chapter specifically looks at the modernisation of democracy through technology.

The process of modernisation in SA is closely related to the perspectives of integration and political strategies that have been defined as the "rationalisation of society", which claims the imposition of a specific form of social progress. (Feenberg, 1986). This process is also articulated by Marx's political revelation that originates from the growing rationalisation of society in terms of both technical progress and of his common understanding of society. Modernisation is being perceived as a process of transformation in the political culture that tends to establish new forms of governance and to redefine the links between state apparatuses and socio-economic structures.

In view of this analysis, this chapter examines the role of technology in the modernisation process, and how technology influences democratisation. It is argued that advances in technology reflect the wider challenge for modernisation in South African society. Some of the main features of this process are the changing links between politics and the economy, and the redefinition of political participation and liberal democracy. Furthermore, the chapter argues that modernisation is a contradictory process. There is no era clearly defined by 'modernity'. Tradition and modernisation coexist in a strenuous symbiotic relationship. In the context of South African political dynamics, however, political modernity coexisted symbiotically with the democratisation and the concomitant advances in technology. The chapter makes

reference to both scholastic approaches, as most of the background assumptions derived from the thought that helped to explain the causal relationship between modernity and technology.

The conception of political modernisation

The concept of modernisation emerged after the Second World War as a result of the global dismantling of European empires, and was seen as the development theory concerned with the development gap between the North and the South, and how best to lessen this gap so that the Third World could develop more rapidly and more successfully. It was during this time that humanities and social sciences were swept by a wave of technological determinism. If technology was praised for modernising societies, it was also blamed for the crisis it caused in culture. Whether interpreted in optimistic or pessimistic terms, determinism appeared to offer a fundamental account of modernity as a unified phenomenon.

This early period of the political modernisation phase is the central element of the early discourse, primarily of progress and control over both society and nature, which come together in the notion of the rational society. Rationality in society refers to what Feenberg (2003) calls "...the generalisation of technical rationality as a cultural form specifically, the introduction of calculation and control into social process with a consequent increase in inefficiency". Succinctly stated, it refers to the idea of man's ability to shape both the social and the physical world. This ability of man to take control of his environment is what in sociology is regarded as functionalism, which takes the form of an explicit evolutionist perspective with regard to sociology of development, as that of the modernisation process.

The modernisation process takes a bipolar view of the world, that all societies can be divided into two varieties, i.e. traditional and modern. An influential exponent of this dichotomy was economist WW Rostow. The modernisation process is driven by a number of different ideologies, which share the basic assumption that it is possible to outline the most desirable development of society. Rostow depicted five stages of sociological growth. The first of these stages is the traditional society, which is an astoundingly general category; it links together a vast diversity of different societies, ranging from stone age cultures to France on the verge of its revolution at the end of the eighteenth century. But he asserts that the similarities outweigh the differences

between them. (Rostow, 1960). These similarities include: 'pre-Newtonian' science and technology; a basically agricultural economy; and a rigid ascriptive system based on bloodline, kinship, etc. Until just before the industrial revolution that took place in Western Europe two centuries ago, all human societies were based on this form. This stage of development can be said to encompass all societies prior to the 17th century, which possess little of the structural characteristics that can be seen today.

Next come the preconditions for take-off. This stage is said to be often triggered by a stimulus from outside, such as imperial profit motives. It is characterised by an increase in trade, services, communications, and the beginnings of industry, especially extractive industries, such as mining. The economy becomes more specialised and interdependent, less localised, and self-sufficient. Rational science plays a more major role. An elite group comes to power, which wishes rather to re-invest its wealth rather than squander it. This is the period whereby a society begins to grow at a steady rate, both in quantity and quality. Essentially, the political, social, and manufacturing sectors are reformed to allow growth within all aspects of the country, and the society can be said to be emerging as a modern, market-oriented civilisation. The preconditions for this are various, but can be categorised as a general change in direction through all walks of society, toward the transition from a traditional to a modern society. The final two stages are natural extensions from the take-off: the drive to maturity is the expansion of the newly developed ideas and technology into other divisions of society, that is, a period of consolidation. Modern science and technology are extended to most if not all branches of the economy, and thus the range of leading sectors is widened, and the age of high mass consumption, which is a description of a period of further consolidation and advancement, and is as such not clearly separated from the 'drive to maturity' (Bell, 1973). Because of the high level of economic development, choices can be made about how the society works, and what its priorities are. Wealth can be channelled into individual consumption, as in the USA, or channelled into a welfare state, as in Western Europe, or social and political power. This is the final stage whereby the progress made previously has been fully filtered throughout the economy and culture, and is essentially the state of a country where little or no growth is longer necessary to maintain itself. (Rostow, 1960).

In simplifying the progress that has filtered through the economy and culture, the modernisation process assumes the fundamental proposition that people in traditional

societies should adopt the characteristics of modern societies in order to modernise their social, political and economic institutions. The main characteristic of modernisation is that of its simplicity, which dictates to the traditional society to recognise what is needed, from examination of other 'take-offs' to modernity, for their own culture to evolve. Having been modernised, the modern societies can assist in the evolution of the traditional society, which may not necessarily be the case. As a theoretical model, Rostow's perspective on modernisation is useful in that it is indiscriminate and unsophisticated as it requires little adaptation from one culture to the other. The basis of the concept is that the ultimate goal already exists and can be examined readily, and that this is what the developing country should strive for, hence the technologies that exist could easily be adapted to suit the environment in the developing countries. Although Rostow makes no attempt to isolate individual cases and discover the different ways to adapt the theory to suit the environment, the concept does provide the structure and ground rules to benchmark its applicability within the South African context. (Rostow, 1960).

Based on the foregoing, the South African model could also be depicted from other theories that are central to all modernisation and political development. These theories also present the notion that all societies have passed, or are in the process of passing, from a condition in which a bundle of related characteristics which can be broadly classified as traditional predominates to one in which modern characteristics predominate. A consideration of this series of changes as it relates to politics has been a relatively belated development in political science and rests on the work of social scientists concerned with the broader distinction between tradition and modernity. In its early development from the 1920s on, political science's lack of concern with change (Huntington, 1971), let alone with the modernising change from traditional to modern, can be traced to a number of factors. First, political science was concerned almost exclusively with relatively stable political systems, essentially those of Western Europe and North America. These had elements of change that could be studied, for example the rise and fall of particular political changes in balance of power between executives and legislatures, but did not seem to exhibit fundamental overall change. Political science also neglected fundamental change because its practitioners sought autonomy for their discipline by rejecting historical approaches, a

rejection reinforced by its adoption of behaviourism, which emphasised non-historical evidence such as surveys, interviews and observation.

The rise in modernity and hence in the study of political change, which became synonymous with political development, began in the 1950s as a result of the attempt of Western and particularly American political scientists to come to grips with the changes brought by the Second World War and, where Europeans ruled over dependent territories, the beginnings of decolonisation, in Asia, Africa, the Caribbean and Latin America – the areas that were later to be described as the Third World. Political scientists studying Africa were in the forefront of this movement. Thus, for example, David Apter's study of "political institutional transfer in the Gold Coast" (now Ghana) was researched as early as 1952 and first published in 1955, before Ghana's independence. (Apter, 1955). It was essentially an attempt to explain and predict modernisation; the institutional transfer was from traditional to modern, independence, direct institutions, in terms of Weber's threefold typology of authority.

Apter was a pioneer in his attempt to explain modernity and political development. The work played a major role in first focusing the attention of political scientists on developmental problems. Almond and Coleman (1960) in their book *The Politics of the Developing Areas*, have laid some of the ground rules for the study of political development, notably a characterisation of the distinction between traditional and modern social systems and a functional model of the political system which, it was claimed, had universal applicability. Almond and his collaborators were by no means the only authors to construct models of political development on the basis of these static formulations.

At the most general level, the distinction between modern and traditional is equivalent to a distinction between what are considered rational approaches to social organisation, action, and goals, as contrasted with irrational approaches. Without a predominance of rationality, modernity cannot exist. Already a caution is warranted. Rationality is in the eye of the beholder, what is rational to the self-proclaimed modern man may be hopelessly irrational to the man he has labelled as a traditionalist. Almond's characterisation of the rational/modern dichotomy rests on the pattern variables developed by Talcott Parsons but are part of a long tradition on political

thought. Three of these dichotomies are considered particularly relevant; ascription/achievement; diffuseness/specificity; and particularism/universality. (Parsons, 1951).

In a traditional society in which ascriptive values predominate, individuals will – to take but one aspect of life – be appointed to high office because of their family caste, sex or age. In a society (modern) in which achievement values predominate, an appointment will be made on the basis of clear indications that a person is qualified to carry out a particular function through the skills he has acquired rather than the status he has inherited. Secondly, in traditional society where diffuse values predominate, there will be, for example, little actual specialisation of activities or actors or perception of such specialisation. The economic, political and religious systems will merge both in the theory and practice of participants. By contrast, in a modern society where specific values predominate, individuals will both perceive and act in the knowledge that there are clear distinctions not only between the political, religious and economic spheres but also, for example, between different aspects of the political, such as the legislature, the executive and the judiciary. Finally, where particularist values predominate (in traditional societies), there may be a sharp distinction between, for example, the rights and obligations of different sectors of the population. Only a few might for instance be free men or entitled to own property or to pursue certain occupations. In a modern society where universalist values predominate, obligations and rights applicable to one man will tend to be applicable to everyone. (Nwabuzo and Mueller, 1985).

It should be noted that the above three dichotomies are of course closely related. Universalism, for example, implies an orientation towards achievement values. Finally, to Almond, the dichotomy between traditional and modern is not intended to be a rigid one. No society, or its political system, is from this point of view seen to be entirely traditional or modern. Rather, all political systems are transitional systems. There is also a need to look at the functional model of the political system, which together with the traditional/modern dichotomy forms the basis for the dynamic elements of the model of political development.

Like the characterisation of traditional and modern societies, Almond's model of the political system is by no means original. Aiming to provide interconnected analytical

concepts that would be applicable to any political system – however primitive or advanced – the functional model avoids such formalistic terms as legislature, executive and political party, and certainly any explicit reference to the machinery or characteristics of any specific political system. Whether such reference is implicit is another question. The emphasis is on the functions that the system performs, and the core of the model is developed from David Easton's notion of the political system as having certain inputs. Almond's model can be simply categorised as the input/output process, where for example *Inputs* are socialisation and recruitment, interest articulation, interest aggregation, and communication, and *Outputs* are rule-making, rule-implementation and rule-adjudication.

The model is elaborated in Almond's work in collaboration with Powell, partly to counteract criticism that the original model was static and had conservative implications. Almond and Powell conceded that the earlier framework was suitable mainly for the analysis of political systems in a given cross-section of time. It did not allow for explaining developmental patterns, that is to explain how political systems change and why they change. (Almond and Powell, 1966).

In the model, the outputs are characterised in terms of their relationship to their environment: they may be regulative, extractive, distributive, symbolic and responsive capacities. Implicit in such categorisations is the notion that a successful modernisation process or political development depends on the ability of the political system to adapt its capacities to the changing national and international environment. Such a suggestion is unexceptionable; a political system, for example, must be able to organise the extraction of resources needed to fund its changing activities, or create symbols which encourage the populace to grant it legitimacy under changing circumstances, if it is to survive. Almond and Powell, and some other theorists, do not, however, rest content with a model of political change that is universally applicable, in time and space, if somewhat truistic.. In so far as the notion of a traditional society is at all useful, one could – using Almond and Powell's broadest notion of adaptation – conceive of modernity which, for example, rested on the creation of new forms of traditional organisation. If every society that is not predominantly modern is also predominantly traditional, then indeed this must have happened innumerable times in world history. However, the elaboration of the mechanisms of adaptation that Almond and Powell offer, makes it clear that they are

concerned only with the modernising phase of political change. The model they offer therefore warrants further examination. (Almond and Powell, 1966).

Given the reasons discussed earlier in this chapter for the rise in the theories and models of political development, it is hardly surprising that interest should focus on questions of modernisation. Modernisation was the avowed objective of most of the governments of the new states, an objective looked upon benevolently by the United States – the home of the modern – anxious to maintain or expand its own influence and foster viable political systems after its own image as a buffer against revolution. Most political scientists concerned with political development were American and, as critics were to point out, they not only took up modernisation as a process that should be studied and conceptualised in an objective manner, but often seemed in their enthusiasm to have assumed rather than demonstrated that modernisation was indeed taking place.

The concept of modernisation, itself dependent on the demonstration of substantive distinctions between traditional and modern societies and political systems, is also central to various models of political development by Almond and Powell, Feenberg, Beck, Apter, Parsons, etc. According to them, both the process of political development and its ultimate goal may be subsumed under the concepts of structural differentiation, subsystem autonomy and cultural secularisation. (Apter, 1965). They argue that the political modernisation process results when the existing structure of the political system is unable to cope with the problem or challenge which confronts it without further structural differentiation.

The political modernisation process

Contemporary society is in transition as a consequence of processes of democratisation and the effects of technological accessibility. These processes are said to aggravate a new stage in the political arena in which the general idea of the modern society is being redefined. This phase of political modernisation is a combination of debates on post-traditional and modernity. Some modernist theorists assert that contemporary societies show a new or intensified degree of political, economic and cultural life being strongly influenced by advances in technological

developments and other related developments at global level. Modernism proclaims multicultural and multiethnic societies and promotes the politics of difference, linking the local and the global societies in which identity is not unitary or essential, but fluid and shifting, fed by multiple sources and taking multiple forms. (Ray, 1987). Contemporary modernisation theorists understand change as an accumulation of and within modernity, in which aspects of technology and globalisation are put at the forefront. It seems as though there is no way to overcome the impetus of technology, but at the same time individuals have to enjoy and live with these consequences of modernity. Modern society is seen as a society that assumes to be at a stage of high or radicalised democracy. Essential here is the unintentional and unplanned transition from traditional society to modern industrial democratic society. This transformation to a modern democratic society is understood to be at a phase of development in which the combination of individual, social, economic and natural aspects, created by the momentum of technological innovation, increasingly supports the social and political issues prevalent in a democratic society. As political processes become modernised, society as a whole too can no longer rely upon traditional institutions, and the less it can rely on traditional securities, the more it seeks reliance on technology. (Kumar, 1995).

The concept of modernisation in the technological era

Over the last century society has witnessed a revolution in information and communication technologies that has moved much of the public discourse and agenda setting from the individual and community level to the mass level. As communication technologies and their use by people continue to evolve, there are indications that this trend is now reversing, with some notable globalisation exceptions. With computer-mediated communications, people are reclaiming their communications power from mass institutions. (Clift, 1997).

Studies in the theories of modernisation and technology have made great progress in recent years; they have, however, remained different in the nature and role they have played in society's economic and political sphere. The relationship between the two is somewhat complex, such that it is incomprehensible to make sense out of modernity without an adequate account of the technological advancements that make it possible, and that it is also difficult to understand how the technologies can impact on society without a reasoning of the larger society in which they develop.

Modernisation is premised on the key notion of rationalisation to explain the uniqueness of modern societies. Rationalisation refers to the generalisation of technical rationality as a cultural form, specifically the introduction of calculation and control into social processes with a consequent increase in efficiency. (Feenberg, 1986). But rationalisation also reduces the normative and qualitative richness of the traditional society, exposing social reality to technical manipulation. It depends on a broad pattern of modern development, which is described as the “differentiation” of society. The notion of this differentiation in society has common applications in the separation of real political issues like property and political power, religion and the state, etc. Modernity as a theory relies on the key notion of rationalisation to explain the uniqueness of modern societies.

Technology’s influence in the modernisation process

In the past years, the subject of modernity has been recaptured in the humanities and social sciences, and has gained increased attention. What is striking in the existing literature on modernity is the ambivalent role played by technology in its analyses. Technology is often depicted as the engine of processes of modernisation and as one of the principal icons of modernity. It is the main motor-force of social change that is considered to be economic, more particularly technological change; and as such economic change is alleged to determine the most significant changes in social relations, values, or ideology, and political structure. (Nwabuzor and Mueller, 1985).

The role of technology in the modernisation process involves a complex relationship between its adaptations and how it is applied as an engine of the modernisation process. In terms of its adaptation, specifically the use of the Internet technology, technology seems to be a strong artefact for fast-tracking the modernisation process as it encourages mass interaction around the world due to its public openness and non-proprietary nature, in that there is nobody who can claim to own the protocols. Shapiro (1999:14) suggests that technology has been used to modernise societies, either from the traditional or authoritarian to modern democratic societies.

Democracy in the post-traditional societies in the late twentieth century was characterised by two major trends. The first being the transitions of traditional societies, mostly from authoritarian rule to democratic political system, which Huntington (1991) refers to as the Third Wave of the democratisation process. The

second trend has been referred to as the crisis experienced by Western democracy as a result of the lack of political participation and mostly the domination of democratic processes by special interests in political systems. It is argued that technology impacts on these trends in ways favourable to democracy. Technology has also played a role beyond enhancing the modernisation process within the context of national democracy by facilitating transnational networking, which scholars refer to as the globalisation of democracy.

Huntington (1991) defines democratisation as the transition from authoritarianism to democracy. Democratic transitions involve two processes. The first is the non-democratic government that abdicates or is overthrown, and a democratic government is installed through free and fair elections. The second is rather a broader modernisation process that involves creating a democratic political culture. The latter process commonly commences before a democratic government is inaugurated, fast-tracking the democratisation process, and usually continues after the installation of a democratic government. The following are examples of how advancements in information technology play a role in the modernisation process and consequently in the democratisation process.

The role of information technology in modernising the democratisation process

The Internet has been cited as one of the most powerful artefacts that have been significant in influencing the democratisation process, particularly because of its capacity to be used as a mass media instrument. Originally designed around 1969, it has the potential to enhance opportunities for participation within existing political forums. Many commentators have pointed to the Internet's potential to create entirely new political spaces or to update those historical spaces that have been lost as a consequence of the increased complexity of social and political life. Thus, some have suggested that the Internet offers the potential to re-enact direct forms of democratic engagement amongst citizens through the medium of electronic 'town hall' meetings and even the recreation of something similar to an ancient Athenian public sphere. For those optimistic of the Internet's potential to re-engage citizens in face-to-face, or at least keyboard-to-keyboard, political deliberation, a number of high-profile experiments in the United States are repeatedly cited as examples of the way in which this aspect of communicative technology might develop. (Feenberg, 1986).

For instance, since 1995, the government in Korea has strongly pushed the construction of a National Information Superhighway and is putting its utmost efforts into moving towards an information society. With the wide provision of personal computers, which plausibly can be connected to online services or the Internet in Korea, people are getting plenty of domestic and international information. Information technology has enhanced the possibility that people can communicate with unknown persons around the world, exchange their ideas and experiences, and even develop their own curiosity about new information. The advancement of information technology has also led people to wish for better services and quality of life, and enjoy the rights of free expression.

Information technology and services augment the opportunities for developing public participation in, and awareness of, the political process. The online services played an important role in promoting openness of government. On the basis of a nation-wide information infrastructure, the Korean government at both central and local levels has been actively experimenting with electronic democracy to hear citizen's views on government policy and planning, government activities, and social issues. Public organisations have also been launching electronic democracy projects in many forms. Most of the projects are still in the infant stages of development. However, much attention must consistently be given to the creation of an enhanced information system which will enable the public to engage in an online dialogue with politicians and government officials and participate in government decision-making processes. (Lee and Cho, 1996).

In South Africa the government is setting up a government-wide call centre. It has phased in an electronic system, an e-government gateway, in which a directory of government services will be available. The government gateway project aims to enable the different government computer systems to communicate in order to fast-track service delivery and make services available around the clock. This is done in order to ensure that government goes to the people so that it sharply improves the quality of the outcomes of public expenditures intended to raise the standard of living. Recently the government initiated a Programme of Action which allows the public to track and comment on the government's progress. The Programme of Action is available in five 'clusters' by theme: 'Economic, Investment and Employment', 'Governance and Administration', 'International Relations, Peace and Security',

'Justice, Crime Prevention and Security', and 'Social'. The information on the implementation of the programme is made available every two months after progress reports have been submitted by clusters to Cabinet. The posting of information online forms part of the efforts to realise transparent governance in actual practice, and constitutes an element of the people's contract for a better life. (Brrows, 2003).

There is no doubt that all of the examples in the literature of attempts to re-engage communities in the politics of their locality, point to a number of ways in which information technology can lead to a genuine growth of social capital and the enhancement of local democratic participation. Today's technology can electronically support virtually every aspect of democracy so that, should the need arise for government to achieve more and more sophisticated levels of electronic democracy (e-democracy), focus needs to be driven towards sophisticated levels of e-government, such as online citizen services, which should include a companion progression to more and more sophisticated levels of e-democracy within and beyond its national borders.

Modernisation of democracy through the use of information technologies

Information technology, in particular the Internet, was originally designed around 1969 to allow the exchange of packets of bytes between computers; for a long time it remained restricted to the exchange of scientific data between scientists and secure information within the US government. In the 1990s it became a popular means of communication. In 1993 the US government opened the network to the industry, and the creation of the Hypertext Mark-Up Language (HTML) laid the basis for universal accessibility. Since then its growth has been phenomenal. A survey towards the end of 1999 suggested that 259 million people were now Internet users. Of these 111 million were in the United States, six times as many as the next largest figure, which was for Japan. The survey predicted that the figures would rise to around 490 million by the end of the year 2002. Another survey claimed that over 28 million people visited the Worldwide Web every day and confirmed that it was now spreading rapidly throughout the world and outside the US. As a means of communication it has the potential to revolutionise political activity as it offers the possibility of direct two-way interaction between the citizens and politicians. This has led to predictions that it will completely revolutionise government and democracy, even that the outcome will be a

new wave of democratisation worldwide, as authoritarian regimes find it difficult to survive and as established democracies are transformed. (Ferdinand, 2000).

The impact of the Internet has not been in politics only; it has also impacted greatly on business and society. It has already transformed marketing, procurement and recruitment functions of corporations in the United States. Now the impact is spreading to other parts of the world, partly through the socializing role of multinational corporations. At the same time the Internet has created opportunities for a whole host of new companies, principally dealing with information technology. Whilst making use of the Internet a core business function certainly requires the acquisition of technical skills, in other respects it may reduce the costs of entry into the marketplace for new companies. New companies may, for example, be spared many of the start-up costs of acquiring premises because they can deal directly with clients or customers. (Strommer-Galley, 2000).

The initial benefit of the Internet was its ability to reduce the costs of government administration. It has considerably speeded up communication with colleagues and clients. It has also reduced the costs of transmitting data. And business commentators predict that one of its chief effects will be to reduce the number of intermediaries between the original providers of goods and services, and the final consumers. This 'disintermediation' will challenge the traditional economic functions of wholesalers and retailers, agents, and so on. At least in theory it offers the prospect of more direct selling and more convenient buying. The more futuristically minded suggest a world with fewer large shops as people shop through the Internet, with fewer large offices, as individuals work from home, and fewer publishers, as writers, composers and performers distribute their creations directly through the Internet. They even suggest that the Internet will create a new paradigm of economics. (Ferdinand, 2000.)

Internet usage by people has increased; the Internet not only provides information services for others, it has become an increasing source of reference and has also modernised the education system as well as transforming other agencies that need to process large amounts of information. As a result, the institutions as well as individuals will be able to achieve much more from such usage. For example, the government of Finland has taken to the Internet for internal communication, and for diplomacy too. Previously the Finnish Foreign Ministry was unable to afford a

presence in a large number of countries or a large research staff. It did not have sufficient information about diplomatic issues in many parts of the world to be able to make a constructive contribution to developments. Now that it can rely much more on the Internet to keep abreast of what is happening around the world, it feels capable of a much more significant role in international diplomacy. (Ferdinand, 2000).

Given the modernisation process, the one kind of innovation that the Internet might bring to politics has been managerial expertise and improved service delivery. It has been linked with the assumption that most government departments, even in established democracies, are too dominated by outdated and out-of-touch bureaucracies. This viewpoint is expressed both by individuals and by companies that have a great deal of contact with government agencies. Whether it is welfare claims, or taxation, or planning applications, the experience of those outside the government was that traditionally the bureaucracy seemed to run their affairs primarily for their own benefit and to avoid embarrassment to the party in power, rather than for the good of the public.

Those who argue along these lines believe that the new technology will also open up the processes of administration to outside observers much more effectively than before. In so doing administration will become more transparent, and more amenable to democratic pressures. This will lead to a virtuous circle of increasing transparency leading to greater efficiency and then to greater democracy. This impetus has lain behind many of the proposals for reform at both the national and local levels, namely simply bringing administration closer to the people.

Others wishing to apply benefits to government through applications of the Internet have focused on local rather than central government. In many western countries, local government has suffered from popular apathy and/or official neglect. The Internet has offered an opportunity for improving local government services, and also possibly a new way for ordinary citizens to participate more directly in the decisions that will affect their wellbeing. In Europe there has also been an increasing interest in using the Internet to (re)create a new sense of community, especially at the local level. The European Commission has actively encouraged the formation of new networks of local authorities in various countries, which have achieved a pioneering success, for example the Civic Community network.

Technology and transformation in governments

Governments are usually traditionally orientated and move slowly due to the nature of their organisations and the duty to take all interests of society into consideration when undertaking change. For the moment a difference in cultures is occurring and there is a wide gap between what individuals and groups are doing online and what governments are currently capable of doing online, especially in their relationships with the public. The challenge of governments in a few years to come will be to set out mechanisms on how to embrace more of the public into the decision-making process. More importantly, governments, especially the elected bodies, need to take a leadership role in engaging the public in wide debate on how, or if, information and communication technologies can and should change the current dynamics of democracy. For a while many might argue that being online is essential for politicians to continue to get elected, yet the evidence does not point to this being a deciding factor at this time. The debate is a fluid one. There is a need for society to become partners in a debate on the nature of democracy in its very changed world, which will then lead to ways and means whereby information and communication technologies can be strategic tools for the democratic process. Governments are concerned about the decline in public approval of their institutions. There are tools available that can help reverse this attitude – it is now a question of how extensively these tools can be used to effect this change. As is evidenced in this section, it is becoming increasingly important to engage the citizen. Tools for consultation are still run from the top down but, if done properly, the goals of an interactive government and an interactive citizenry can be reached.

Democracy as practised now by many countries, is an evolving concept. The principles and practice of democratic ideals vary from jurisdiction to jurisdiction, but underpinning all democracies are the underlying tenets of liberal democracy as evolved in the past two to three hundred years. There is representative democracy, and many electoral and legislative forms of this type of democracy, participatory democracy (practised in some jurisdictions, such as the town hall meetings tradition in the United States), and direct democracy (the closest example of this today being the practice of decisions of national importance by a referendum amongst the electorate). (Riley and Riley, 2003).

The following are but a few examples of governments that already exploit this e-democracy as technology to gather inputs from citizens and business to determine a course of action that could take society into a new form of democracy, which would reflect a wider voice of the public:

In Queensland, Australia, the website (www.qld.gov.au) gives citizens an impressive array of opportunities to interact with government. The “Get Involved With Government” choice links citizens to their representatives, to Queensland agencies, and to Parliament. The ‘Queensland Agencies’ link gives citizens background information on an issue, current law or proposed legislation, and invites direct citizen comments which go to the committee and then eventually to Parliament to help formulate policies and standards on a variety of legislative issues. The ‘Queensland Parliament’ link empowers a citizen to make a formal, direct request to Parliament in the form of an e-petition with the object of “persuading Parliament to take some particular action”. Citizens can also review existing e-petitions and add their own signatures in a show of support, or express their objections. The site also surveys users about the e-petition process itself – a built-in quality control and improvement mechanism.

Likewise, the Scottish Parliament was an early innovator in e-petitioning. Citizens can create an e-petition or comment on or add their support to an existing e-petition – all electronically (www.scottish.parliament.uk/e-petitions/index.htm). The International Teledemocracy Centre, founded in 1999 by Scotland’s Napier University and BT Scotland, aims to develop and apply advanced information and communication technology to enhance and support the democratic decision-making process. Their mission includes:

- Promoting the application of information and communications technologies (ICT) by governments and parliaments worldwide in order that elected members and supporting staff can conduct their business more effectively and efficiently.
- Demonstrating how technology can contribute to more openness and accessibility in government.
- Encouraging and assisting the public, voluntary organisations and business to participate in government through the use of technology. (Caldow, 2003).

In 2001 the European Commission adopted an “Interactive Policy Making” (IPM) project to improve the European Union’s governance. Through its website, “Your Voice in Europe” (<http://europa.eu.int/yourvoice>), the IPM collects and analyses citizen and business input to evaluate existing EU policies and to solicit consultations on new initiatives. The purpose is to make EU policy-making more transparent, comprehensive and effective, giving stakeholders an active role in the policy-making process. (Caldow, 2003).

To some extent, the same variable of organisational transformation has penetrated government. It began with internal organisation, but then gradually spread more widely to include government's relations with outsiders, whether businesses or citizens. Certainly part of the impetus for change came from businesses that had begun to adapt to the new technology and expected government to do the same. But in addition the US government recognised from early on the potential for the Internet both to increase the efficiency of its administration and also to reduce its costs. The government spends \$25-billion a year on welfare, \$27-billion on food stamps, ideas where to get job training, and the skills of the workforce further behind. It is an opportunity to use the power of information technology to fight the war on crime, to deliver social benefits to the needy; it is a secure and efficient manner while eliminating fraud and cheating; improves health care delivery, helps to find missing children, and to improve on privacy protection for all citizens – in short, to completely show how government delivers its services to its customers. (Ferdinand, 2000).

This possibility of enhanced efficiency through increased coherence government policies has attracted countries from around the world. Tony Blair’s government in Britain, for example, has been much attracted by opportunities afforded by the Internet to provide 'joined up' government. A large part of the rationale for the 'third wave', for instance, rests upon the possibility of uncovering resources that can be diverted to the pool members of society, not by increasing taxes on the rich or public owners of industry, but because of the savings that can be achieved through increased efficiency. It was no coincidence that Demos, one of the think-tanks associated with New Labour (Ferdinand, 2000), has devoted quite a lot of attention to new technology, government and democracy.

In East Asia, the Malaysian government of Prime Minister Mahath Mohammed proclaimed the ambition of making the country as advanced as any in the West by the year 2020 on the basis of information technology.

Singapore set out a programme for putting all the population on information technology by the year 2000. And even a country such as China, whose leaders are suspicious of the impact of the Internet on their people and who prevent complete, free interaction with people abroad through it, has become converted to this ambition of putting China on line. Beijing announced that 1999 was the year when Chinese government was put "online." Even non-significantly, in addition to the efficiency advantages that attracted the Chinese government, and the perceived need to provide an IT environment that would invigorate Chinese businesses so that they could compete with Western counterparts, the official announcement also pointed to the increasing 'transparency' that going online would bring to the administration of any government. (Ferdinand, 2000).

The Chinese word "tou-mingdu" was the same as that used to translate "glasnost" before the collapse of the Soviet Union. This was probably not directed so much at increasing popular control over administration, as was the case in the Former Soviet Union, as at increasing the control of the centre over the periphery in China. The stubborn persistence of obscurity and deceit practised by lower-level officials in their dealings with Beijing in the post-Mao era no doubt explains the enthusiasm of the leadership there for the new technology. Nevertheless, greater transparency was also explicitly linked with democratisation, and would certainly be a precondition for it. (Bray, 2000).

There is a general movement towards easing accessibility to information both in the news media and by governments. News agencies are increasing the speed at which and the scale on which they provide information, while giving citizens greater control over the information they want. In the United States, the National Information Infrastructure (NII) Agenda for Action makes provision for easy and equitable access to government information, while in Italy a new law on the need for transparency underlies the creation of a civic network. (Bryan Tsagarousianou and Tambini, 1998). Government and the news media often work together by broadcasting the

deliberations of government bodies, such as the C-SPAN channel in the United States and Parliament Online in South Africa (Ferdinand, 2000).

In Amsterdam, the Netherlands, a project was launched in 1994 by an independent political-cultural centre, De Balie, and a group of former computer activists, the Hacktic Network Foundation (now called XS4ALL). A virtual city was constructed where information providers have different theme-based squares, for example an environmental square, a news square, a health square, a book square and a gay square. Each of these squares has eight buildings occupied by information providers and citizens can build “houses” (homepages containing personal or other information) between the squares. In the public spaces of the squares citizens can have discussions. The project aims to use the city metaphor, a true-life frame, to:

- initiate and stimulate public debate between citizens and between citizens and local government in electronic discussion groups;
- create a platform for distributing local government, public and administrative information;
- assist/support citizens and civic groups to post their information electronically;
- stimulate citizens’ rights and obligations on the Electronic Highway and to look after the interests of consumers;
- provide opportunities for and connection between projects and information providers both nationally and internationally;
- develop instruments which would enable users to obtain access to information services; and
- maintain and expand contact with international community networks. (Francissen and Brants 1998).

The Amsterdam Digital City was such a success in terms of people registering as “inhabitants” and visitors, that there are today some 70 digital cities in the Netherlands. Despite the non-committal nature of discussion groups and the often racist or other bigoted contribution, the digital cities have become an Athenian-style

agora where people come to buy things as well as exchange ideas. (Francissen and Brants 1998 in Pretorius, 2001.)

E-democracy

Webster's defines democracy as "a government in which the supreme power is vested in the people and exercised by them directly or indirectly through a system of representation". Putting an "e" in front of democracy means nothing more than using information technology tools to facilitate, improve and ultimately extend the exercise of democracy.

There are many interpretations of what constitutes e-democracy. This is primarily as a result of the fact that the concept is at the beginning stage and as such there is much confusion about what it encompasses and how to define it clearly.

Steven Clift is an acknowledged expert and leader in the worldwide e-democracy movement. He describes e-democracy as referring to "how the Internet can be used to enhance a democratic process and provide increased opportunities for individuals and communities to interact with government and for the government to seek input from the community" (democracy online <http://www.dowire.org>). Characteristics of the Internet which he feels support e-democracy are that it provides opportunity to participate in debates as they happen, participation is less limited by geography, disability or networks, and it facilitates the access to information and provision of input by individuals and groups who previously had not been included in these debates. For instance, in Scotland an organisation that specialises in e-democracy, the International Teledemocracy Centre, states its goal as "to strengthen democracy through the use of innovative ICT to deliver improved democratic decision-making processes, thereby increasing citizen participation – specifically through the use of electronic consultation and electronic petitions". (Riley and Riley, 2003).

E-democracy has both a tactical side and a strategic side. On the tactical side, information technology has advanced communication and the access to information is arguably better than in any other known medium. But something even more fundamental is at hand. The underlying core principle of democracy is an informed and engaged citizenry. Most governments get passing marks for "informing" citizens via digital communication. But the vast majority have a long way to go to "actively engage" citizens or to effectively exert global influence using digital media. These

elements comprise the most overlooked dimension of e-democracy – the strategic side. How can a government use digital media to both actively engage citizens and advance its public policies to the world community? Engaging your “own” citizens or constituents through digital media includes enhancing active participation in the law-making, policy-making, and legislative processes, all of which are influenced by a variety of forces, public opinion, debate, lobbyists, special interest groups, consultation with constituents, portfolio committee hearings, and expert testimony. The regulatory process, subsequent to enactment of law, follows many of the same communicative and collaborative patterns as law making. It should be noted that the ability to leverage digital technology by political parties, campaigns and candidates is also part of the equation. Voter registration, election or referenda voting, and on-going communication between constituents and their elected representatives, are equally integral to e-democracy. (Caldow, 2003).

Political mobilisation and action coordination using information technology

Another benefit of information technology is the ability of users to mobilise society in order to overcome the limitations of both time and space in their communicative strategies through the near-instant delivery of information to an almost limited number of end-users. Political mobilisation and action coordination as espoused by interest and pressure groups garner support through the use of information technology to force authorities to make decisions as prescribed by their demand. This use of technology is another way of entrenching political decision-making in the modern democratic political system. Near-instantaneous communication technology like the Internet makes it possible to put pressure on decision-makers to act promptly. Having direct access to democracy in the information era could also be a risky business as voters may at times make quick decisions about complex issues without having regard to their situations. In the political sphere, this has opened up intriguing possibilities for organisations seeking to mobilise and coordinate political action where previously the ability to effect such mobilisation and coordination in any systematic fashion required the use of mass-based support and the high of the print and broadcast media. The Internet offers a means to realise such activities without a significant drain on the organisation’s resources.

In the US, within African American communities, the most prominent example of the use of information technology in aid of political mobilisation is perhaps that of the Nation of Islam and its organisation of the 1995 Million Man March. The event was the largest single political mobilisation of African Americans in history and made extensive use of the Internet to advertise its aims, coordinate the activities of organisers and disseminate information on arrangements to participants. These activities were structured through both a subscription-based electronic mailing list and the Nation's dedicated website for the event. While there is no analysis of the precise effect of the Internet's use in this instance, it is clear that the Nation of Islam itself has subsequently sought to expand its use of new communications technologies in the more recent development of its political strategy. The Nation is now at the forefront of implementing innovative technologies in the cause of political communication and education. Using audio and video streaming technologies, as well as more standard text-based information services, the Nation has an array of websites dedicated to different aspects of its work – including an online version of the organisation's Final Call newspaper; a health education website; a national student association website; an online study centre and a web page dedicated to links forged within the Islamic and African diasporas. In addition, the Nation of Islam has recently sought to exploit the potential of the Internet as a medium for political communication through a strategic link-up with America Online's Black Voices Internet site. This site, in conjunction with the Final Call Online, has featured live interactive 'chat' forums engaging Nation of Islam Ministers in debates with the wider public. (Lekhi, 2000).

The example of the Nation of Islam's enthusiastic and other interest and pressure groups' embrace of the use of information technologies as an integral part of their political strategy indicates the power of this new medium as an independent mechanism through which to channel the message of those on the political platform. And to the extent that it is effective in articulating its political programme to an increasingly sympathetic audience, these experiences offer a useful insight into at least one possible direction that might be taken by those who seek to exploit information technology's potential as integral tool of political mobilisation and communication.(Lekhi, 2000).

Information technology has made it easier for groups to organise on a local, national and global scale. Lobbying is more egalitarian because it is cheaper to mobilise

support for a movement. (Wright 1995:42). It is thus easier for those groups usually marginalised in the political process to convey their sentiments to their representatives.

The use of Internet technology by the pro and anti-democratic movements

Internet¹ is usually seen as the new medium with great potential for enhancing societal citizenship and democracy. (Chroust, 2000). Since the onset of the Third Wave of democratisation, rebel movements have used the information and communication technology to overthrow or counter non-democratic governments. Electronic media, like fax machines and video cassettes, were used in the mid-1980s in the Philippine revolution to spread disguised Western and Japanese news content to oust the Marcos regime, and in Panama the News Center in Washington D.C. used Apple computers to translate Western newspapers when President Noriega closed down independent radio stations and newspapers in 1987. These translated articles were laid out to look like news clips and faxed to businesses and corporations where they were photocopied and distributed by sympathetic distributors against the Noriega regime. (Ganley, 1991). However, the 1989 pro-democracy movement in China remains one of the best examples of how Internet technology was used to counter non-democratic governments during the early stages of the information revolution. Students made extensive use of video and audiocassette recording, photocopying, faxing and telephoning, and, for the first time, a vast computer network was employed to further their cause. An academic network linking US, Canadian and Mexican universities was connected to another academic network in Western Europe and a network in Japan and the Pacific basin. After the successful inter-connectivity it then appeared on the bulletin boards so that the Chinese students across the United States, Europe and Asia could post their outcries against the Chinese government. This technology also served as an organisational platform where pro-democracy supporters set up telephone, fax and letter-writing brigades. These were used to supply and coordinate news and messages, exchange Chinese fax numbers, keep lists of the dead and wounded of Tiananmen Square, make arrangements to lobby Washington, mobilise international public opinion, and arrange to get equipment for

¹ While reference is made to the Internet in this chapter, it should also be noted that the Internet incorporates a broad range of information and communication technologies which may include computing and telecommunications.

communication to protesters. (Bumbaugh 1990). The coverage of the Tiananmen Square events by television and radio both in China and abroad added to the effective mobilisation of public opinion and support for the pro-democracy movement.

In his research on silent revolutions, covering 43 societies in four continents, Ronald Inglehart writes that modernisation is characterised by an interlink process of industrialisation, urbanisation, mass communication and, following Max Webber, by rationalisation of all societies' spheres with a dissolution of traditional ties. Modernisation is also marked by the increasing significance of non-materialistic needs, such as demands for political participation or for the protection of natural resources. (Inglehart, 1997).

There are also other examples, like the Free Vietnam Alliance, and the Cambodian pro-democracy, where the Internet is used as a medium to discuss prohibited subjects such as corruption and military or government misconduct, to inform and mobilise public opinion both domestically and abroad, and to organise campaigns against the government. (Eng, 1998). In some cases the Internet is not so much used as a tool for insurgency, but more to focus attention on low-intensity, regional conflicts between people and their government. In Chiapas (Mexico) the Zapatista movement does not have any hope of overthrowing the Mexican government, just as women whose human rights were grossly violated in Afghanistan could not overthrow the Taliban even by mobilisation through the Internet (Afghanistan was a feudal agrarian society with few industrial production enterprises and public services and in 1994 the Taliban marked the revenge of the traditional village against the modern city). Their Internet activities can, however, draw attention to local conditions and problems and if they mount enough international pressure, their governments may be forced to address their problems. (Lutz, 1999).

The neo-Nazis also use advanced technology in their internal and external communications to react to the challenges of a second wave of modernisation; they attack the process of globalisation, worldwide 'dollar-imperialism' and the threat of racial inundation, while at the same time they demand the protection of natural resources against interest of profit and the equal participation of women in the national struggle. (Chroust, 2000).

The Internet has several distinct characteristics that make it suitable for dissident purposes. Firstly, it is possible to hide the identity of the dissident. In the case of Kosovo, Anonymizer (a US IT Company affiliated with human rights organisations) set up the Kosovo Privacy Project, which allowed Serbians, Kosovs and others reporting on the situation in Kosovo to download tools to hide their identity when e-mailing, accessing information or joining discussion groups. Secondly, the Internet has all the audio-visual qualities of television, radio and newspapers combined. For example, in Belgrade an independent radio station's transmitter was linked to a British Broadcasting Corporation (BBC) satellite and transmissions were re-sent from there all over the world, including to 35 other independent Serbian local radio stations. Thirdly, encryption technology, which can be downloaded for free from the Internet, makes it difficult for dissident messages to be intercepted. In the case of Belgrade, tunnel encryption was used to hide the radio channel, making it invisible from the outside. Fourthly, key to the Internet's ability to further dissident causes is the fact that it is not mass media in the traditional sense of "one-to-many" like newspapers, television and radio, but "many-to-many". It allowed friends and family to report on their situation from Kosovo to relatives and acquaintances abroad. These means of communication are often seen as more credible information sources than Western media reports. (Time International, 1999).

Cumulatively these characteristics of the Internet make it a difficult medium to bring under government control. Governments can try to block access to certain sites (for example, the Chinese government has blocked access to such sites as Human Rights Watch, the *New York Times* and *Playboy*) or to require anybody who signs up with an Internet Service Provider (ISP) to register with government security agencies. In China unregistered Internet cafes are shut down and monitoring equipment is installed on all of China's major sites. (Pomfret, 2000). Similarly, in Burma (Myanmar) unauthorised possession of a computer with network capability is punishable by as many as 15 years' imprisonment. These efforts are, however, not insurmountable challenges. It is for example still possible to access prohibited sites periodically as the dozens to hundreds of 'hits' received from China each week indicate. Furthermore, Chinese Internet surfers reportedly get around the electronic barriers by linking up to computers outside of China. (Dobson, 1998).

Conclusion

The understanding of modernity and technology have both presented intriguing debates in social sciences and made strides in political discourse. This chapter has demonstrated how they overlap in their concerns, since it is imperative to understand modernity in order to have regard to an adequate account of the technological developments that make it possible. For how can one study specific technologies without an understanding of the larger society in which they develop?

The concept of modernity relies on the key notion of rationalisation to explain the uniqueness of modern societies. Rationalisation, as the generalisation of technical rationality, reduces the normative and qualitative wealth of the traditional social society, exposing its reality to technical manipulation. Rationalisation depends on a broad pattern of modern developments in technology.

Technology indicates the social complexity of the multiple actors involved with its creation, and the consequent richness of the values in other social phenomena.

Over the last years there has been a transformation in communications that has moved much of the public discourse and agenda setting for society at large. With these information and communication technologies people are reclaiming their communications power and are geared toward building citizen-based efforts that work to ensure that the shift toward communication increases their capacity for participation in democracy, and that the strategically organised use of information technology by citizen-based efforts makes an important contribution to improve democracy. To begin with, information technology holds the potential to raise awareness about political process, of which the ultimate benefit could be a more democratic society – a society where more people are able to hear and listen to each other, have a public voice in agenda setting, and have an increased ability to contribute toward the resolution of public problems. It is generally held that if parliaments and other elected bodies do not institute reforms to develop e-democracy mechanisms there will be severe political consequences, such as the non-election of political candidates seeking office who do not use online technologies to deal with the

voters. These views are based on the belief that the technology-inclined society expects its leaders to communicate with them in this new generation's medium of use.

These arguments assume that there are a host of citizens arming themselves with the tools to have a direct influence on legislative and policy development, and who also have the will, resources and desire to engage in the emerging e-democracy process. Citizen-based electronic democracy (e-democracy) has been able to create the online public spaces for interaction among citizens and organised interests that are for the most part only focused on using electronic communication to further their own goals. In a simple sense, there is a creation of an open and on-going arena for public expression, development of opinion, and accountability.

This chapter has illustrated how e-democracy in the context of information and communication technology is explored as a subset of the greater, and more important, philosophical topic of democracy itself. It set the support for an appraisal of whether or not e-democracy can be an extension of representative and liberal democracy, consequent to the modernisation process as practised in most countries today. It is evident that e-democracy practices, such as online consultations, enhance the modernisation process in the current system whereby the policy governs society, and continues to have limited and controlled inputs from the citizen, as such presenting a new form of democracy. These are pressing issues for modernised governments as the new technologies are contributing to the creation of faster communications, the sharing of information and knowledge, and the emergence of new forms of modern societal cultures. It has also been demonstrated that the political mobilisation and action coordination by members of the society and of pro and anti-political movements as networked communities have quickly evolved through the Internet. They are increasingly using the new technologies to organise themselves so that their voices can be heard, and to develop tools to attempt to influence government policy and programmes at political level.

As modernisation is not static, there are different schools of thought as to whether information and communication technologies will change the nature of democracy, or

if it will simply result in an extension of the democracy we now practise and understand.

The important issue at hand is that there should be a vigorous debate and discussion about the nature of democracy and how technologies can be used to produce a more engaged and interactive society. To make significant changes that would draw the public more widely into the process requires commitment and change of attitude. Cost factors also come to bear on this, as well as the question of how to engage people for their input and opinion. This raises an even more fundamental question of whether the public wants to be more engaged in government, or do they simply want the opportunity to make their views known? And if governments do engage the public more frequently into public debate over issues of the day, how often do they do this? What mechanisms will be available to facilitate this process?

The challenge of governments in years to come will be to set out mechanisms on how to embrace more of the public into the decision-making process. More importantly, governments, especially the elected representatives, need to take a leadership role in engaging the public in wide debate on how information and communication technology can change the current dynamics of democracy. There is a need for society to become partners in an issue on the nature of modern democracy, which will then show the way to how the information and communication technologies can be strategic tools for the democratic process. For instance, governments are concerned about the decline in public participation in the democratic political process. Officials in the United States, Canada, and the United Kingdom are seeking ways to combat voter apathy, especially because of the declining engagement amongst young people. Some argue that this is rather a political problem, and that there will not be significant shifts to new forms of democracy or participation by the citizenry because of information and communication technologies. They suggest instead that the new information and communication technologies will serve only to strengthen existing democratic institutions, but not dramatically change the legislative bodies of public sector institutions. There are tools available that can help reverse this attitude – it is now a question of how extensively these tools can be used to effect this change.

There is a suggestion that the evolution of e-democracy could take society into a new form of democracy, which would reflect a wider voice of the public. But there is no clear vision of what such a democracy would entail, and how it would differ from current practices or reflect the overall society.

In the current system of democracy, elected officials, and the institutions adopted from this system, have been governing as usual in the interests of society. So the question is: will information and communication technologies and the tools that continue to be developed enable people to have access to more information and to communicate better with government? This is often a negative if there is too much information or a lack of organisation or critical skills to assess the importance of the information that can then be turned into knowledge. Both these abilities could be a result of the rapid modernisation of societies as a result of the emergence of these information and communication technologies.

Technology is one of the mediums and a driver of the modernisation process, bringing in new and important trends in society to the extent that they are driven by new ideas, conceptual constructs that contain innovation, and creativity. It facilitates change, its access and usage result in enlightening evolutions because societies organise and administer themselves, but they are never the driver of ideas, only the facilitator. Original ideas come from the mind of one person or from collective debate which then drives philosophical, cultural, societal, organisational, and administrative change. Thus the use of information and communication technologies for the purposes of e-democracy principles, as articulated to date, is only the beginning, and simply a driver on the road to possible new forms of democracy. It is how it is being used as a medium and the way in which society frames the debate that will result in these new forms and an extension of the current structures of democracy.

It is apparent that technology is having some impact on both governments and society, which will bring society to a possible new level of a system of democracy that will reflect its increasingly changing culture, built on the strength of the forms of democracy that have been developed over the past years.

Lastly, when the modernisation process has taken effect and society being at least democratised, a democratic political system must ensure that democracy functions as expected. In order for it to function properly, society must have access to information technology. The advantages of the technology include the fact that information can be accessed from almost anywhere, communications between citizens and the government can be made easier, and that both citizens and the government can enjoy cost advantages if the new technology is employed correctly. More extensive use of government information is possible, without limiting benefits to any one member of society.

Information technology gives the authorities a very powerful tool to strengthen the rule of law. Information technology can – and will – affect democracy in a political system. It is important to note that the benefits of information technology in reinforcing democracy depend, to a great extent, on what facilities citizens have, i.e. computer literacy and access to computers. An increased amount of governmental information available through the new media will not reinforce democracy if there is neither common computer literacy nor easy access to computers for each and every citizen. Instead, the gap between those who have and those who do not have good access to information will increase. Authorities must guard against this in an effort to provide equal access to information technology. Information technology should be able to give citizens an equally better chance to exercise their rights as information provides the basis for decision-making by voting. Information technology will enable citizens to get closer to the ideal of an informed choice. A democratic state should attempt to guarantee all its citizens full and equal access to such technology and the options it offers.

CHAPTER FIVE

INFORMATION TECHNOLOGY AS AN IMPERATIVE FOR SECURING DEMOCRACY IN SOUTH AFRICA

Introduction

The turn of the century has seen many nation states transcending to post-Fordist societies. Information technology (IT) particularly has been diffusing to large numbers of nations all over the world and is now cutting edge of socio-economic development. It has come to be seen not only as a developmental issue in itself, but also as a necessary component of all other developmental programmes.

The ominous characteristic of modern information technology threats to democracy is that they change the proverbial convention of national security embedded in democratic political systems. National security no longer refers simply to the conduct of wars among nations, but rather to the protection of its citizens, interests and property from outside threats of any kind, thus the protection of democracy.

Technology, as in other areas, is a double-edged sword. While it greatly empowers those who would or might threaten South Africa, it also empowers South Africa in the effort to defend itself and harm its opponents. For instance, while technological advances may put missile technology in the hands of rogue states, they may also enable South Africa to defend itself against missile attacks.

There is a need to maintain a balance between threat and opportunity. The nature of threats to South African security and the available means to contend with them are changing with lightning speed, and it is vital to remain conscious of these changes and their implications.

The South African democratic political system no longer views national security as predominantly a military and police problem but rather as incorporating political,

economic, social and environmental concerns. Of paramount concern is the security of its people. Security is thus an all-encompassing condition in which individual citizens live in freedom, peace and safety, where society participates fully in the process of governance and enjoys the protection of fundamental rights; have access to resources and the basic necessities of life; and inhabit an environment that is not detrimental to their health and wellbeing. The objectives of security policy therefore encompass the consolidation of democracy and political stability. Stability and development are regarded as inextricably linked and mutually reinforcing. (White Paper on Defence, 1996).

The development of technology has been inextricably linked to national security concerns. Nations' efforts to arm and defend themselves against others have often driven them to engage in scientific research and development, in the hope of making use of the resulting technologies. Computers were first used to direct artillery shells against moving targets. The Internet was created by the Pentagon to safeguard vital communication in case of nuclear attack. Advances in most forms of technology have been carried out in the name of national defence.

The genie of technology is difficult to contain once released, and others can soon turn advances made by a nation against it in their own defence. A country may, for instance, create the atomic bomb as deterrent, but other countries may copy its efforts, thus threatening its security. The Americans, for instance, created the Internet but must now face the possibility that rogue states or even individuals could use it against them.

The expansions in personal electronic media along with the exploitation of computer-telecommunications convergence have paved the way for the creation of a worldwide web of networked computers. Expansion of cyberspace into virtually all spheres of human activity and the growing number of Internet users worldwide exacerbated the concept of information technology, which has changed the world. The nature of these changes is, however, contentious with conflicting explanations of the impact of the information technology revolution and the relationship between technology and national security, which invariably underlie the character of threats and vulnerabilities in a democratic society. In this respect it is deserving to review the nature and character of national security as presented by the challenges in information

technology. Given the national security aspects and its relationship with information technology, it is imperative to note that, other things being equal, democracy is usually prevalent where threats and vulnerabilities are minimal. This study investigates and departs from a self-constructed hypothesis that advance in information technology may enhance political stability in a democratic political system, and that where stability is maintained, threats and vulnerabilities are minimised and thus consequently a perennial national security can be enhanced. Therefore the absence of threats and vulnerabilities also reduces the high level of insecurity in a democratic political system.

The nature and scope of information technology²

Information technology (IT) is the term that describes the disciplines encompassing systems analysis, programming, telecommunications and multimedia (combining audio, text and video information) applications. It came into common use in the late 1980s, supplanting other terms such as electronic data processing, management information system, information resources management, data communication, etc. (<http://govt.ghana.gov.gh/story.asp?ID=68.02/07/19>). The term could also be credited to former US Vice President Al Gore, who coined the phrase in the early 1990s as a piece of political rhetoric to capture the imagination of the US electorate. (Tsagarousianou, Tambini and Bryan, 1998). Information technology is the concept that is generally used to refer to the use of computer, electronics, and telecommunications equipment for processing and distributing information in a digital form. Martin 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. (Martin, 1988).

Information technology is deeply seated in computing, telecommunications and microelectronics technologies and its distribution from the Worldwide Web network, from individual to industry services, which includes television broadcast and electronic mail service. According to the United States Commission on National

² The terms information technology (IT) and information and communication technology (ICT) are inextricably bound and are used interchangeably in most literature resources. However for the purpose of consistency in this study, the term IT will be used throughout, unless otherwise specified.

Security in the 21st Century, the entire world will be linked by 2025, so that from any stationary or mobile station it will be physically possible to send and receive near-instantaneous voice, video and other serial electronic signals to any other stations. (USCNS, 1999).

To have a comprehensive approach as to how these technological capacities could have an influence on national security, it is important to perhaps outline developments in these areas, i.e. information, communication and technologies (ICT).

The development of ICT has undergone several stages, encompassing to capture, store, process, transport and display information. Eventual constraints upon the distance, speed, volume and reliability of information handling have progressively been reduced. The current stage in the development of information and communication technologies is marked by the substitution of more powerful, reliable and flexible digital systems. The technical foundations of this process lie in the innovation of a common language of microelectronics for both computing and, later, telecommunications. (Schiller and Fregoso, 1991). With the development of digital switches and digital transmission facilities came the transition from analogue to digital networks. The process accelerated, and by the late 1980s most of the office telephone switches in the advanced industrial market economies had been digitised.

Information and communication technologies (ICTs) encompass 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.

There is the general view held by many scholars that the basis for the current information revolution has been the advent of the radio or television, or even computers. However, the basis was the magnitude of transformation of the microchip, and its impact of microelectronics on computers and on telecommunication devices has been compact, cheap, reliable and disposable (Martin 1988). Microelectronics has been the basis for the developments both in computing and in telecommunications. Bankes and Builder (1992) maintain that it was the developments in solid-state electronics that brought all of these devices, i.e. telegraph,

telephone, radio, television, and electronic computers, into practical form that could be mass-produced and distributed to individuals throughout the world.

The developments in information and communication technologies did not occur separately from one another. Digitisation meant that all the media became translatable into each other (Brand in Saxby 1990) and this has been fundamental to the information revolution. Convergence, that is the ease of interaction between information and communication technologies, occurs at different levels and in different directions. Martin (1988) asserts that convergence is not only the marriage of two technologies but also the erosion of functional barriers as between data processing and communications as well as the vertical integration of industries. As voice (traditionally the terrain of telecommunications), data (computing), text (publishing and library services) and video (broadcasting) are translatable into one another, service suppliers become more interrelated. (Cowie 1989).

The information technology is not only about developing the broader scope for ICT but the fact that it has been diffusible to societies. The scope of information and communication media that are available for personal use and to an extent controllable by individuals, has expanded tremendously from TV sets and citizen band radios in the 1940s to desktop and laptop computers, personal fax machines, handheld video cameras, cellular telephones, cable television and satellite uplinks in the 1990s. (Ganley 1991).

These expansions in personal electronic media along with the exploitation of computer-telecommunications convergence have paved the way for the creation of a worldwide web of networked computers. In the late 1960s the US Department of Defence embarked on a research project that would be the precursor of the Internet, as it is known today. A decentralised computer network was established to link several research sites, universities and other institutions conducting experiments to maintain military communication in the event of a nuclear attack. Because the Internet was never linked to any critical military application or system and was burdened with security classifications, black budgets, or secret technical specifications, Chapman (in Pretorius, 2001) suggests that it is precisely the research character of the Internet that explains why it was so easily absorbed by the civilian sector and commercial enterprises.

The spread of modems and networked computing in 1990 brought the Internet to average citizens and commercial enterprises. A wide range of interactions became possible in cyberspace, such as browsing information stored on other computers and searching databases, exchanging electronic mail, participating in discussion groups on a multitude of topics, and increasingly engaging in e-business. (Kitchin, 1998). Expansion of cyberspace into virtually all spheres of human activity and the growing number of Internet users worldwide exacerbated the concept of information revolution that has changed the world.

The information technology (IT) sector is unique because it represents a scientific discipline and industry in its own right, as well as cutting across all other sectors. Even a cursory glance at the other sectors reveals the all-pervasive role of IT at the close of the 20th century. The IT sector is also unique in its pace of change and the rapid convergence of 'traditionally' distinct areas of human endeavour - broadcasting, print media and telecommunications. Indeed, it is almost impossible to construct a definition of IT that will last longer than about six months. The boundaries shift continually. While other manufacturers and energy suppliers are presently the largest global corporate players, new IT conglomerates are challenging this position. (Hamelink, 1997).

The nature of these changes is contentious however. Conflicting explanations of the impact of the information technology revolution can be traced to different theoretical approaches towards the relationship between technology and national security, which invariably underlie the character of threats and vulnerabilities in a democratic society. The democratic South Africa cannot be discounted from developments in information and communication technologies that did not occur separately from one another. The country's exposure to this digitisation means it is also party to fundamentals in the information technology.

Information technology in South Africa

The South African democratic political system operates in very challenging circumstances as a result of dynamic social, economic and technological developments. One of the challenges it faces is the challenge of advances in information technology that can expand or impede democracy. Information technology can make it easier for people to follow up on bureaucratic decisions, party politics, economic policies, welfare agenda, legislation, etc., to express their will and keep check and balances on the government, and can also mobilise and rally support for specific interest. ICT can make policy-making a more participatory approach. Numerous failures of democracy in some African states have been cited as being directly linked to the inability of some African parliamentary democracies to generate enduring popular support among their populace, which is seen as incomprehensible and distant. (Lyons and Lyons, 1999).

The technology as panacea approach misses key elements of the circumstances facing some African states. A case presented in this regard is the World Bank's effort in which US\$6,5m has been spent since 1995 on establishing a long-distance learning capacity that will obviate the need for local teachers, libraries, and even paper. Yet an established fact is that the sporadic delivery of electricity power in (South) Africa creates obstacles to the Internet's reliability and utility. (Alden, 2001).

In order to have a clear focus on the South African environment it is also important to have a global overview of ICT circumstances that influence the socio-economic and political perspectives that are a potential for the conflict.

The nature of global conflict has changed during the past century. The bloody battles of the First and Second World Wars were followed by the Cold War in which the tensions shifted from a military to a political nature. A more recent shift is that the world is currently embroiled in a global economic battle. One of its consequences is that economic security will become an increasingly important part of national security. (Pistorius, 2001). Economic changes also affect productivity output as influenced by advances in information technology.

The new mode of production, which is centred around information technology and instantaneous worldwide electronic communication, has become dominant in the era

of multinational capitalism. (Louw, 1994). South Africa took interest in strengthening its information and communications capabilities. It is understood that the technologies that had lifted the advanced industrial countries to exceptional economic and material wealth could be used to accomplish the same results in South Africa as an emerging economy.

Perspective on information technology and democratisation

Looking at the accounts and lessons from other spheres it is interesting to note that most developing countries' policies were concerned with the availability of technological products, rather than with the more complex problems of the associated political, economic and cultural integration of such products. In South Africa a different approach was followed, and ample attention was given to meeting the infrastructure needs for an industrious adaptation of technology. Policies regarding technology choice were identified, as well as problems in implementation, as the democratic nature often requires over-stretched public consultation on alternatives.

Policy-making was characterised by an emphasis more on the national system of innovation as a framework of policy and policies set out in the White Paper than on the promotion of effective distribution of available knowledge as a critical function in this context. (White Paper on Science and Technology, 1996).

Another critical issue to draw from developing countries is that in these countries, where mostly the transferred technology increased considerably in volume such that it usually consisted of end-products rather than of technology as such, much of the transfer took place as intra-firm movements, that the conditions under which transfer took place were often disadvantageous, and that much of the technology was inappropriate, obsolete, over-priced, or all of these together. (Hamelink, 1997).

The introduction of IT, such as telephony, television and satellite communications, in developing countries, began to show a specific pattern of social benefits in the 1970s. Various studies suggested that the primary beneficiaries were the companies that provided the equipment, like the telephone companies, banking consortia providing the financial resources, and local administrative leaders who used the new technology.

Often unforeseen negative secondary effects occurred, such as serious balance of payment problems associated with the capital intensity of the new technologies. (Clippinger, 1976). In the same period employment and economic growth were covered by the acquisition and adaptation of manufacturing technology, which brought rapid growth in employment and incomes, particularly in the Republic of Korea, Malaysia and Singapore. The industrial revolution was triggered by technological change, and most economists argue that technological progress plays a pivotal role in sustained long-term economic growth. Cross-country studies suggest that technological change accounts for a large portion of differences in growth rates. (UNDP, 2001).

During the 1980s these countries took a stand to share the expectation within industrial nations that innovations in telecommunications and computer technologies could markedly improve industrial performance and increase economic productivity. There was a common belief among them that ICTs in fact enable developing economies to leapfrog over industrialisation into a post-industrial society. With this hope, developing countries began to launch policies and programmes to acquire a share in international satellite communications and trans-border data flow networks.

There was also anxiety concerning the possibility that ICTs might imply serious social risks. People were concerned about issues like the potential for cultural colonialism, the replacement of jobs by machines, and the erosion of individual privacy, national sovereignty, hence national security as such. Towards the end of the 1980s these fears seemed to have abated, and the general view on the relation between ICTs and national security entered a third and current phase. This phase is driven by a very strong fear of being left behind and being cut off from the emerging global digital highway. Therefore the "digital divide" is on to create and broaden ICT links. (Hamelink, 1997).

The current levels of IT amongst South African citizens tend to be weak and proportionate to levels of income, education, race and gender. The use of ICTs in South Africa presents a challenge that should be viewed as an important agent for change in overcoming social problems and closing the information gap.

The advance rate of information technology has influenced the social, economic and cultural changes, which have stretched the resources of the strongest economic sectors.

As South Africa has adopted a National System of Innovation (NSI), many argue that technological innovations, particularly in the information and communications technology (ICT) sector, are the main drivers of these changes. Some authors refer to an emerging 'knowledge society' as the fundamental cause. The operational meaning of information and communications technology covers digital technologies facilitating the acquisition, processing, presentation, management and communication of information. These technologies include the microelectronics, computer and telecommunications industries, etc. The ICT sector is dominated by the rich countries and a few large, international corporations, while on the other hand small entrepreneurs with the right niche products are able to enjoy rapid growth with reasonably modest start-up costs. Over half of the growing worldwide information processing market is related to software production. Growth areas include software packages and systems integration services.

South Africa is the 20th largest country market for ICT products and services, accounting for 0,6% of worldwide revenues. 60% of PCs are connected to networks, which compares favourably with OECD norms. In the Financial Services sector there are 74 PCs per 100 employees; with around 24 in Wholesale and Retail; 17 in Manufacturing, and 7 in Government. (IMD, 2002).

Over 95% of hardware revenues by distributors are from imported products and components. South Africa contains a third of all main lines and 85% of all cellular subscribers in Africa. Telkom, 70% state-owned, is the 28th largest telecommunications operator in the world. Its expansion is being financed on the international bond markets with the intention of reaching undersubscribed peri-urban and rural areas and becoming the primary international African hub for telecommunications, computing media and international services.

South Africa is regarded as the largest global system for mobile communications (GSM) market outside of Europe, and the fourth fastest growing GSM market in the world. By 1997, 20% of the country's telephone volume were mobile units. In 1993/4 the telecommunications industry was estimated to have a turnover of roughly R3-billion, employing some 7 200 people. ICT professional services had a turnover of R2,3-billion in 1995, but little of this was spent on cutting edge research and development. (IMD, 2002).

The Industrial Revolution produced a social pact among governments, workers and employers, which sustained growth in capitalist economies for over a century and spawned competing ideologies to the right and left. That balance is now being challenged by a shift to new ICT-mediated modes of producing goods and services. The new paradigm is enabled by ICTs, while simultaneously driving the development of new ICTs.

Distance and time are no longer limiting factors in production. Companies locate operations based on local labour skills and costs, taxation and incentive arrangements. Concentration on 'core business' provokes outsourcing and the creation of 'virtual business entities'.

Within the economic perspective, the ICT deployment challenges the bureaucratic/industrial organisational model. For instance, the "7 x 24 working" is replacing the working week with part-time, more flexible hours and shifts to short-term flexible contracts. The service sector is becoming dominant in the marketplace. Labour market flexibility may reinforce insecurity and isolation in the industrialised world and lead to less tolerance of different conditions and value systems.

The information technology industry resounds with great expectations for a profitable all-digital future and an exponential increase in consumer purchases of digital devices. Chipmakers such as Intel, in particular, in 2001 spent \$7,3-billion on capital investment to help build manufacturing capacity and increase manufacturing efficiency. They expect enormous growth in the market for digital consumer electronics: digital set-top boxes and decoders for satellite and cable television; video-

game consoles; digital videodiscs and small-size dishes for direct digital broadcast television. (Intel, 2002).

There is a clear indication in most literature that in hardware, the most important trends of the recent past have been increasing speed, miniaturisation, more efficient energy use, greater capacity, and lower costs. These tendencies may continue. But in addition there may well be completely new developments, such as the optical computer that processes information through light waves instead of electrical pulses. Universal digital fibre optic networks may combine with wireless networks to expand communications capacity enormously. Meanwhile, one of the latest developments in digital convergence is the symbiosis of television sets and personal computers that creates new forms of interactive television, a recent example being with DSTV interactive, making the television act as a personal computer to be able to shop, send e-mail and use the TV. (DSTV, 2002).

ICTs are dominant in the global market. Trade in ICT products and services was worth over \$1 trillion in 1995. On the one hand the G7 countries and a few large, international corporates dominate the ICT sector, while on the other hand small entrepreneurs with the right niche products are able to enjoy rapid growth with reasonably modest start-up costs. The trend amongst the major world economic players is to extend their markets into developing countries.

The world competitiveness yearbook ranked South Africa's investment in telecommunication at number 4 out of 47 countries, where 1,165% of the GDP was spent on telecommunications with 118 people per 1 000 number of mainlines per inhabitants of the country in 1999. The number of mobile telephone subscribers in 2001 was 234,2 per 1 000 inhabitants. (IMD, 2002).

Challenges and disparities in information technology

Concern about the information gap between rich and poor, and rural and urban communities, is well founded. There seems to be a wide-ranging perception in the scientific literature and in public policy statements that the ICT gap between the haves and the have-nots in South Africa is widening, and that this hinders the integration of the country into the global information society.

The hype and fervour about the digital divide makes it difficult to gain an overall understanding of the problem, the different approaches to solutions, and, what is really making it difficult, the fact that there are multiple definitions of the "digital divide", conflicting reports of whether it is growing or shrinking, and a range of opinions on the key factors affecting it. What is clear is that the disparity between the "haves" and the "have-nots" is growing, and that the potential impact on society, whether good or bad, will be exacerbated by technology. In fact, the digital divide is a complex problem that manifests itself in different ways in different countries. It presents both practical and policy challenges. Moreover, it is apparent that solutions that work in one country cannot simply be transplanted to another country's environment. Solutions must be based on an understanding of local needs and conditions. (Bridges, 2002).

The infusion of ICT in South Africa paints the existing landscape of poverty, past discrimination and division onto the new canvas of technology use. Because ICT can reward those who know how to use it with increased income and cultural and political advantages, the resulting digital divide shows up in increasingly stark contrast. Therefore, ICT disparities usually exacerbate existing disparities based on location (such as urban-rural), gender, ethnicity, physical disability, age, and, especially, income level, and between "rich" and "poor" communities.

The gravity of the ICT gap in South Africa can be presented by posing the question whether communication technology is leading to globalisation or polarisation? Current access to ICT runs along fault lines of society, dividing the educated from the illiterate, men from women, rich from poor, young from old, urban from rural. (UNDP, 1999.) This is clearly confirmed by the situation where only 11 percent of

black/African families have telephones in their homes, compared with 43,6 percent of Coloureds, 77,2 percent of Asian/Indians, and 89 percent of whites. (Cape Times, 7 Sep 1999:3).

The widening gap in information technology capacity raises serious questions about whether the poorer communities will be able to overcome the financial obstacles that hamper their access to information technologies.

Since reducing the IT gap requires a major financial effort, one central concern is whether the foreign and local business communities are ready to provide the massive investments needed for the technology innovation and the upgrading and expansion of networks in South Africa. To understand the magnitude of the challenge, it is useful to remember that the world competitiveness yearbook 2002 has ranked South Africa 39 out of 49 countries, with the number of Internet users per 1 000 people being 67,53, compared to 267,96, and the number of computers per 1 000 people being 79, compared to the 309 of the 49 countries ranked. (IMD, 2002).

Total reliance on international initiatives and foreign investment poses some serious concern, while being self-sufficient requires massive capital investment. For instance, South Africa's telecommunication investment of 1,165 percent of the GDP is hardly sufficient to compete globally and enhance socio-economic development. These international initiatives coincide with continuing concern about the appropriateness of the technologies being transferred and the capacity of recipient countries to gain control over them. In fact, there is at present no convincing evidence that the owners of advanced technologies will change their attitudes and policies towards the international transfer of technology. Throughout the past decades, the prevailing international policies in this field have erected formidable obstacles to the reduction of North-South technology gaps. There is no indication that the current restrictive business practices, constraints on the ownership of knowledge, and rules on intellectual property rights that are adverse to developing country interests are radically changing. And, in this case, there are no realistic prospects that the relations between ICT-rich and ICT-poor communities will change in the near future.

Furthermore, the key actors in international ICT policy-making have expressed a clear preference for leaving the construction of the global information infrastructure to "the forces of the free market", and there is room for doubt as to whether the institutional arrangements of a corporate-capitalist market economy allow for the development of an equitable information society. At any rate, it is important to think carefully about whether, given the realities of the existing international economic order, there can be any serious reduction in existing ICT disparities. It may well be an illusion to think that ICT-poor countries can "catch up" or keep pace with advances in the most technologically advanced societies. In the North the rate of technological development is very high and is supported by enormous resources. This is certainly not to say that poor countries should not try to upgrade their ICT systems. But they should not do so in the unrealistic expectation that those who are ahead will wait for them. The situation may improve for poorer countries, but the information divide between North and South is not likely to go away. (UNISRID, 2001).

South Africa, having taken on the concerns of the "digital divide", through President Thabo Mbeki's initiatives in October 2001 organised the first meeting of the International Presidential Advisory Council on Information and Communication Technology, where global corporate and other leaders in the ICT environment met to advise on the complex, dynamic and exciting area of human activity. The first task of the Council is to close the digital gap that already exists between the world and South Africa. (Mbeki, 2001.) There is a general belief that, without adequate access to the system, South Africa cannot hope to be economically competitive. Therefore the "digital rush" is on to create and broaden links with electronic networks in the fields of trade, finance, transport and science. Such a position is inspired by recognition of the obvious benefits that digital information and communication technologies have to offer in a number of ways.

There is also the preponderance of educational problems in South Africa. Education facilities, for example, could be improved by using ICTs to facilitate distance learning and development through the use of online library access. In this regard, there are very promising pilot projects in schools that have been linked electronically for the provision of a host of online services. Electronic networking has also been used to improve the quality of health services, since ICTs permit remote access to the best diagnostic and healing practices and, in the process, cut costs. (Durant, 1996). Digital

technologies for remote resource sensing can provide early warning to sites vulnerable to seismic disturbances, and they can identify suitable land for crop cultivation.

South Africa is in an extremely precarious position with regard to international competitiveness. According to Pistorius (2001), the country's sustained poor performance in the competitiveness domain is a national threat. The growing ICT demand in South Africa finds expression in waiting lists for telephone connections, growing use of cellular systems and rapidly expanding numbers of Internet users. To meet this demand, consideration of information and communications technologies is increasingly becoming an integral part of national development agendas. The planned increase in telephone lines in South Africa has presented challenges, which resulted in Telkom experiencing continued growth in data and multimedia revenues largely from the corporate sector. During the 2000/2001 financial year Telkom installed approximately 2,1 million lines, taking the total to 5 million fixed lines in the country. According to BMI-TechnKnowledge and IDC, it is estimated that revenue from the provision of telecommunication services has reached R48-billion, approximately US\$4bn, and it is expected to grow at a rate of 10,5% per annum. With the approval of the second national operator (SNO) and as South Africa's approach to the gradual liberalisation of the telecommunication industry, it has undertaken to sell a portion of its share in Telkom in an initial public offering (IPO). (SNO, 2001).

This is expected to be achieved largely through a massive inflow of foreign capital. And, to encourage the latter, countries are deregulating and opening their markets for equipment manufacturers and service providers. A rapidly increasing number of developing countries are scheduling the privatisation of their telephone companies.

Looking at this phenomenon, South Africa has over the past five years inaugurated its cellular networks, of which the cellular industry has been described as an economic miracle generating more than R15-billion worth of economic activity. The growth in this market has been spectacular, with a current subscriber base of over 8 million (Vodacom 55% and MTN 45%) and extensive infrastructure rollout. The high growth

in cellular phone use by both high and low-income communities has seen a third cellular operator (Cell C) being licensed in 2001. (SNO, 2001).

A holistic approach which aims for real access to technology is needed that will be effective and sustainable so that people can put it to use to improve their lives. Improving the lives of people through the diffusion of ICT may raise societal concern, which may not be overlooked in attempting to bridge the digital divide, particularly when concerns become issues of national security.

Balancing the discourse on democracy and information technology

Information technology is important not only because of its value in advancing science and technology but because it has very laterally changed almost every aspect of life in an astoundingly short period of time. The ways in which society works, governs, educates, shops, entertains, communicates and maintains aspects of national security are dramatically different from those of the last century. Information technology has democratised nation states and has also shaped the strategic environment in political systems. It has dramatically increased the interconnectedness of people around communities, societies and the world.

The implementation of information technologies has now made it possible to monitor millions of people in their daily activities around the clock, to store information about their misdemeanours forever, and to re-create their experiences through information manipulation.

The ethical challenges posed by information technologies are rooted in conventional questions such as privacy and intellectual property, which are more pressing in the context of information and communication technologies. With more information available there will also be more information that people would prefer to have censored. Although this has always been the case to some extent, the total velocity and flexibility of information transmission now make border controls less realistic than ever before.

Information technology also obscures dividing lines between the mass media and the private sphere. In fact, this convenient division between regulatory domains is disappearing. Private e-mail can be broadcast to a million receivers, most of whom never asked to receive the message. In addition, information technologies have made the manipulation of data, images and sound so easy that it is possible to use and reuse all sorts of materials without consulting the initial author-owner. Rules against piracy activities cannot always be legally enforced, and a large grey area of contested intellectual ownership emerges. It is precisely for this reason that issues of security are necessary, and where the line can be drawn with regard to the protection of privacy.

An additional threat to privacy involves the use of medical and biological information. The collection of sensitive personal data through diagnostic techniques like genetic screening is becoming a reality; and these techniques can generate information about future diseases. The potential for the exclusion of "high-risk" persons from employment or health insurance is great under such circumstances. A real prospect looms that firms may sell genetic profiles to insurers and employers. The violation of privacy will follow the spread of advanced digital technology around the world. Admittedly, people have very different conceptions of privacy. The protection of privacy is important not only for individual citizens but also for nations. Information technology creates transparent societies and "glass-house" countries that are very vulnerable to external forces which can undermine their sovereignty. (De Vries, 1990).

Not only does information technology magnify security concerns, it also raises completely new security issues that are intimately related to specific features of these new technologies. Questions arise, for example, in connection with its reliability at a time when it is depended upon. Information technology involves risks. If the technology is tampered with, airline passengers may die in a crash, patients may be seriously injured, companies may go bust, or enemy forces may gain advantage. Should the information technology fail and cause great social and political harm, the responsibility of the different actors involved must be defined, e.g. hardware manufacturers, software designers, and users,. This becomes especially complex, however, when in the course of events electronic agents, smart robots, or other

intelligent software makes decisions, or when decisions are based on the information provided by expert systems. Increased vulnerability to technology failure in many aspects of life is reinforced by the unreliability of digital computers. Forester and Morrison (1990) argue that computers are inherently unreliable as "they are prone to catastrophic failure; and secondly, their very complexity ensures that they cannot be thoroughly tested before use".

National security issues are raised by the possibility of combining human beings and electronic systems in cybernetic organisms. The dividing lines between humans and non-human systems begin to blur, and questions arise about the moral quality of this new existence. (Schroeder, 1994). What are the implications of creating software robots that might permit an information resurrection of the dead? What enormous power does this bestow upon those who can create such personality constructs? And how can this power be socially controlled? To what extent can the information technology power be polarised? (Schroeder, 1994).

Edward Luttwak (1998) maintains that during the cold war local and regional conflicts were often instigated or at least encouraged and materially supported by the rival great powers. Now by contrast it is the absence of the functioning great powers that is the cause of the world's inability to cope with violent disorders that persist even in the absence of instigation, encouragement or military support by the great powers. The result is that not only aggressive small powers, such as Serbia or even Burundi, not only an armed secessionist of all kinds, but even mere bands can now impose their will or simply rampage from without in today's world, even when there is neither the danger of great power wars nor the relative tranquillity once imposed by each great power within its own space of influence. (Luttwak, 1998). IT has changed South Africa as an emerging economy in fundamental ways. Its mechanisms, both powerfully revolutionary and subtly insidious, will continue to change the landscape of communication, commerce, national security and community, for years to come.

The relevance of information technology in defence research and development to sustain democracy in South Africa

The South African defence industrial complex in 1995 achieved a sales turnover of R678 million with direct contribution to the economy. (NRTA, 1998.) The defence industry in general is a repository of technology and its technology strategy should be seen in the context of the National System of Innovation (NSI) that the development and application of science and technology in South Africa should be central to the success of the Growth and Development Strategy as it seeks to address the needs of all South Africans in the maintenance of political, constitutional, social and economic changes introduced by the government. The NSI as an enabling framework for science and technology is intended to support the government's Growth and Development Strategy. This is imperative as it will be central to the empowerment of all South Africans as they seek to achieve social, political, economic and environmental goals. The development of innovative ideas, products, institutional arrangements and processes will enable South Africa to address the needs and aspirations of its citizens. This is particularly important within the context of the demands of global economic competitiveness, sustainable development and equity considerations related to the divided society of the past apartheid system. (White Paper on Science and Technology, 1996).

The preservation of a strong technology base is a requisite of the defence strategy and must serve to maintain the capability to detect threats, being aware of trends in military technology and their implications for the defence. The technology base should be able to produce technology demonstrators that can rapidly be turned into military technology if necessary, be capable of providing expert advice for procurement purposes, provide test and evaluation services, and support upgrade and maintenance activities.

The essential concern of defence technology in South Africa has been whether sufficient spin-offs can occur for the Defence Research and Development budget to have a positive effect on high-technology development in the civilian sector. The spin-off paradigm focuses on the military products, processes and organisational innovations, including national technology infrastructures and firms that transform

and enhance the civilian economy. However, there are also instances of "spin-on" technologies, that is technologies developed in the civil sector that have found military applications.

There is increasing predominance of dual-use technologies in the defence arena, where performance requirements for commercial markets have caught up with military specifications, and the increasing development costs can now be supported as easily by the volume of sales of consumer products as by the guaranteed markets of military procurement. Product life cycles in competitive markets are considerably shorter than those for military systems. In this sense, the civilian economy has proved itself an even more voracious consumer of technology-intensive products than the military.

It is clear, therefore, that the future of the South African defence industry cannot be seen as distinct from that of its civilian manufacturing counterpart and that dual-use concepts should be understood and applied. The view that defence technology should be phased out in favour of civilian technology, or converted into it, is not tenable. Instead, the defence industry must make special efforts to leverage spin-offs in the civilian sector and to develop relationships with civilian institutions in the NSI to promote spin-ons. It is via this partnership route that the defence industry will achieve its rightful place in the mind of the South African public. (White Paper on Science and Technology, 1996).

Information and communication technologies will not by themselves change existing institutional settings. This will need processes of political decision-making that are guided by the genuine aspiration to bring about sustainable and democratic social development. The UNESCO World Science Report warns that the use of ICTs within conventional social and institutional frameworks may not only hamper the realisation of possible benefits, but may also reinforce the possible social risks (UNESCO, 1996).

Conclusion

The arguments presented in the preceding sections suggest that a number of issues require extensive research conducted on national security and information technology. The main purpose of further study and debate would be to provide policy makers with analytical perspectives and empirical data that create a better match between technological potential and preferred futures. It is assumed that these futures should be both sustainable and democratic.

The first area could be concerned with the design of democratic and pro-active policies and programmes that make it possible to realise the socio-economic development potential of information technologies. Among other things, this entails studying the roles that public and private sectors should play in the design and execution of these policies and programmes; the forms of public intervention that are conducive to shaping technological change in accordance with desirable social goals; and the establishment of new and more democratic relations between producers and consumers of ICTs, so that technological progress becomes much more responsive to social needs.

A second area of concern is centred around the definition of those social and institutional changes that are required to maximise the social benefits and to minimise the social risks associated with the adoption and deployment of information technologies. This entails considering various ways of adjusting the organisational structures that are relevant for economic productivity, political participation, and cultural diversity in line with preferred social scenarios; and the cultural appropriateness of educational methods and training materials required for the realisation of the technological potential. Again it is important to discuss the design and adoption of information technologies that strengthen sustainable national security. This involves creating information technologies that reduce the threat and vulnerabilities, and encouraging environmentally sustainable applications of IT.

The future of information technology and national security is compounded by uncertainty – no one knows how the technological advancement will continue to unfold. The goal for the future will be to somehow bridge the theoretical possibilities with technological capability. Research focused on the goal of ubiquitous information

technology will be concerned with a number of important technological obstacles, such as how society could enjoy the benefits of information technology without nation states being too worried about its impact on national security, and society that is ready for a pervasive system that surrounds its communities and monitors their day-to-day activities as there is a worry that ubiquitous networks will present new and emerging challenges to personal privacy which may destabilise security.

Some scientists suggest that the most powerful 21st century technologies, for example robotics, genetic engineering, and nanotechnology, could threaten to make humans an endangered species. Bill Joy predicts that as technology advances, humans will increasingly delegate responsibility to intelligent machines able to make their own decisions and, referring to the writings of Theodore Kaczynski, known as the Unibomber, wonders whether these same machines might not reduce humans to "the status of domestic animals". (Joy, 2000).

Information technology is shaping the strategic environment in which a conflict may take place. For instance, revolutions in military affairs are the dependent variable driven by mostly the political, economic, social and ethical dimensions of the information technology. Given that IT has contributed to the dramatic increase in the interconnectedness of the South African society and people around the world, it is imperative that there should be good entrepreneurship, and government policy that encourages and supports equity, development initiatives and sufficient funding to finance them. The major problem in the South African situation, particularly in deep rural areas, is that without basic electrical and telecommunications infrastructure programmes and universal service initiatives by government, information and communication technology companies will have little incentive to develop new products to meet the needs of people who cannot use or afford their existing services. And, government policies will become ineffective without ground-level programmes to take advantage of them.

Finally, information technology could in future greatly benefit society if its advancement is harmonious with the needs of the people.

CHAPTER SIX

SOUTH AFRICA WITHIN THE CONTEXT OF A DEMOCRATIC POLITICAL SYSTEM

Introduction

This chapter explores the need for, and development of, a model for the analysis of the democratic political system within the context of South Africa. A core approach is advanced which allows for the realisation of a democratic political system as well as other imperatives that motivate and affect democracy and the existence of links that exert their influence within a political system.

In this chapter the three components of the core approaches, namely democracy, political system and South African democracy, are expanded and examined separately. This part of the chapter will look at the elements that exist in a political system and later at what constitutes a political system to be democratic as a whole, together with its subsystems as its analytical component. It will also explore the political processes as subsystems. It is therefore necessary to explain the political system and processes in assessing how far these elements can be linked in upholding democracy.

Explaining and defining democracy

The origin of the term democracy can be traced back to ancient Greece. The word democracy is derived from the Greek word *kratos*, meaning power, or rule. The word therefore means “rule by the *demos*”, the *demos* referring to the “the people”, although the Greeks originally used this to mean “the poor” or “the many”. (Heywood, 1997). Democracy in essence means to designate a government where the people share in directing the activities of the state, as distinct from governments controlled by a single class, select group, or autocrat. The definition of democracy has been expanded, however, to describe a philosophy that insists on the right and the

capacity of a people, acting either directly or through representatives, to control their institutions for their own purposes. Such a philosophy places a high value on the equality of individuals and would free people as far as possible from restraints not self-imposed. It insists that necessary restraints be imposed only by the consent of the majority and that they conform to the principle of equality.

Democracy is an expression often used to describe Western democratic political systems, such as Australia, the United States, Britain, New Zealand, Canada and other nations. It refers to political systems in which there are attempts to:

- defend and increase civil liberties against the encroachment of governments, institutions and powerful forces in society
- restrict or regulate government intervention in political, economic and moral matters affecting the citizenry
- increase the scope for religious, political and intellectual freedom of citizens
- question the demands made by vested interest groups seeking special privileges
- develop a society open to talent and which rewards citizens on merit, rather than on rank, privilege or status
- frame rules that maximise the wellbeing of all or most citizens.

It is generally agreed that liberal democracies are based on four main principles:

- A belief in the individual, based on the idea that the individual is both moral and rational.
- A belief in reason and progress, based on the belief that growth and development are the natural conditions of mankind, with politics the art of compromise.
- A consensual theory of society, based on the belief that society is a kind of mutual benefit association, based on the desire for order and cooperation, rather than disorder and conflict.
- A suspicion of concentrated forms of power, whether by individuals, groups or governments.

Accordingly, liberal democracies are organised in such a way as to define and

limit power in order to promote legitimate government within a framework of justice and freedom:

Power: Efforts are made to define and limit power, usually by means of a written constitution. Checks and balances are instituted, such as the separation of legislative, executive and judicial power. There are conventions of behaviour and an equitable legal system to complement the political system.

Legitimacy: The notion of a legitimate government with a mandate/authority to rule is crucial. Governments require a high degree of popular support, derived from an electoral system that allows for popular, free and frequent elections with the highest possible franchise.

Justice: This is achieved by the full implementation of the equitable things already mentioned so that citizens live in a climate where representative democracy prevails, tempered by constitutionalism, free elections and restraints of power, so that all citizens are treated equally and accorded dignity and respect.

Freedom: For freedom to exist there must be the freedom to make decisions, to learn from them and to accept responsibility for them. There must be the capacity to choose between alternatives and the freedom to do what the law does not forbid. Prohibitions should exist for the general good and there should be respect for political and civil liberties. Liberal democracies often experience disputation about the appropriate role of government in economic matters, some groups arguing for a totally free market, whilst others support varying degrees of regulation and intervention.

A democratic political system

Democratic political systems have been varied, from those of the Greek-political system to the more contemporary complex structures, with common structures to every democracy, freedom of opinion, expression, press and organisation, as well as institutions whereby the people decide on behalf of others through an election in which voters have a free choice, an independent court system and a respected legal system, and minimal violence in a political system. Freedom and equality – the two-pronged approach to democracy – are inextricably bound and there cannot be much of one without the other. Freedom can be assured in a democracy, and the need for political rights is inseparable. (Diamond, Linz and Lipset, 1988)

Democracy means popular control and, to that effect, the then President of America once defined democracy as "government of the people by the people". Government of the people means government on behalf of the people, government by the people means representative government, and government for the people implies that government should be carried by the persons responsible in that nature. It is the responsibility and nature of the government that it is encompassed within different components, legislature, executive and judiciary, in which the distribution of these components concretises the degree of democracy. (Held and Pollit 1993)

Essential characteristics of the political system

Aristotle (384-322 BC) maintained that man is by nature a political animal. The essence in this notion is that of social existence as to politics, by implication, two or more human beings interacting with one another are invariably involved in a political relationship, hence human beings, as they try to define their position in a given society, try to extort personal security from available resources and also try to influence their fellow men to accept their point of view, they find themselves engaging in politics. Thus the only way to maximise one's individual capabilities and to attain the highest form of social life was through political interaction with others in an institutionalised setting in which a political system is able to provide an environment for conversion to take place. (Rodee, Christol, Anderson and Green 1983)

From the above it is clear that there is a need to analyse so as to avoid an oversimplified assumption. Consequently, before any conclusion can be drawn it is important that the environment in a political system should be taken into consideration so as to validate the fact that an analysis of all factors is significant in a political system. The central concept in this discussion is that the political system and its components, like the political processes, exist as subsystem.

The notion of the political system derives from the recognition that the purpose of government is to make and implement decisions for society. The process of decision-making involves the process of allocating goods and services to members of the society, and the allocation of values as policy-making is concerned with values and authority because the political system needs to be acceptable to the society for the

implementation of its policies.

Political system as an analytical concept suggests that the authoritative allocation of values goes through a series of phases that arise from the fact that the political system is the mechanism by which policies are decided. It is this idea of policy making which implies the existence of a succession of phases. It is in this that policies will first be initiated, elaborated and then implemented (input – conversion – output).

Conversely stated, the political system converts demands and support in the form of input, which corresponds to the initiation phase as output, and the conversion process takes place in between, i.e. in the main or core. (Easton 1969 and Almond and Coleman 1960).

The inputs are the responses of all kinds exercised on the system which is activated by way of the demands and which can then elaborate on decisions which will become outputs and be presented to society.

The sequence, input, conversion and output could be divided. The input can be described as having an articulation of demands as an activity consisting of ideas that are presented for discussion and in due course for decision, and the aggregation of demands as an activity which consists in bringing these demands together in a bundle, like policy guidelines to decrease problems by reducing inconsistencies.

Various activities correspond in the output phase, in which rule-making or initiating is the most general, and the first aspect of the conversion process – the rule implementation details, rule-making and rule adjudication – takes place when there is a conflict over rules. These phases, which are called functions, suggest that there is a sequence in which there is articulation and aggregation of demands, rule-making, rule implementation and rule adjudicating, in which they are generally referred to as institutions to describe components of the political system. (Almond and Powell 1966)

Succinctly stated, a political system is a system that deals with political matters, being a structure with interdependent parts which, like any system, has activities that are interrelated and which all define the inner boundary of the system. It is an attempt to

view the political arena in the organised form of a system, hence it possesses the input, conversion and output functions. In any given political system, it is taken that the inputs in particular circumstances are public interests and demands of various types, be it substantive inputs which are more of demands, and support or functional inputs which constitute the expression or articulation of various interest. Citizens may link themselves to the government as active participants or by way of input as to taking part in the work of an organisation. Demands do not always seek change but they do seek government action. (Easton, 1979)

Demand and support are marked out as inputs to the decision-making system; they are essential to the system because they feed definite information into the main or core system. The core or main of the political system is the democratic decision-making representatives or mechanism; they convert input into output. Government is the decision-making instrument that receives inputs and emits outputs since it constitutes the formal government structures. Output from the democratic decision-making mechanism is public policy, which is understood to be laws and government proclamations that are made, enforced or adjudicated. (Hanekom, 1987)

In the political system demands and support of input do actively give one an understanding of the manner in which the environment influences the workings of the system. Demands combine a broad scope of subjects and activities that are transmitted to the system. Without ignoring the importance of support in the input, one would consider demand, in that the flowing into a system constitutes one of the major sources of stress behaving on its important variables.

A demand may be defined as an expression of opinion that an authoritative allocation with regard to a particular subject matter should or should not be made by those responsible for doing so. As such a demand may be quite narrow, specific and simple in nature, as when grievances and discontents relevant to a given experience are directly expressed. For example, exposure of corruption in government may give rise to a demand for control. Broad pleas for better government without specification of the exact steps to be taken represent a highly generalised demand. (Easton, 1975).

Demands have a built-in direction towards the authorities. Directionality of demands

is important as demands are specified and produce accepted binding decisions. They may be expressed or implied.

Every political system function in an environment and certain characteristics of its particular environment contribute materially towards determining both its form of government and its policy output. In a political system the form of government can be understood only against the background of the environment in which it operates. It is generally assumed that a democratic government is likely not to survive in a nation whose people are bound to non-democratic modes of thought and behaviour; hence it is important to give meaning to a democratic political system, and even though the form of democratic political systems has been varied, there are common aspects prevalent to the existence of democratic political systems. (Ranney 1975).

Description of a democratic political system

Ever since the time of Plato and Aristotle, most political scientists have sought to discover universally valid descriptive statements that accurately describe and explain political systems and processes. A general characteristic, which tends to suggest that a political system is democratic, or non-democratic, constitutes a standard principle. It is standard because it explains the way in which the government that runs the country has decided to frame the political system, and as such the manner in which the government runs the country is based on the recognition that government itself constitutes a system, i.e. a political system, because it is engaged in an activity in which a number of elements are interrelated, through which policies are initiated, developed and implemented. (Easton, 1969) These elements include structures that are established by the constitution.

Essential elements of a democratic political system

The political system is composed of sets of institutions, organisations or groups, some of which are set up by a constitution as political processes, and many of which are not. These components and elements together form the framework within which decisions are taken. It is only by understanding how these institutions, organisations and groups can allocate values in a society that these elements and components can exist within a political system. Hence it is essential to describe these elements and components to be able to obtain a detailed picture of what a democratic political system is.

A democratic political system is more than a set of constitutional rules and procedures that determine how a government functions. In a democracy, government is only one element coexisting in a social fabric of many and varied institutions, political parties, organisations, and associations. This diversity in a political system is referred to as pluralism, and it assumes that the many organised groups and institutions in a democratic society do not depend upon government for their existence, legitimacy, or authority.

The following are what most authors would consider to be reasonable, essential elements of democracy:

- Sovereignty of the people.
- Government based upon consent of the governed.
- Majority rule.
- Minority rights.
- Guarantee of basic human rights.
- Free and fair elections.
- Equality before the law.
- Due process of law.
- Constitutional limits on government.
- Social, economic, and political pluralism.
- Values of tolerance, pragmatism, cooperation, and compromise.

Many organisations operate in a democratic society, some local, some national. Many of them serve a mediating role between individuals and the complex social and governmental institutions of which they are a part, filling roles not given to the government and offering individuals opportunities to exercise their rights and responsibilities as citizens of a democracy.

In an undemocratic society, virtually all such organisations would be controlled, licensed, watched, or otherwise accountable to the government. In a democracy, the powers of the government are, by law, clearly defined and sharply limited. As a result, private organisations are free of government control; in fact, many of them lobby the government and seek to hold it accountable for its actions. Other groups, concerned with the arts, the practice of religious faith, scholarly research, or other interests, may choose to have little or no contact with the government at all. In this scope of democratic political system, citizens can explore the possibilities of freedom and the responsibilities of self-government, unpressured by the potentially heavy hand of the state.

The character of a political process in a democratic political system

It is understandable that within a political system the political process is based and concentrates on the organisation and operation of institution which makes the law, enforces it, and settles controversies arising from different interests and various interpretations of the law.

Political process, being generally accepted, implies a recognition that legislatures, executives, and the judiciary do not operate independently of either one another or of the other political organisation in society; they include political parties and interest groups which together with the more formal institutions of government, constitute the political system, which implies that politics involves citizens' attitude and interests, group organisations, and implementation, interpretation of law and policies. It is in the attitudes and interests that different elements and components necessary in achieving a democratic political system are discussed below. (Sainsbury, 1988 and Rodee et al., 1983)

Democratic political process refers to a set of requirements that applies to the institutions and that makes it possible for the citizens to participate in political decision-making processes within a political system. In absolute terms, support for democratic efficacies is widespread. One becomes content at significant levels of endorsement of democratic elections, rights and liberties, political equality and democratic forms to be prevalent in most countries. Most of the criteria used to determine conditions for democratic political process correlate, which leads one to postulate the existence of a general underlying dimension of democratic efficacies. Various conditions of the democratic political system go naturally hand in glove; it is therefore necessary to effectuate a functional meaning of democracy. The triad of democracy, freedom, and equality are inextricably bound in approach and functional meaning. There cannot be much of any one without the other; only in a democracy can freedoms be assured. The demand for political rights is also inseparable from the call for freedom. Again broad political participation is the best evidence of equality in a democratic political system. (Nwabuzor and Mueller, 1987).

It is for this reason that Montesquieu (1689-755) presented and argued that all

functions of the political system could be encompassed within the separation of power that is basically a reflection of what happens in the political world. It is fairly a clear description of the proper function of the government in any democracy where liberty is best assured by the distribution of these different functions among separate institutions of government. (Renwick, 1980).

Given this perspective, from Montesquieu's presentation of the political process, they do not operate and function independently from one another or of the other political organisation in society; primarily, they include political parties, interest and pressure groups, which together with formal institutions of the state constitute the democratic political system, which means that politics, complex as it is, involves citizens' attitudes and interests measured by the public opinion for the formulation, implementation and interpretation of policies. (Maidment and McGrew, 1986).

The effect of public opinion in a political system

The wide acceptance of the democratic thinking led to the idealisation of the role of public opinion in the democratic political system, as to the public being interested in making the laws of the country, the public having the right to know, deliberating and reaching national consensus. Rationally conceived, individual opinions would be held unvaryingly throughout the social order. Having reached consensus as to the democratic political process, the public would make its will known at the polls and in one way or the other, the will or views of the majority would be enacted into law, and continued surveillance and constant criticism would ensure the maintenance of an enlightened public opinion and consequently a public policy will be based upon the environment in which there is demand for democracy and justice.(Budge, 1994).

In any given society, when responding to the challenges of the environment in which one finds oneself, it is one method by which an individual adjusts to the demands of day-to-day life. It is rare that a day passes that an individual does not express his or her views either for or against many subjects. Taking no account of particular case or exception, it is believed that opinions are the end product of the interrelationships between a person's values, beliefs and attitudes, which do not exist in isolation but among others members of the public. (Rose-Ackerman 1978).

As such the public cannot be regarded as a conglomerate and undifferentiated mass of people. Essentially, a public is a segment of society comprising many different types of publics which may be identified by a specific geographic base, such as political system, nation, country, city, peri-urban or rural, and may share common interests. Most authors maintain that "public opinion" is the expression of all those members of a group who give attention in any way to a given issue. Public opinion represents the collectivity of individual opinions of a designated public, thus each issue has its own public. (Dye 1978).

The foundation of an individual's opinion rests upon his or her value systems that represent the objective one wishes to achieve. It is through one's attitude that the belief system finds expression. They structure and focus on beliefs, serving as a frame of reference to guide our thinking and behaviour in a political system.

Political behaviourism in a democratic political system

Naturally men have developed methods by which they can resolve disputes among themselves and agree upon goals, which they wish to pursue by cooperative action. The existence of a common procedure for resolving disputes and reaching common decisions is an important requirement in any political system. Such agreements can be reached by surrendering the right to decide to one person or by fighting to determine whose will shall be reached by either arriving at an agreed view, consensus or by accepting the decision that commands majority support in different situations involving different types of issues. One may wish to insist on a unanimous vote or approval by more than a simple majority. (Elcock, 1976).

A variation upon this decision procedure is for the public to elect representatives who will make decisions for them and who they will hold periodically accountable for their decision by requiring the representatives to submit to re-elect at regular intervals. Thus, a political decision procedure involves discussions and debates followed by a decision which is broadly acceptable to all parties, or is at least not so unacceptable to any party that members decide to oppose it to the point of disrupting the system. This led to the in-depth study of behaviouralism, which most social

scientists found to be more meaningful in reaching a national political decision. (Lindsay, 1992).

The reason why behaviouralism has developed in politics is that it has been the growth of other social sciences. The main reason has been a reaction against the traditional approaches to politics, legalistic study of formal political institutions and a normative and speculative political theory. (Stadler, 1987).

Political institutions are traditionally observed by examining the contents of a country's constitution and law, and interpreting them, rather than by considering how political actors conduct themselves in the context of constitutional law. Of importance is that appearance does not necessarily bear much relationship to reality, the crux is what are individuals' attitudes and informal relationships, rather than the formal structure of power. (Held and Pollit, 1986).

The behaviouralists wanted to see how people carry on with their activity, whatever the formal rules of the constitution and the law might say, and they sought to do so by looking for objectives and indisputable facts which could be analysed systematically. It is given that in any political system political behaviour does affect facts, which are objectives and can be verified by anyone who wishes to check them. There is no question of reality being determined by the observer's viewpoint or ideology. (Lindsay, 1992).

Political behaviour may affect politics in any political system; it raises issues of central importance and it also enables us to answer questions such as the nature of consent, the operation of representatives in government and the extent to which public officials will execute policies as having a bearing on the political socialisation of communities which make up their political culture, the political attitudes, values, feelings, information and skills possessed by the political community, and in political life, on the basis of protecting their interests. (Nwabuzor and Mueller, 1987).

Political culture as a variable in the political system

The characteristics of political socialisation and a close group of opinion, attitudes and beliefs that make up a society are in turn part of the society's political culture and

are important variables in helping to answer some fundamental and enduring questions as to what accounts for a society's political stability or instability. The answer is partly in terms of the extent to which the actual conduct of politics and the moral tendency of citizens coincide with the norms of behaviour prescribed by the political system. (Jaros, 1973).

Some centuries ago, one author declared that, since force is always on the side of the governed, the governors have no support but opinion. When minority groups command the means to destroy millions of people, one may, to qualify this, in a political system, say it is still relevant to say that the people of a country can render it ungovernable, more especially when their grievances are not being investigated so as to institute correctional measures. (Parry and Moran, 1994).

If that being the case, one can safely say that the political system depends on the support of the people. Stable government can be assured only if it is able to retain that support, thus increasing an understanding of the link between the structure of a society and the attitudes of its members on the one hand and the political process on the other. If people are used to running their private lives democratically, they will expect the political system to be run on the same lines and will be able to accept the problems and responsibilities that go with such a system, coping with the continual presentation of contradictory proposals. (Parekh, 1992).

Fundamentally the political culture of any society is made up of the political attitudes, values, feelings, information and skills possessed by the members of the political community. It is reflected in a nation's ideology, in attitudes towards political leaders, in the duties of citizenship, in the conduct and style of political activity, in what is considered to be political or not. (Almond and Verba, 1963).

Basic aspects to any political culture would involve the cognitive knowledge and beliefs people have regarding the various characteristics of the political system: How much do South African citizens know about their national political structure? Does their knowledge begin and end with President Mandela? Do Americans living in South Africa understand the way of doing things in the South African political system or are they more informed regarding the US? This has an effect in that it involves

people's feelings about various characteristics of the political system. For instance, do the people of Rwanda feel loyalty or patriotism towards the regime in Rwanda? Do most South Africans feel admiration for the personality of President Mandela? Lastly, it is also evaluative, in that this involves judgements and opinions regarding the political system and occasionally involves a combination of values or standards with information, i.e. cognitive aspect and affective feeling aspect. How do citizens evaluate their government's performance?. Their judgements are likely to rest on the leading members of the regime as well as on certain values or moral criteria. Thus the cognitive and effective orientations are important aspects in evaluating the cultural way of a political system by integrating the various political substructures, components or elements. Taking it from the history of South Africa, it is necessary to transform the political culture so that it fits the evolving democratic political system. (Almond and Powel, 1966).

Members of a political community can never share the same orientation towards the political system, importantly so for the stability of any political system, that there should be common assumptions and beliefs that will be shared so that the political culture can evolve into relatively political toleration at all angles. Political toleration should be able to resolve dividing issues as in any political system, outputs, as policies, which are popular with some section of the citizens, are bound to be extremely unpopular with others; and the result will be political strife and instability, which will render the executive institutions ineffective.

Political tolerance as an imperative in a political system

A democratic political system requires relatively moderate tension among its contending political forces. And political moderation is facilitated by the process capacity to resolve key dividing issues before new ones arise. For instance, if the issues of religion, self-determinism and the role of the traditional leaders are allowed to accumulate, they reinforce each other and the more reinforced and correlated the sources of cleavage, the less the isolation from heterogeneous political stimuli; the more background factors pile up in one direction, the greater the chance that the group or individuals will have an extremist perception. These two relationships are joined by the fact that parties reflecting accumulated and unresolved issues will

further seek to isolate their followers from conflicting stimuli. (Macridis, 1983).

Within these relationships, similarly, peoples working in isolation are likely to find the world outside their settlement and their business strange, intimidating or at best irrelevant, and will therefore tend to be apathetic towards the political system or alienated from it. Generally toleration depends on the extent to which people mix with a varied selection of their fellows and on their level of affluence, which can include a societal level and the amount of education available. Education should also give a person a deeper understanding of his own views and position in life, besides giving him more information about other people's background. He will become more tolerant of others who have origins, beliefs, attitudes or accents different from his own.

Education is often, not always, an important determinant of levels of toleration. In Germany and Italy, both problematic in terms of the congruence of their political system within the attitudes of their people, education made little difference to the low levels of allegiance to the political system.

Political attitudes, not ignoring toleration, are linked with other attitudes and these are formed by the social activity groups of which the citizen is a member. Opinions and group membership are either superimposed one upon another, presenting the individual with a series of competitive views of the world which support and strengthen one another, or cross-cutting, presenting a variety of different and possibly incompatible views. This latter collection of attitudes and affiliation is more likely to lead to toleration, since it will accustom citizens to dealing with and reconciling different points of view within their own minds. Superimposed opinions or membership will confirm the individual's rightness of existing convictions. Hence the degree of exposure of an individual, a group, or society to either superimposed or cross-cutting opinions or activities will have important consequences for his or their level of toleration.

A particular interesting set of social institutions, from the point of view of the creation of political tolerance or dogmatic political attitudes, is the churches. Most churches are authoritarian structures and their members tend to be associated with one party or

another – social groups and organisations clearly have a considerable influence upon political attitude and the extent to which the citizen is exposed to diverse or consistent opinion will help to determine the strength of his party self-image and the extent to which he is prepared to tolerate the opposition being active and winning power. Thus they have a large role in determining whether conflict in a given society is of intolerance and is sufficient to render the political system unworkable.

A meaningful democratic political system will also be impossible if there are insufficient expressed differences of opinion to give rise to a political debate about which members of society can care sufficiently to involve themselves in or at least to give it a reasonable share of their attention. (Gibson, Duch and Tedin, 1992).

It is therefore imperative that in any political system there has to be a level of political toleration that will in effect help either to facilitate or deepen democracy. It suffices to mention that there are certain conditions necessary for attaining a meaningful democratic political system.

The South African democratic political system

South Africa's National Party apartheid regime can be mapped out back before 1948 when it came into power. The 1910 apartheid Constitution of South Africa provided for an all-white government and gave a continued system of discrimination and oppression. A number of discriminatory measures were taken during this time, including the enactment of the 1913 Land Act which effectively deprived African people of their land. This was also the time of the birth of the African National Congress (ANC), which provided the largest mass-based forum for the freedom struggle in South Africa. The struggle for freedom reached its height in the 1970s and 1980s, when State repression and internal opposition intensified and international attention was focused on the plight of South Africans. One of the significant developments in this period was the adoption of the 1983 Constitution, which unsuccessfully attempted to restructure racial and political arrangements while keeping power in the hands of the white minority. It created a tri-cameral parliament that sought to co-opt Coloureds and Indians into the national parliament in separate houses. The African majority were excluded from this political system and were

relegated to black local authorities in their townships and the so-called 'independent' homelands and self-governing territories. While South Africa was isolated from the international community, this period also saw the rise of the United Democratic Front, a mass-based umbrella body, which identified itself with the African National Congress in exile.

The beginning of 1990 saw the unbanning of the ANC and the release of political prisoners. In 1993 the ANC, as the chief negotiator on behalf of the liberation movement, the government and other political parties came together to negotiate South Africa's transition to democracy. A number of organisations and structures that formed the broad liberation movement worked together in developing policy positions and determining priorities for a new South Africa democratic political system.

One of the priorities for the new South African democratic political system was to have a constitution. An interim constitution was implemented and then later the final Constitution. One of the most important reasons for the success of the process of drafting the final Constitution was the use of technology. The Constitutional Assembly's public awareness and education campaign strategy used several ICT platforms to engage the public in its campaigns. The campaigns were designed to educate the public on constitutionalism and basic rights, as well as to elicit the views of the public on the content of the new Constitution. The use of technology involved several strategies which were used during the campaign and whereby thousands of public meetings were held, covering nearly every town and village in South Africa, both to educate and allow people to give feedback and make submissions. These meetings were advertised widely, especially through television and radio.

Participatory workshops were organised. Members of the Constitutional Assembly participated extensively in this campaign, and travelled across the country, to townships, informal settlements, rural villages, churches, schools, etc. to consult with the public about the constitution-making process. The media technology was also used extensively; over 10 million people a week listened to the Constitutional Assembly's show on the radio in one of the official languages, and an estimated 160 000 people received a copy of the newsletter "Constitutional Talk", also published in the 11 official languages, each fortnight. In addition, an Internet site was launched, providing information on the constitution-writing process. Through the use of ICT a Constitutional Talk Line was set up to enable people to make submissions

over the telephone. Members of the public could make submissions in their own languages, and approximately 2,5 million written submissions were made. Public meetings were held with many organisations representing a number of diverse interest groups.

After the 1994 general elections and during the negotiation process, South Africa experienced a diverse compelling political system. There was first the politics of transitional arrangements, which brought a lot of uncertainty, tension and mistrust between different negotiating parties, and at that time there was ongoing violence in the country. Many concessions had to be made which were based on the will to make the political negotiations work. These involved some form of persuasion in politics, as the need to win the public support became essential together with the international community that played a vital role throughout the negotiation process. For all intents and purposes, it was important to build a transitional facet into changing from a shun-orientated apartheid status quo to the new political system, which was a good way of ensuring democratic political consensus.

The intensity of the political reform process increased, particularly after the April 1994 elections and those of 1999. South Africa assumed a new political order when the general election gave birth to a democratic, popular and legitimate government.

South Africa's new political system qualifies as a genuine democracy. It has now run two largely peaceful national elections, in 1994 and 1999 respectively, judged to be free and fair. It has the Constitution that encapsulates features like the National Council of Provinces, a range of independent watchdog agencies and commissions, like the Office of the Public Protector, Youth Commission, Gender Commission, Human Rights Commission, the Equality Court, etc. guaranteeing a wide range of classic political rights as well as an array of socio-economic rights, all guarded by a relatively strong Constitutional Court. A constitution and elected representative institutions do not necessarily complete the democratic picture. No matter how well designed its political institutions and processes are, in order to sustain and consolidate democracy there is a need for society to support the democratic sustenance practices.

The South African political system should be understood in the realm of a sovereign

state that makes formal provision for the entitlement of every citizen to citizenship and franchise. The legislative and executive organs of the State at all levels of government are bound by the application of fundamental human rights, which apply to all the laws in force and all the administrative decisions and acts. Every citizen has the right of equality before the law and to protection of the law, and to human dignity, freedom and security. The South African political system is characterised by far-reaching administrative, social and political changes that have left virtually no governmental structure unaffected

Conclusion

The 1994 elections in South Africa presented a new democracy that delivered not only a universal right to vote but also formal equality before the law, channels for citizens' participation in governance, and institutions strengthening democracy. The second democratic elections in 1999 took place amidst large-scale societal transformation and reform and presented the first major opportunity to determine the extent of the impact of technology in a democratic South Africa.

South Africa made the transition from a minority-ruled country to an inclusive majoritarian democracy in 1994. A special feature of this transition was that it was pact-driven, i.e. negotiated between and among the major political stakeholders at the time, namely the National Party government and the African National Congress. The pact-driven phase commenced with FW De Klerk's "reform speech" of February 1990. From that point onward, apartheid legislation was systematically scrapped, while the major political role-players engaged in multiparty negotiations on a new constitutional order. This process was completed in 1993 when an interim constitution was adopted that led to the introduction of democratic rule in 1994 under the political leadership of the ANC, which had won the elections of April 1994. Then a final constitution was negotiated, under which the ANC won by a landslide. The principle of the constitution when interpreted makes provision for characteristics of liberal democracy. (Breytenbach, 2000).

South Africa's two constitutions drafted during the nineties, that is the Interim Constitution of 1993 and the final Constitution of the Republic, adopted in 1996, are

fully-fledged "liberal democratic" constitutions as presented by Breytenbach (2000).

He also presents salient features, as follows:

- The supremacy of the constitution, making South Africa a typical "rechtstaat", with an independent judiciary, Bill of Rights and Constitutional Court;
- Although the head of state is the President, South Africa does not have a typical presidential system. Instead, South Africa has a parliamentary - really Westminster system, where the Executive is formed only after elections and represents the strongest party in parliament and is therefore accountable to parliament, as in the UK parliamentary system;
- Unlike the UK/ British system, South Africa's electoral system is not based on geographical constituencies as basis for representation in parliament. It is based instead on the typical, continental, European system of Proportional Representation (PR) based on party lists;
- Division (in the Constitution) of functional areas of concurrent and exclusive competencies between national and provincial powers. The central level has stronger exclusive powers than provinces; it also takes precedence over provincial powers in the case of concurrent powers, making centralisation stronger than provincialisation. This suggests that South Africa has a hybrid system ("regionalism") between federalism and unitarism (very much like Canada);
- Elections at all three levels of government – national, provincial and local – every 5 years, and equal and full participation for all adult citizens in public institutions where citizens normally participate in liberal democracies. So, institutionally, the system provides for "contestation" and "participation" which is a typical "polyarchy" (in Dahl's terms), otherwise known as "plural" system.

But is it "plural" (or "liberal") in all respects?

Polyarchy and pluralism and a liberal constitution, Breytenbach (2000), in South Africa are the product of two major forces: a pact-driven negotiated settlement

between the former NP government and the ANC. The negotiated settlement made for a pact-driven process emphasising shared rule during the transition.

The word transition literally means the passage from one condition or stage of development to another. Transitions are said to exist for a particular duration, usually medium to long term. Transitions from authoritarian rule to democracy are usually referred to as transformations. In transformation the passage from one condition or stage of development should be interpreted as structural change affecting especially the political, social and economic spheres of state and society, and resulting in a fundamental change or the relations of power, which existed prior to the transition. In this respect, transition resembles managed revolutions over time. (Roux, 2000).

Transitions may take on many forms, in some instances present in one and the same country as in South Africa. South Africa faces the daunting challenge of having to manage the passage from one condition to another on three levels: politics, society and economics. South Africa is trying to get through its transition under very difficult economic circumstances. The Nedcor/Mutual scenario-team (1990), after having studied a variety of transitions, become convinced that South Africa's transition is probably more far-reaching than any other which has been attempted. It was stated by the team that "poor social conditions, poor economic performance, and violence could well disrupt the transition or create a situation in which a new government would find it impossible to govern successfully" (Nedcor/Old Mutual, 1992:14), thereby creating "political instability".

O'Donnell and Schmitter (1986:7) in Roux (2000) display three stages that form part of South Africa's transition:

Liberalisation, where the incumbent government cedes power to, and recognises additional rights of, citizens.

Democratisation, where the loser of an election cedes power to the winner while at the same time government acknowledges and respects the full rights and obligations of citizenship.

Socialisation, where democracy is consolidated into a way of life which has broad support among the populace. (Nedcor/Old Mutual Scenarios, 1992).

The Nedcor/Old Mutual scenarios also described a successful transition as one where a stable democracy becomes entrenched; where rising incomes earned are experienced; where a reasonable distribution of incomes takes place; and stable social fabric is in existence. Roger Southall (indicator SA, 16(1), 1998) refers to six factors, as identified by *Przeworski et al*, which can be used to determine whether or not democracy will survive, i.e. the existence of democracy itself; parliamentary, as opposed to presidential democracy; the level of economic development; positive economic performance; narrowing income inequality; and a favourable international climate. (Roux, 2000).

It is within the context of South Africa's level of economic development and positive economic performance that technology could have an impact on democracy. It is given that South Africa is in a more fortunate position as it has mostly relatively well-developed infrastructure, good financial and banking institutions, a functioning bureaucracy, efficient security forces and, importantly, a private sector and entrepreneurial class which are both the envy of many entrenched first-world democracies. These beneficial issues can only strengthen long-term development if they are maintained and properly managed. In any democratisation process elections are a mere event; they are an essential, but not sufficient, condition for the consolidation of democracy, for "stability and development". Given the transition in South Africa, this period of a democratic political system also provides an opportunity to examine whether advances in technology can enhance democracy in South Africa so as to validate the claim that political stability and development can consolidate democracy.

Political stability and sustainability of a democratic political system cannot be taken for granted. Robert Dahl, in Muthien, Khosa and Magubane (2000), points out that the number of democracies increased from 21 in 1950 to 51 in 1996, and that 30 countries achieved democratic status between 1993 and 1996. However, between 1900 and 1985, non-democratic regimes replaced democratic regimes 52 times.

Democracy in South Africa has delivered the franchise to the disenfranchised majority. It also put in place the key pillars of democratic constitution, i.e. a functioning multiparty parliamentary system; a strong sense of constitutionalism and the rule of law; mechanisms of accountability; a professional civil service functioning

on the basis of constitutional values; mechanisms for civil participation in government; and an integrated and highly developed economic infrastructure. The democratic political system meets the requirements as an indisputable democracy. It has also run two national elections, which were judged to be free and fair. It has the Constitution that encapsulates features like the National Council of Provinces, a range of independent watchdog agencies and commissions, guaranteeing a wide range of classic political rights as well as an array of socio-economic rights, all guarded by a relatively strong Constitutional Court. A constitution and elected representative institutions do not necessarily complete the democratic picture. Despite how well designed its political institutions and processes are, in order to sustain and consolidate democracy there is a need to determine the level of democratic sustenance (Idasa, 2000) by assessing the effectiveness of transformational public policies in a democratic political system.

An important aspect of transformation in South Africa during the first term of office of the democratic state was the democratisation of public policy-making, particularly the science and technology policy. The new political environment introduced processes and practices that differed radically from those that marked policy-making during the apartheid era. In particular a more transparent public and answerable policy-making process replaced the previously semi-secretive, technocratic, authoritarian mode of policy-making.

The most significant example of this new political culture was demonstrated by the number of inputs received during the discussions on the Science and Technology Green Paper. Popular participation in the policy-making was made possible by encouraging the citizenry to make submissions, resulting in many written submissions.

This new policy-making approach created opportunities for a greater and more active role of communities on issues of governance. It also proved the desire for transformation of the relationship between technology and political democracy.

CHAPTER SEVEN

SOUTH AFRICAN DEMOCRATIC POLITICS OF TECHNOLOGY

Introduction

Technology and democracy are two interrelated variables in the South African political system. The relationship between technology and democracy in South Africa is an essential component of government's strategy for growth and economic development in creating a better life for all. The advent of democracy in South Africa has seen initiatives taken by government to review and reform the country's technology approach. In 1996 the government published South Africa's Science and Technology Policy, which envisages a future where all citizens will enjoy a sustainable quality of life, participate in the economy and share a democratic culture.

The South African government's technology approach highlights concerns about improving the wellbeing of society. Such concerns inversely question the certainty of whether technology can support democracy. In view of these concerns, the scope for assessment, monitoring and evaluating the impact of technology has grown enormously in response to the demand for democratisation and the increasing challenges for the provision of goods and services in meeting the basic need.

Technology is one of the main drivers of economic growth and prosperity [in a democratic political system]. (Pistorius, 1996). It is also widely recognised as being one of the most important contributors to competitiveness, whether at international level, national level, or organisational level. Numerous studies have been performed to investigate the effect that technology has on [society's] productivity, and one can safely say that there is general consensus that technology can, in principle, contribute significantly to [national] productivity.

The purpose of this chapter is not, however, to expand or elaborate on technology itself. It is to put the role of technology in perspective vis-a- vis the extent to which

South Africa as a political system is playing a role in creating a conducive and enabling environment for political decision-making in terms of the science and technology policy in order to support an endeavour to enhance democratisation. In other words, the role of technology is investigated to determine whether political decisions on science and technology policy have any influence on democracy in South Africa. In order to do so, however, it is necessary that the concept of technology and democracy be considered in context and not interpreted narrowly. It will be shown that technological advance is one of the central aspects that can enhance democracy in a political system.

A general overview of technology approach

There is abundant literature available on technology policy. Since early in the 1980s technology approach in developing countries centred around the concept of "appropriate technology" where there was a need to move away from capital intensive technologies towards more labour-intensive technologies which were more suited for local environment. (Chang and Cheema, 1999). The debate around the concept went through transformation and was more about why some countries were more successful than others in absorbing imported technologies. There is a common understanding that there is a need for a technological capability in order for countries to be successful in choosing their approach to technology. It is also emphasised that there is a need for investments in building technological capability, and that policy actions have an important role to play in the process of supporting a particular policy decision. (Fransman and King, 1984).

There is a more advanced understanding, especially as presented by Nelson and Winter (1982), and also by Freeman (1982), which emphasises the importance of institutional and policy factors in the evolutionary nature of technological process. (Dosi et al (eds.), 1988) These developments in technological evolution culminated in the introduction of the concept of "national systems of innovation", and emphasised the importance of institutional factors, and the inter-relationship between the constituent parts of the institutional complex, in the determination of technological progress. (Lundvall, 1992, and Nelson (ed.), 1993).

The concept of a national system of innovation is also embedded in the South African science and technology policy which seeks to harness the diverse aspects of science and technology through the various institutions where they are developed, practised and utilised.

The above theoretical concept influenced, and was also influenced by, the literature on technology policy, which produced a new breed of theoretically sophisticated and empirically well-grounded literature that may demand a clearly focused policy execution. (Lall & Teubal, 1998).

South Africa, having adopted this concept, may have difficulty in generating a socially desirable degree of technological progress and the type of policies that may be necessary to resolve this problem of having a clearly defined policy execution. The reason for this problem can be related in two areas that have been relatively ignored in the existing literature, namely the political and the institutional aspects of technology policy design and implementation.

It would be wrong to suggest that those who have contributed to the debate on technology policy in developing countries have completely neglected these two aspects. However, it would not be too much of an exaggeration to say that most literature has paid relatively little attention to the political aspect of technology policy design and implementation. Likewise, it would be wrong to suggest that institutional factors have been neglected in most literature, especially given the numerous writings on national systems of innovation. However, it would be fair to say that far more attention has been paid in the literature to the institutions related to knowledge generation and diffusion (e.g. the educational system, linkages between firms and research institutions), rather than to those directly related to policy design and implementation (e.g. bureaucracy, industry association).

In determining the impact of technology on democracy, this study puts emphasis on the analysis of the political and institutional aspects of technology policy design and implementation in South Africa.

South Africa's technology policy approach

The technological skills and the ability of a nation to improve are important to its overall development and have led governments to adopt more comprehensive and forthright policies with regard to technology. The purpose of a national (science and) technology policy is defined by UNESCO (1990:9) as "...the development and fruitful use of national scientific and technological resources in order to promote the advancement of knowledge, encourage innovation, increase productivity and to attain the objectives of the country's economic, social and cultural development more quickly and surely". Much emphasis is on the structure in terms of methods and legislation. (Kaplan, 1995). In South Africa's context technology policy has three principal concerns, which are:

- to enhance capacities for invention and innovation;
- to ensure access to international technology; and
- to enhance the diffusion of new and appropriate technologies and technological best practices.

The democratisation process in South Africa has seen the transformation of the science and technology community. The transformation involved that the government departments, in particular the Department of Arts, Culture, Science and Technology (DACTS), had to restructure and transform their structures and implement policies and programmes. In January 1996 DACTS published a Green Paper on Science and Technology. This was the result of consultation with stakeholders in the science and technology community. A further process of consultation culminated in the publication of the White Paper on Science and Technology in September 1996.

The above process took account of , among other things, the results of two studies of the science and technology policies of five decentralised states, viz. Belgium, Canada, Germany, India, and the USA, in which the HSRC (Prinsloo and Pienaar, 1993) investigated the functioning and implementation of science and technology policy. The study noted that:

- In countries where the private sector involvement in science and technology was less than that of the government, the country's science and technology system was generally inadequate. All five countries display systematic and concerted efforts to encourage the private sector to invest more in science and technology research so as to achieve a higher level of technological advancement.
- The creation of a solid and effective education system to provide the required number and quality of scientists and technologists is a *sine qua non* of science and technology development.
- There is a trend to a greater centralisation of science and technology policy. This trend is mainly the result of worldwide recession and thus economic constraints, and brings with it the risk of the politicisation of science and technology policy, generally regarded as undesirable.
- Financial constraints are compelling industrialised nations to actively increase the pace of international scientific and technological collaboration.

The Council for Scientific and Industrial Research (CSIR) commissioned a study of science and technology policies in sixteen countries (CSIR, 1991). The sample included the USA and Canada, countries in Eastern and Western Europe, the former USSR, some Pacific Rim countries, and Botswana and Kenya. In the process a number of policy instruments were identified that directly affected science and technology. These instruments all have a direct influence on science and technology policies and ultimately on economic prosperity and development in general. From a national economic development perspective, the study also highlighted the fundamental importance of the following aspects:

- Distinction between technology and science, and the fact that competence in the former may not be dependent on, or even related to, competence in the latter. Indeed it is possible in the short term for a country to be competent in utilising and adapting technology development elsewhere without itself having a strong science base.
- The strategic capacity to manage technology effectively at the level of overall economy as well as that of the individual (and sometimes at sectoral and

regional levels). The most successful economies are those that use technology best across a broad spread of industries – as exemplified by Japan and the former West Germany.

- An efficiently functioning national innovation system properly connected with outside systems, and in which the science, technology, market and finance "pole" interact readily with one another. (The market refers not just to regular commercial markets, but also to all applications opportunities in sectors such as health, education, environment, and national security where commercial markets may not exist.)
- The role of government in exercising overall leadership, in creating a macro-economic and regulatory framework conducive to technological innovation, and in affecting, within the overall pattern of resource allocation, the appropriate volume and quality of investment in education and training in physical infrastructure. In some cases government can become the driving force for innovation in a particular industry at a particular time.
- The role of the private sector in identifying and responding to applications opportunities and, especially in the case of large companies, in participating in the policy process. The private sector is usually, but by no means always, the principal engine of the technological innovation process.
- A rapport between government and the private sector, which allows each to play its role appropriate to evolving circumstance of the industry in question.

Developments towards formulating the South African science and technology policy began by re-examining its science and technology policy with the publication of a report in 1992 entitled "Towards a science and technology policy for a democratic South Africa", which was sponsored by the International Development Research Centre (IDRC), Canada. Its findings were that:

- There was a crisis in the educational system at all levels and this crisis was at its worse when it affected the teaching of mathematics, science and engineering.
- South Africa should see itself as a participant in joint ventures in S & T on the continent of Africa, but not as an automatic leader.

- In various individual institutions in South Africa R&D funds tended to be allocated for inappropriate activities.
- There was vacuum in leadership on issues dealing with science and technology at ministerial level.

The government's policy approach was intended to meet the challenges of stimulating development and overcoming the biases and entrenched ideas prevalent about the nature of science and technology, while on the other hand it was also the government's role to promote and develop the science and technology sectors. The process of implementing government's policy approach included numerous programmes, *inter alia*:

- The formation of the National S&T Forum (NSTF) composed of members from all sectors, including business, acting as an advisory to the Minister of Arts, Culture, Science and Technology.
- Appointment of the National Science and Technology Council from government and private sector.
- The commissioning of the National Research and Technology Audit for South Africa in late 1995, as a national stocktaking exercise of all science and technology skills and capabilities resident in South Africa, taking January 1996 as the base date.
- In 1996 the government established the Academy of Science of South Africa, its purpose being to ensure that leading scientists, acting in concert and across all disciplines, can promote the advancement of science and technology and provide effective advice, and can facilitate appropriate action in relation to the collective needs, threats, opportunities, and challenges of all South Africans. (Document circulated by the Facilitating Committee, 28 Nov. 1992).
- A National Research and Technology Foresight programme was completed in 2000.
- Establishment of the National Advisory Council on Innovation (NACI), whose role will be to support the Minister of Arts, Culture, Science and Technology.
- The review of the science councils and related institutions (SETI) in South Africa was completed.

- The tabling of the White Paper on Science and Technology, preparing for the 21st century (SA Department of Arts, Culture, Science and Technology, 1996).

The White Paper on Science and Technology saw the promotion of the effective distribution of available knowledge as a critical function of a national system of innovation; a well-functioning process of technology diffusion which could boost progress in South Africa through appropriate combinations of domestic and imported technologies. But it was expected that this in turn would be highly dependent on the ability of South African firms to absorb such technologies (DACTS, 2000-2001).

The White Paper on Science and Technology

As discussed earlier in this chapter, the White Paper on Science and Technology presents a salient feature, which is its most important aspect. It deals with the concept of “National System of Innovation (NSI)”, which is concerned with ensuring a sufficient supply of new knowledge and new technologies, as well as supporting and promoting the attainment of national objectives. (DACTS, 1996). The concept of a national system of innovation is an important basis for policy formulation. The use of this concept as a framework for policy was influenced by the 1994 Report of the Auditor General of Canada, which highlights South Africa’s courage which she would like to see spread through the science and technology policy. (DACTS, 1996). The government introduced a new view of the role and status of the sciences, engineering and technology in the context of socio-economic development. Many countries have accepted that technological change is the primary source of economic growth, which means that economic and science and technology policies have to recognise that innovation and technology diffusion are central concerns as they are the agents driving that technological change.

The national system of innovation is described as a set of functioning institutions, organisations and policies that interact constructively in the pursuit of a common set of social and economic goals and objectives.

There are three key interests that the government described in the White Paper:

- to ensure that South Africa has in place a set of institutions, organisations and policies which give effect to the various functions of a national system of innovation;
- to ensure that there is a constructive set of interactions among those institutions, organisations and policies; and
- to ensure that there is a set of goals and objectives which are consonant with an articulated vision of the future which is being sought.

The White Paper is the result of five basic requirements that are in line with a vision for innovation in South Africa intended to achieve excellence in serving the national objectives. These basic requirements are priority areas that a sound science and technology policy needed to cover:

- Promoting competitiveness and creating employment.
- Enhancing the quality of life.
- Developing human resources.
- Working towards environmental sustainability.
- Promoting an information society.

There are also crucially important dimensions of science and technology that inform South Africa's strategies:

- The importance of knowledge generation.
- The role of the human sciences in innovation.
- Finance, management and performance.
- Promoting competitiveness and creation of employment.

Promoting competitiveness and creating employment

These are the most important requirements that recognise that, in the face of the

growing globalisation of the world economy, technological innovation and support for South African enterprises need to be encouraged; that business is the driving force behind the economy, and that government must provide the leadership, incentives and support that the business sector needs to meet the new challenges posed by highly competitive markets. This will involve developing a shared vision of South African innovation, and its support structure for creating and sustaining micro-enterprises and small businesses will require a strong technology component. Public investment in R&D needs to be redistributed away from the support of activities within the government's own facilities and towards more comprehensive support of R&D executed in the private sector.

This long-term need must be seen in the light of the government's current responsibilities, namely to take a lead in pre-competitive research, until a culture develops in the private sector where such research is seen as a business imperative where entry barriers relating to equipment and human resources are high in areas where the activity is considered to be a service which the government has a duty to provide, and in areas of public good in which, to achieve the greatest benefit, the research results and technology transfer need to be placed in the public sector.

A prime objective of the NSI is to enhance the rate and quality of technology transfer and diffusion from the science, engineering and technology (SET) sector by the provision of quality human resources, effective hard technology transfer mechanisms and the creation of more effective and efficient users of technology in the business and governmental sectors.

The development of entrepreneurship needs to be fostered throughout South African society, particularly among those historically excluded from the formal economic sector, and this entrepreneurship needs to be linked to the promotion of innovation. Government, via the Growth and Development Strategy and the Macroeconomic Strategy, is seeking to achieve an annual economic growth rate of 6%. In a country which is currently under-investing in science and technology and innovation, this target will require a greater than 6% per annum growth rate in the national investment in these activities. In particular, those sectors destined for export growth will not achieve their targets if this investment does not occur (DACTS, 2000-2001).

Enhancing quality of life

The means must be established to ensure that the governmental research portfolio gives due attention to those areas of R&D with the capacity to affect quality of life, and specifically in domains where market failure is high, such as environmental sustainability, provision of health care, meeting basic needs at community level, reducing the total cost of infrastructure provision and providing safety and security to all who live and work in South Africa.

It is imperative for the government to ensure that an appropriate portion of the money it spends on science is utilised in these areas. Urban and rural communities need to be assisted and encouraged to adopt social and technological innovations to assist them in decision-making and to enhance their ability to make informed choices.

Developing human resources

In line with a dynamic vision for innovation-assisted economic growth, greater equalisation of income and economic opportunities need to be facilitated and the legacy of apartheid-based disempowerment of individuals and institutions needs to be addressed within a national system of innovation.

The lifelong processes of scientific and technical education, training and learning among the workforce and among South Africans in general need to be promoted as an essential response to the forces created by the dynamic changes of the global economy. This is a necessary response to enable those made redundant in one circumstance by these changes to continue making an active and creative contribution to the economy, their own wellbeing and that of society.

New approaches to education and training need to be developed that will equip researchers to work more effectively in an innovative society. This will require new curricula and training programmes that are comprehensive, holistic and flexible, rather than narrowly discipline-based. Education and training in an innovative society should not trap people within constraining specialities, but enable them to participate and adopt a problem-solving approach to social and economic issues within and across discipline boundaries.

Working towards environmental sustainability

South Africa's economic growth must be reconciled with considerations of environmental impact, resource constraints and conservation, and must further be determined by human needs and safety. Sound regulatory mechanisms are necessary to ensure that the positive aspects of technology introduction, transfer and diffusion are maximised and the negative aspects minimised.

Environmental research, monitoring and control require ongoing support and encouragement, as do the development and improved availability of environmental technologies. Economic and environmental efficiencies are interrelated, thus innovative practice needs to include environmental management. It is important that South African enterprises are able to adopt and implement best-practice technologies for environmental management and waste minimisation.

A national strategy is required to implement the terms of agreement on environmental sustainability adopted at the United Nations Conference on Environment and Development in Rio de Janeiro in 1994 (Agenda 21), and specifically to develop an understanding of the problems of climatic change, desertification and loss of biodiversity.

Promoting an information society

Development of the South African vision of the information society is necessary and should seek to ensure that the advantages offered by the information revolution reach down to every level of society and achieve as best a balance between individuals and social groups, communities and societies as is practically possible. The vision would seek to ensure that there is the creation of an equitable information order nationally, regionally and internationally. It should take into account the potential of communities at various levels to cooperate, to bridge differences, to work for mutual upliftment and meeting basic needs, and to redress the social imbalances of underdevelopment. The development of such a perspective would aim to ensure that the information revolution benefits society as a whole.

The potential of information technology (IT) needs to be captured to serve people issues such as supporting education, providing household services and enabling social

development. As a developing country, South Africa needs to determine what should be done to prevent it from being marginalised by the accelerating rate of innovation in information technology. How can she participate globally without merely throwing open her markets to foreign products, thus increasing her dependency on the developed world? How can she empower herself with a capacity for technology innovation?

The importance of knowledge generation

The wellbeing of scientific activity in South Africa is intimately linked to material factors. There is a clear trend worldwide for curiosity-driven research to increase as a function of national per capita income. There is also a danger of adopting too economic a viewpoint. Currently though, there is a need to recognise the importance of the knowledge-generating function of research, particularly in the higher education sector. Human curiosity and the ability to recognise unexpected discovery account for much of scientific progress. Basic enquiry, as opposed to a formula-driven approach, is absolutely essential, particularly at the universities and technikons. It is important that fundamental research activity not to be regarded as impractical, because it is the preserver of standards without which, in the long term, the applied sciences will also die. Scientific endeavour is not purely utilitarian in its objectives and has important associated cultural and social values.

The role of the human sciences in innovation

The importance of the human sciences in South African society needs to be documented. The four important roles in the context of innovation that need to be highlighted are human resources in understanding the social processes and problems as a source of social innovation, in facilitating appropriate technological change within society and within the economy, in providing the basis of policy analysis, and as a source of new knowledge and informed critique of the transformation of South African society and its economy.

Finance, management and performance

The limitations imposed on research, technology development and technology transfer by the fiscal problems of the day need to be addressed. This will require a co-ordinated approach, which recognises in general the less wasteful nature of a simpler fiscal policy, while appreciating the absolute necessity of encouraging innovation in the private sector.

There is also a need to identify a framework to promote linkages between universities, science, engineering and technology institutions (SETIs) and the private sector, with a view to sharing risks, resources and insights with respect to pre-competitive research. There is also a need to meet the internal challenges of governing a healthy science and technology system. This includes managing the problems of big science, fundamental research and service-oriented science and their relationship with technology development, infrastructure, the provision of basic needs and human resource development. It also includes the comprehensive measurement of the inputs and outputs of science and technology research and development, and its impact on the goals of national policy objectives, both in science and technology and in other fields.

International cooperation, interaction and institutional arrangements

Since 1993 South Africa has on a regular basis entered into bilateral agreements with foreign countries in the fields of science and technology, as well as agreements that include cooperation in science and technology. A policy framework to guide South Africa's participation and cooperation was to formalise and promote bilateral co-operation so as to derive maximum benefit from such interaction. The policy framework proceeds from the basic view that science and technology cooperation is crucial in the age of globalisation and that its impact on South Africa's democracy would be positive for the development of science and technology human resources, socio-economic development and the optimisation of financial and other resources for research and development.

By the end of 1993 bilateral scientific and technological agreements had been concluded with most countries in the world. Science and technology cooperation with these countries are being pursued in a wide range of fields that include material science, manufacturing technology, biotechnology, information technology and

systems, sustainable management of the environment, exploitation of natural resources and minerals, medical research, and public health, engineering science and advancement of technologies, water supply projects, agriculture, mathematics and science education, amongst others.

International cooperation, in science and technology, is enhanced by the funding of lead programmes that reflect national priorities. South Africa identified five priority fields:

Biotechnology – food production, agriculture, health;

Development of new materials and manufacturing;

Information technology and systems and the information society;

The sustainable management of environmental issues and of natural resources; and

Mapping and exploitation of natural resources and minerals.

The first, multilateral, meeting of the European Commission-South African Joint Science and Technology Cooperation Committee was held in Brussels on 3 June 1998. Co-operative ventures were highlighted and included the participation of South African scientists in projects under the Fifth Framework Programme, and the involvement of European researchers in South African science and technology programmes. Multilateral and multinational cooperation was promoted as well, inter alia with UNESCO in the areas pertaining to regional policy development and co-operation in science and technology within the context of the Southern African Development Community (SADC). Science and technology cooperation was also under discussion at the Summit of the Non-Aligned Movement (NAM) held in Durban from 29 to 3 September 1998. South Africa has been afforded observer status in the Committee for Scientific and Technological Policy of the Organisation for Economic Cooperation and Development (OECD). Observer status gives South Africa access to a considerable pool of expertise in S&T policy development, implementation and evaluation.

Institutional arrangements: In support of the NSI the following institutional initiatives were undertaken by government: the National Advisory Council on Innovation Act no 55 of 1997 (NACI Act), in terms of which the Council would advise the Minister on issues of science and technology policy. The members of the Council comprise

individuals from industry, academia and science councils. The human resources capacity has clearly been identified as one of the key constraints in South Africa's goal of establishing a truly democratic country based on equity and human rights (DACTS, 2001-2002).

The National Research Foundation (NRF) was established, which will promote research through funding, human resource development and the provision of the necessary research facilities in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including indigenous knowledge, and thereby to contribute to the improvement of the quality of life of all the people of South Africa. It was created by bringing together institutions and programmes that dealt with scientific human resource development along interdisciplinary structures. It is believed that the most important innovations occur at the confluence of and interface between disciplines.

With regard to the funding of the science councils, over the past years the government has been able to redirect and redistribute approximately 49% of the Parliamentary research grant funding to science councils, approximately 10% of which has been re-directed to the broader science and technology community. The framework within which science councils secure funding, both from the state and private sources, is set out in terms of a three-stream funding approach in the White Paper on Science and Technology, September 1996. This approach was later incorporated into the Financing and Reporting System (FRS) for science councils and was adopted by Cabinet in April 1998. In addition, the Ministers Committee on Science and Technology, chaired by the Deputy President, accepted the phasing in of the proposed approach of the White Paper. In terms of this, councils receive support for core responsibilities and have to compete for support of programmes that could be undertaken by other research bodies with the same competency. (White Paper 1996.)

In terms of the funding framework, the science councils can access parliamentary grant funding for their mandated core activities. The framework requires that the core activities for funding be identified and subjected to a medium term, cyclical review by the peer-research and technology development and user/stakeholder communities, while at the same time the institution is subjected to a management efficiency

assessment.

Competitive funding

The White Paper on Science and Technology states: "A national system of innovation benefits from knowledge practitioners being located in multiple knowledge generating sites and institutions such as higher education institutions, government and civil society research organisations, private sector think tanks and laboratories." (White Paper 1996.) A major initiative introduced through the White Paper is the establishment of the Innovation Fund. It promotes large-scale projects, involving participation from throughout the National System of Innovation, and focuses attention on the major themes of competitiveness, quality of life and environmental sustainability.

The third stream of funding from the public takes the form of "contract income". Government departments from time to time put out to tender projects that are essential for the fulfilment of their organisational objectives but for which they do not require long-term capacity. The nature of the contracts is typically short term with a highly specific performance contract, and the performance capability is not confined to the science council community. Science councils therefore have to compete for this source of funding and are expected to adopt a "full-cost-recovery" approach when tendering.

The White Paper emphasises the need for policy instruments to give effect to the concept of innovation. The Innovation Fund offers a new lead in encouraging and enabling longer-term solutions to problems that are serious enough to impede socio-economic development or that affect our ability to compete in products and services.

The principle objectives of the Innovation Fund are to permit a reallocation of resources from the historical patterns of government science towards the key issues of competitiveness, quality of life, environmental sustainability and the harnessing of information technology, to increase the extent to which funds for the activities of government science, engineering and technology institutions are obtained via competitiveness processes, and to promote increased networking and cross-sectoral

collaboration within South Africa's national system of innovation.

An annual call is made for proposals to be submitted for support from the Fund. The proposals must involve projects that generate products/processes for commercialisation or new methodologies for development programmes orientated towards service delivery (DACTS, 2000-2001).

The Innovation Fund was first piloted in the area of Crime Prevention in 1997/98 after it was officially launched with a limited amount of R30-million in 1998/99 in support of the three focal areas of crime prevention, promotion of an information society and value-adding for products and processes. An amount of R10-million was used for the pilot programme. The end results of some of those projects were very useful. For example, in KwaZulu-Natal the police utilised entomology techniques to provide an accurate time of death of a badly decomposing corpse that was found in a sugar-cane field. The accurate time of the crime was vital to the police in solving the case.

In the second term the Innovation Fund has been increased to an amount of R75-million. The thrust areas for round two are the promotion of an information society, biotechnology; and advanced technology for materials and manufacturing(DACTS, 2000-2001).

The South African technology approach also ensured that, in addition to making funding resources available, the government also makes provision for institutional support, which will enhance democracy. Such enhancement should be through the involvement of these institutions that have been created by government, which are also intended to enhance South Africa's democratic aspirations.

Enhancing democracy through technological involvement

Technology diffusion programme: The South African Government expressed a strong commitment towards strengthening the capacity and capability of the small, medium and micro enterprises (SMME) sector to contribute to higher economic growth rates. Access to technology and an innovative mindset are crucial for small and medium

enterprises to become more competitive and to shape out niche areas. One of the concerns expressed in the White Paper was the poor capacity of small, medium and micro enterprises in technology assimilation. Efforts to promote a culture of research and development through other programmes such as the Innovation Fund will be bolstered if the market has the technically absorptive capacity for application of research results.

Technology stations programme (TSP): The government has established a TSP involving a shared-use cooperative arrangement with technikons, in terms of which the technikon's facilities are used for the diffusion of technology through demonstration and other stimulation techniques. For management of the programme, a Technology Advisor works with the technikon, with shared-use aspects as regards the equipment and arrangements for students to acquire hands-on experience in the selected SMME sector. The following technikons were selected in SMME sector specific areas: The Technikon Free State for metal works/value-adding; Mangosuthu/North West for chemicals, and Technikon Pretoria for electronics.

The German experience in technology transfer programmes was drawn on to refine the TSP concept and operational framework. It is anticipated that the German Economic Co-operative Development Programme will be making technical assistance available during the life of the pilot TSPs.

Innovation centre, technology demonstration centre & technology incubator: As part of its wider strategy of technology diffusion, government has secured support from the European Union (EU) for testing the feasibility, sustainability and replicability of SMME-targeted technology transfer models such as Innovation Centres, Technology Demonstration Centres and Incubators. The Innovation Centre will be established with the focus on optimising and commercialising newly developed technologies.

The Technology Demonstration Centre will be established in a particular manufacturing area. It will accommodate the dual purpose of training students in the practical applications of courses for which they are registered and providing SMMEs with levied access to equipment in cases where they intend moving into new markets and need to do market testing first.

The Technology Incubator will provide a protected environment for an industry-focused cluster of new technology-based start-up entrepreneurs and enterprises. Tenant enterprises will be nurtured for a definite period by way of easier access to technical assistance and training and support services such as assistance with market development. In addition, communal facilities will mean lower overheads, which in turn will improve cash flow in these enterprises.

CAD/CAM/CAE facility: An initiative in this area involves providing seeding support to a pilot computer-aided design/computer-aided manufacturing/computer-aided engineering (CAD/CAM/CAE) facility established by the “Make-it South Africa” initiative. This will enable the development of technical expertise, infrastructure and capacity for rapid prototyping. As a follow-up of the workshop, a market survey was conducted amongst a number of companies within the South African automotive industry in response to a question as to what the companies perceived in 1997. Companies in the automotive industry identified the CAD/CAM as their most urgent technology requirement.

The CAD/CAM/CAE facility will provide a range of services, aimed at addressing the needs of the South African manufacturing and design industry. In particular, through the establishment of a number of regional resource centres, the initiative will focus on assisting the industry to develop world-class computerised product design, engineering and manufacturing expertise. A “hub” operation is located at the CSIR Manufacturing Excellence Centre. Regional outreach centres are located at: Technikon Witwatersrand; Eastern Cape Technikon or Port Elizabeth Technikon; and Mangosuthu Technikon.

Establishment of a satellite laser ranging (SLR) system: The National Aeronautics and Space Administration (NASA) in the United States offered to provide an SLR system to South Africa, including initial training support and ongoing maintenance. South Africa will have to provide and fund the personnel to operate the SLR station (approximately R1-million per annum). It was decided to accept the offer of NASA and the SLR system will be established at the Hartebeesthoek Radio Astronomical Observatory National. An SLR is used, inter alia, for mapping changes in global ocean levels. Such data are vital in following the potential effects of global climatic

change and for long-term weather predictions (e.g. with regard to El Niño events).

Southern African large telescope (SALT): To fully exploit our advantage of being in the Southern hemisphere, the building of a new large telescope was commenced at Sutherland. Owing to substantial developments in the field of astronomy, South Africa's capacity, previously on the forefront, is lagging behind. The government committed R50-million over 5 years to the establishment of a 10-m class Hobby-Eberly telescope. A further R50-million will be raised internationally. Both South Africans and international researchers from the Northern Hemisphere will utilise the facility.

Pro-active approach to international S&T cooperation: With a view to effectively targeting specific countries or regions for possible S&T cooperation, a survey was initiated in 1998 to establish the potential for such cooperation. An understanding of the S&T strengths and weaknesses of these countries or regions will be of assistance in making strategic decisions on new areas of cooperation or redirecting areas of cooperation.

Automotive manufacturing initiative: In 1997 a workshop on the automotive engineering sector was held with South Africa and international partners, industry, institutions from research, technology transfer and automotive manufacturing companies from Germany.

Public understanding of science, engineering and technology (PUSET): The public understanding of science, engineering and technology (PUSET) is identified in the White Paper on Science and Technology as a fundamental requirement and a key thrust for establishing a successful National System of Innovation in South Africa. To kick-start the programme for public understanding of science, engineering and technology, the government declared 1998 the Year of Science and Technology. This involved running a major national awareness campaign involving all stakeholders in order to generate the nation's interest in science, engineering and technology.

The Year of Science and Technology: This project was an initiative of the Parliamentary Portfolio Committee on Science and Technology, Language, Arts and

Culture. The year was launched on 5 February 1998 and on this day the then Deputy President, Mr Thabo Mbeki, accepted patronage of the project. A focus week of activities in a particular month was dedicated to each of the nine provinces, during which close to 200 000 learners, teachers, families and individuals were reached. These activities were kick-started in the Western Cape and concluded in Gauteng. Various stakeholders, science councils, the Science Councils Communication Forum and embassies formed partnerships and assisted the Department of Science and Technology to realise the Vision of the Year, which was to create a special period during which much of the attention of the nation and the media focused on science and technology.

The Department of Arts, Culture, Science and Technology, in addition to provincial activities funded four major initiatives to celebrate the Year of Science and Technology. These ranged from television and radio programmes to the conference on Women in Science and Technology, the second national conference on Puset and the science journalism awards. Details of the above initiatives were captured in TV and radio programmes. A major publicity and promotional campaign was also undertaken through radio programmes on science and technology in partnership with the SABC. The main focus was on community radio stations, while others were also taken on board. The aim of these programmes was to reach the wider community, especially women, rural communities and people previously excluded from science, engineering and technology activities.

South Africa's involvement in technology saw her taking initiatives towards the Conference on Women in Science and Technology in September 1998. The purpose of the conference was to create an enabling environment for women in the science and technology fields, to contribute to the promotion and improvement in terms of access, communication, knowledge transfer, training and quality of life, and to raise awareness and public understanding of gender issues with regard to science, engineering and technology. Commissions on Agriculture, Business, Education, Energy, and Health also focused on issues of access, training, knowledge transfer and quality of life. The outcomes of the conference informed the Department to develop a policy framework on gender issues in science, engineering and technology programmes and opportunities that raise awareness and promote the role of women,

and to develop a framework and guidelines for implementation. The main recommendations arising from the Conference focused on policy, strategy and programme development.

The South African Science Journalism Awards 1998 were another area of involvement. These awards are in recognition of the pivotal role of the mass media in promoting public awareness, understanding and appreciation of science, engineering and technology, and are presented to those journalists who have made outstanding contributions to this field. Awards in seven categories were presented to journalists on 12 March 1999 for excellence in science, engineering and technology reporting during 1998. This initiative is in keeping with the vision of the Year of Science and Technology to engage the media in science and technology activities.

The *Foundation for Education, Science and Technology (FEST)* is an organisation created to render a vital service to scientific societies by publishing research results in sixteen widely distributed journals. It contributes in many ways to the goals of Puset. It does so by popularising science and technology, especially in disadvantaged communities, and providing enriching educational material in support of science education. FEST initiated a process of establishing a comprehensive national science centre at the existing Museum of Science and Technology, where enhancing courses are offered for science teachers in the classroom and laboratory practice.

Conclusion

It is evident that the South African technology approach departs from the premise that knowledge and development of capacity in science, engineering and technology are central to promoting social, environmental and economic well-being in a democratic political system. The vision, the role and contribution of science and technology in achieving South Africa's national democratic objectives remain priorities. (DACTS, 1996.) An analysis of the White Paper has highlighted sensible standards for government and society to consider when investing in technology to meet basic needs, develop human resources, build the economy and democratise the state and society. The broad technology policy approach as outlined, presents a clearly defined vision

for a democratic South Africa. Given the imperatives of the White Paper and in order to achieve any objective in the approach, it is imperative that South Africa should ensure that democratic values are prevalent and that citizens have access to technology with a view to the provision, availability and accessibility of basic services such as health, education, water, housing, etc. Through technology the availability and accessibility of these basic services will give South Africa a basic ground to consolidate its democracy.

CHAPTER EIGHT

CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter deliberates on the framework of technology in a democratic society. The study drew closely on relevant literature review with emphasis on and relevance to the South African democratic political system, as well as on the experience of other countries, with specific lessons to be learned.

In the final analysis, it is necessary to return to the initial research problem and research objectives as formulated. The aim of the study was to evaluate the plausibility, viability and feasibility of technology as an approach to enhance democracy. This aim underpinned three research objectives, namely (1) to review the technology policy as an approach to a democratic political system by contextualising it within the framework of other approaches to democratic politics of technology, (2) tracing the theoretical origins of the democratic itself, and (3) outlining it as a phenomenon in world politics. Secondly, it aimed to examine the claim that technology enhances democracy in a political system. Thirdly, it endeavoured to assess claims, by authors of technology and democracy texts, that there are causal relations between technology and democracy and between democracy and political stability, applying deductive logic to reach a conclusion about the correlation between technology and democracy. Fourthly, the study aimed to recommend ways in which technology should be employed to harness the political stability and direct it towards concretising democracy in South Africa. The latter objective is normative in nature inasmuch as it goes beyond an examination of what is likely to occur in the technological advancements in order to prescribe concrete steps that would enhance the probability of sustainable democracy.

The study adopted the working definition of technology as the systematic application of knowledge to resources to produce goods or services. (Stilwell, 1994).

Since the first democratic elections in 1994, South Africa has simultaneously been faced with a number of challenges and opportunities. South Africa undertook the transformation of a divided society and opened the economy to global competition. The rapidly unfolding global agenda has provided opportunities for direct foreign investment and technology transfer; it has at the same time introduced challenges coupled with open markets and trade barriers. Advanced microelectronics-based information and communication technologies (ICTs) are at the centre of current social and economic transformation in South Africa. The costs of the ICTs are continuing to fall. As their capabilities increase, they are being applied throughout all sectors of the economy and society. The increasing spread of ICT opens up new opportunities for South Africa to harness these technologies and services to serve their development goals. In addition to its current transformation, South Africa also has to face a transition from an industrial society to one that is knowledge-based.

During the industrial revolution, technological developments and industries emerged. The main elements of these technology developments included energy, chemicals, manufacturing and communications. The impact of these technologies in shaping the South African socio-economy is such that doubts have been articulated with regard to the notion of “digital divide”, that is the comparison between the “wired” and “non-wired” communities and the comparison between the poor who may not afford technology at all and the affluent communities. It is possible that an echelon of highly mobile knowledge workers who share a global work ethic and perhaps even “global” values will overlay large numbers of marginalised working class. However, technology does not stand still and many rural communities may be able to seize the opportunities that these technologies present and be able to “leapfrog” into the future.

As far as technology is concerned, any definitive claim whether it is utopian or a Luddite when it comes to democracy, can only succumb to technological determinism. Based on the evaluation of the relationship between technology and democracy, though, there is reason to believe that advances in technology provide favourable opportunities for democracy. There are two sides to this argument. Firstly, social movements and groups devoted to progressive issues and social change use technology to improve democracy. Technology does not only divide the haves

and the have-nots, but also is important to facilitate democratic transitions by creating a more open political culture. Furthermore, technology is increasingly in use to overcome the crisis in socio-economic development in South Africa, primarily as a result of a lack of infrastructure. Creating public spheres where citizens can deliberate on public issues and communicate with their political representatives and make inputs directly to parliament does this. The phenomenon of public spheres is replicated at a national level where the civil society engages in deliberation and acts to influence the outcome of national issues.

The other side of the argument is that new advances in technology can be distinguished from the media that preceded it as it is relatively cheap, easy to use, difficult to control and interactive. For example, the Internet user can be both a sender and receiver of information; the information era provides unprecedented opportunities for participatory media forms and democratic uses of IT. The threats posed by state and corporate control and use of IT are duly noted as challenges to democracy in the information era. However, there have been substantial societal movements to expose and counter this. The Internet also provides unique ways to inform and mobilise civil society, which should be of some consolation for political economists concerned about the expansion of global capitalism in the information era. Another challenge to democracy in the information era is the extent to which the digital divide in and between countries can be closed. This is one of the key concerns for striking a balance between state, market and societal control of IT, where the state and society emphasise equality of access, while the market emphasises efficient development of technology and production.

The way in which IT impacts on democracy has a direct and important bearing on the research problem of the study, inasmuch as the second postulate of the propositional logical deductive model states that the information revolution is likely to enhance democracy. Establishing the probability that IT will provide favourable opportunities for democratisation, the quality of democracy and the globalisation of democracy, is thus an essential step in inferring that the democratic peace is more likely to exist in the information era. But, the research problem also probes a normative objective, namely to propose ways in which IT should be employed to enhance world peace. In this respect the challenges for democracy in the information era as identified here, should be key concerns if the democratic peace is to be a plausible, viable and feasible approach to world peace in the information era.

Technology is ubiquitous within South Africa's democratic political system. It has both benefits and disadvantages, and this poses a difficult choice for society and government in policy approach. The social dichotomy of this nature raises the need for further inquiry as to the reasoning and application to technology as the systematic application of knowledge to resources in addressing democratic imperatives.

The review of the literature demonstrated that technology could influence a democratic political system. It is evident that technology can shape challenges in the political, social, military and economic environment of the political system. The review of the literature further made it clear that technology as a systematic application of knowledge to resources can provide a good tool for sustaining democracy in South Africa.

It addressed the important question of whether technologies are substantively democratic, and whether technology policy decisions are compatible with perpetuating a democratic political system. The review investigated and appraised democratic theories and analysed approaches and challenges of technology in democratic politics, which could be applied in South Africa. Specifically the focus examined the character and crisis in technology and considered what theoretical and practical resources were available for democratisation in South Africa.

In essence, if democracy is impacted by technology by way of a systematic application of knowledge to resources to produce goods and services, it will enhance stability and equality. Therefore, it can shape challenges in the environment of a democratic political system by maintaining stability and order. It will also deliver material prosperity, and foster democratic rule.

It is evident that the South African technology approach departs from the premise that knowledge and development of capacity in technology are central to promoting social, environmental and economic well-being in a democratic political system. The vision, the role and contribution of science and technology in achieving SA's national democratic objectives remain priorities. (DACTS, 1996). The White Paper highlighted some practical values for government and society to consider when they invest in technology to meet basic needs, develop human resources, build the economy and democratise the state and society. The broad technology policy

approach, as outlined, presents a new vision for the twenty-first century. Given the imperatives of the White Paper and in order to achieve any objective in the approach, it is imperative that South Africa should ensure that democratic values are prevalent and that citizens have access to technology with a view to the provision, availability and accessibility of basic services such as health, education, water, and housing. Through technology the availability and accessibility of these basic services will give South Africa a basic ground to consolidate its democracy, as it is a process preconditioned by stability and equality. It is a process that will improve the stability of democracy through the creation of capabilities by the systematic application of knowledge to resources in order to produce goods and services.

The arguments presented in the preceding sections suggest that a number of issues require extensive research conducted on national security and information technology. The main purpose of further study and debate would be to provide policy makers with analytical perspectives and empirical data that create a better match between technological potential and preferred futures. It is assumed that these futures should be both sustainable and democratic.

The first area could be concerned with the design of democratic and pro-active policies and programmes that make it possible to realise the socio-economic development potential of information technologies. This mainly entails studying the roles that public and private sectors should play in the design and execution of these policies and programmes; the forms of public intervention that are conducive to shaping technological change in accordance with desirable social goals, and the establishment of new and more democratic relations between producers and consumers of ICTs, so that technological progress becomes much more responsive to social needs.

A second area of concern is centred around the definition of those social and institutional changes that are required to maximise the social benefits and to minimise the social risks associated with the adoption and deployment of information technologies. This entails considering various ways of adjusting the organisational structures that are relevant for economic productivity, political participation and cultural diversity in line with preferred social scenarios; and the cultural

appropriateness of educational methods and training materials required for the realisation of the technological potential. Again, it is important to discuss the design and adoption of information technologies that strengthen sustainable national security. This involves creating information technologies that reduce the threat and vulnerabilities and encourage environmentally sustainable applications of IT.

The future of information technology and national security is compounded by uncertainty - no one knows how the technological advancement will continue to unfold. The goal for the future will be to somehow bridge the theoretical possibilities with technological capability. Research focused on the goal of ubiquitous information technology will be concerned with a number of important technological obstacles, such as how society could enjoy the benefits of information technology without nation states being too worried about its impact on national security, and society that is ready for a pervasive system that surrounds its communities and monitors their day-to-day activities as there is a worry that ubiquitous networks will present new and emerging challenges to personal privacy, which may destabilise security.

It has been suggested by some scientists like Bill Joy (2000) that the most powerful 21st century technologies could threaten to make humans an endangered species. He predicts that as technology advances, humans will increasingly delegate responsibility to intelligent machines able to make their own decisions and, referring to the writings of Theodore Kaczynski, known as the Unibomber, he wonders whether these same machines might not reduce humans to "the status of domestic animals". (Joy, 2000).

Information technology is shaping the strategic environment in which a conflict may take place, where it would be driven by mostly the political, economic, social and ethical dimensions of the information technology. The fact that IT has contributed increasingly to the interconnectedness of people and states around the world is an indication that there should be leadership in government policy that encourages and supports equity, development initiatives and sufficient funding to finance such initiatives. The major problem, especially in deep rural areas without basic electrical and telecommunications infrastructure programmes and universal service initiatives by government, is that information and communication technology companies will have little incentive to develop new products to meet the needs of people who cannot use or afford their existing services. And government policies will become useless without ground-level programmes to take advantage of them.

Finally, technology could in future greatly benefit society if its advancement is harmonious with national democratic imperatives and if it is intended to serve the needs of the people.

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