Information management and technology in public policy making and implementation in South Africa

By

J. A. MEYER

Submitted in partial fulfilment of the requirements
for the degree

Doctor Philosophiae

In the Faculty of Economic and Management Sciences
in the subject

Public Administration

at the

University of Pretoria

PROMOTER:
Prof. Dr. P.A. Brynard

CO-PROMOTER:
Prof. Dr. N.L. Roux

February 2003

This thesis is dedicated to my wife, Carin, who not only believed in me, but unfailingly supported and motivated me, throughout the difficult periods and completion of this thesis.

A special word of thanks to my promoter, Prof. Petrus Brynard and co-promoter, Prof. Nico Roux, for the support and belief put, not only in the support of this thesis, but also in the compilation and content thereof.

Heartfelt thanks to the director and staff at the School for Public Management and Administration for their support throughout my study period.

Also a sincere thanks to my friend Peter Goddard, for co-sponsoring the reproduction and binding of this thesis.

Lastly, and definitely not the least, **thanks to my Maker,** for the insight to complete, not only the thesis, but also my studies.

SUMMARY

The aim of this thesis is to ascertain what the requirements for the successful implementation of information management and technology, as an integrated solution for policy formulation and implementation in the Republic of South Africa would be. Shortcomings exist in the field of policy formulation in the area of information management. It is also stated that various requirements for the improvement thereof exist. The essence of the thesis is that an improved information management and technology solution is required for all public service departments.

The value of the study is twofold. It addresses the aspect of information management (and the aspect of the required technology) in order to sustain both the transactional and executive needs of an organisation or department in the public sector. The study highlights the aspects of factors influencing management and the decision to implement information management and technology.

In terms of the differentiation between transactional and executive information management needs, the public sector specifically lacks the resources to execute statistical inferences and obtain executive information. From the thesis the implementation of a system whereby executive decision-making as well as transactional activities are possible through the application of existing and available data and the manipulation thereof, is postulated. The study contributes to the field of the public administration in terms of its contribution of the model and the approach to management within the public sector.

The research question being considered is:

What are the requirements for the application of information for executive management purposes and policy formulation and

implementation in the public sector, through the use of information technology.

In order to consider this research question one has to consider two dimensions. The two dimensions are the driving forces that are required for the successful implementation of a management concept and the denominators that influence the postulated research question.

The postulated model furthers the solution in terms of what the considerations of a public service department or organisation should be, to successfully implement an information management and technological solution. This model, formulated to be applied generically, will enhance departments' and organisations' capability to successfully identify needs and implement an information management and technology solution for the successful management at both the transactional and executive level of the organisation or department.

This thesis sets out to prove that information management and technology implemented in the public service does not comply with the requirements of the day. It further sets out to prove that if a model for implementation is followed, this implementation and selected solution may be successful. This thesis also identified and by means of a proposed model substantiated and determined the relevance of the driving forces underlying the basic requirements for the successful implementation of a all level management solution in terms of information management and technology in the public sector.

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CHAPTER 1

INTRODUCTION AND RESEARCH DESIGN

1.1 General Introduction

The public sector has over the years amassed data for functional management purposes. However, little of this information was applied in the context of strategic management. The aspect of information management with the aid of technology in the public sector for improved governance therefore needs attention. In actual terms this refers to the issues to elevate the current paper environment of Public Administration and Management to that of an integrated environment of communication, media application with and through the use of information management and technology of a particular public sector environment. These now becoming possible through the use of information technology for the formulation of policies, which are realistic and practical for the purpose of implementation. Information management and technology in the public sector does not bring about electronic (being computerised with the free exchange of information) democracy (the physical aspect of government in which a free nation share through their elected representatives) and governance (the administration and management of government at all spheres). It merely facilitates the migration to a more participative or direct democracy managed effectively and efficiently. As a means to an end this should result in a situation whereby less time is spent on administrative issues and more time is available for management issues. These issues include the collation of data for informed decision-making as well as monitoring delegated tasks at all levels of government. The application of advanced information management will

result in more time being made available for executive management decision-making purposes.

The concept of electronic (direct) democracy and governance is not new. Applying technology for improved information management and hence improved decision-making is being experimented with in the United States of America (USA) and Western Europe. Resistance is being met. Most of the resistance centres on the aspect of reliability, security of information and voter/citizen distancing and what the actual benefit to the citizen is or what he/she is being deprived of. Furthermore the question is raised as to how public sector management may be improved through the application of information technology. An aspect also under scope is what added value is obtained from the implementation of the information technology? This, needless to say, at great cost to the taxpayer. In this instances, the development of three logistics information systems for the Armed Services in South Africa serve as an example (Director, Enterprise Information Systems Architecture, Department of Defence, 2000).

It has to be stated that electronic democracy and governance does not solely consist of technology but has as its basis the need for communicating management information effectively and efficiently. Thus the question arises to what extent does the governing authority need to empower both the citizenry and the government in terms of not only access but also education and skills required to both participate and to apply this means of democracy in the public management and administration environment.

It needs to be understood that various concepts surround the use and application of information technology as a method for participative or direct democracy. In this instance electronic democracy and governance may be seen as an end in itself in that the computerisation for the sake of improved transactional use justifies the cost thereof. The

one aspect not clear at this time is whether this route will create a greater interaction or closeness between the public office-bearer and the citizenry whereby management and administration of the public sector is improved.

1.2 Frame of reference

The policy making and implementation through the use of information management and technology in the public sector of the Republic of South Africa will be analysed with specific reference to the influence of defined driving forces and denominators (*Infra.* par. 1.3.2). Influences also to be referenced are technology, communication, information and decision-making based on the inference of available data. In addition a background will be presented with regards to the development and requirements for electronic governance through the application of applied information in the public sector management.

Apart from the references to the influencing factors and for the purpose of presenting a holistic framework of the research for this thesis, the principles underlying policy formulation and implementation as well as the principles underlying information management and technology from both the national and international perspective will be analysed. This analysis is to determine the existing *status quo* of information management and utilisation of applied information for the formulation and eventual implementation of policies.

The research conducted is in the area of selected Republic of South African public departments, to wit, the Department of Defence, the Independent Electoral Commission and the Department of Justice and Constitutional Development. The time dimension of this thesis is over the period 1994 to 2001 but in certain instances not limited to this time frame. The research encompassed literature research and interviews.

The level at which the interviews were conducted, was at the level that of director and chief director.

1.3 Problem formulation

This section comprises two aspects to wit the problem statement and the objectives of the study.

1.3.1 Problem statement

Vast sums of taxpayer money are spent on policy making. Equally, vast sums of taxpayer money are spent in ratification and promoting the need therefore. In many cases these policies are never implemented. Public policy making has generally suffered from the need of being fundamentally based on sound management information. In many cases policies at all spheres of government were designed based on a party political need rather than citizenry (voting populace) requirement for a process solution in support of the nation. This, needless to say, leads to the non-acceptance of such policies and the eventual non-implementation thereof (Dye, 1987:19).

Equally so is it found that many excellent policies are devised based on citizenry requirement in support of national needs, but not implemented. Here again, fundamentally, the underlying scientific information supporting or warning against this policy might be lacking, making the policy, although excellent in concept, impractical to implement either from a cost perspective or from an executability perspective (Dye, 1987:19-20). Point in case might be the implementation of the new national identification smart card system and the related cost against the backdrop of the recently (1998/1999) much publicised drive to new bar-coded identification and related documents.

However, applying the masses of data to which the public figures responsible for policy formulation and implementation have access could alleviate many of these problems. Housed in masses of databases managed by mainly the State Information Technology Agency (SITA), South African government departments have access to vast amounts of applicable information that could substantiate or prove the risk in many policy decisions. At this time an integrated approach to transactional information (information required to execute the functional tasks), content information (information contained in documents, policies and procedures) and knowledge information (information reflecting on internal scripts, records and processes as developed by the specific department) is absent. When implemented, is integrative approach will lead to an improved executive management capability (*Infra*. Chapter 3, par 3.15).

However, to support the public services information management requirement, there is a requirement for technology and interconnectivity. Shortcomings exist in the field of infrastructure and communication networks. This data, applied correctly, could also assist in the implementation of the correctly formulated policies in that public and private acceptance through buy-in for the policy will be made easy. In South Africa this concept of electronic democracy and governance is still new and needs to be exploited to a greater extent (*Infra*. Chapter 3, par 3.15).

As an instrument for policy making and implementation data (unprocessed facts from which conclusions and information might be drawn) in its unprocessed form, may form a framework for the proposed policy. However, information (processed data obtained from the performing of an operation and from which informed decisions may be taken) should lead the decision-makers in making more informed decisions regarding the proposed policy. This could include the aspects

of both executability and cost (KableNET, Dec 10, 1999 and Sept 10, 2001).

It is interesting to note that much is written about the aspect of management or managing with the application of information technology in an electronic democracy and governance. In literary terms however this does not represent a well-researched topic. Internationally many Local Governments have to this day experimented with the use of electronic democracy and governance and the application of information technology but are primarily involved with this application in their line function or day-to-day operations. At a national level the United States of America, through the endeavours of Ross Perot, and the concept of Electronic Town Halls, is probably the most active in the field of electronic democracy. Perot actively applied the information from databases to enhance his political career (albeit that his endeavours were unsuccessful). In the United Kingdom major in-roads are being achieved with the successful implementation of technology for information management at all spheres of government (KableNET, Dec 7, 2001; Dec 21, 2001 and Jan 11, 2002).

The point of departure for the information age is capabilities to not only transmit data but also to receive and make this data accessible to all users. This in turn implies converting this data into management information. This standard should apply to all three spheres of government. Taylor *et al*. (1999:61) refers to teledemocracy. This according to him is the combined application of telecommunication and computers. In the application of electronic democracy and governance and the availability of information vis-à-vis the citizenry, these two aspects are interdependent.

1.3.2 Research Questions

Research questions that derived from the problem statement are the following:

a. What are the requirements for the application of information for executive management purposes and policy formulation and implementation in the public sector, through the use of information technology?

b. On what information basis is policy formulation and implementation done?

c. Is information and technology utilised to make informed decisions and determine policy making in the public sector?

d. Are the vast information databases of the public sector utilised in the decision-making process, specifically when executive decisions need to be taken?

e. Is the implementation of applied information management and technology for the establishment of electronic government and governance contributing to value (value adding) of the existing system. Also, is this information utilised to formulate policies. That is, to support the line function/operations or executive in the most cost effective manner?

f. Does the public service apply the existing and futuristic information capabilities to the fullest extent in order to comply with the new democratic and transparent society?

g. Does the public service continue with the existing transformation and reform policy in order to enjoy global support for all activities such as improving efficiency and improving the South African economy?

h. Does the public service train their staff to the required levels of expertise to effectively and efficiently utilise the information management data and technology for the establishment of electronic government and governance?

Derived from the problem statement, the following section will endeavour to explain the process and route to be followed for the successful implementation of a probable solution.

1.3.3 Objectives of the study

The objectives of this thesis will be to:

a. Determine and define the existing and proposing new parameters for this field of study.

b. Define acceptable elements required (e.g. policy making and implementation, electronic democracy and the reconciliation with the grass roots level, defining the elements to be integrated such as human resource management, financial management, core operations and logistics).

c. Consult with existing public information and technology users and fields of application in order to ascertain the application of available information resources in the field of information management and technology.

d. Propose an integrated solution for the delta deviation (the difference in what is and what should be).

The research intentions for this thesis can be put down to ten objectives to wit five primary drivers and five secondary forces. Also to be added to this list are the five denominators (transversal elements). These are those elements, which are underlying to the primary drivers and the secondary forces. The question might arise as to why there are drivers

and forces and not only driving forces. In the context of this research it is to differentiate between that which is departmentally manageable, which could have statistical outcomes and inferences done (drivers as part of driving forces) and that what is part of the organisation (forces as part of driving forces). Individually either can be addressed but together they present the departmental whole.

From the research for this thesis the objectives will be considered in their three main divisions to wit primary drivers, secondary forces and denominators. The drivers, forces and denominators will be explained and validated in chapter 5 (*Infra*). The five primary objectives, also the drivers, are:

a. To ascertain the relevance of having availability of both the information and the technology for policy formulation and implementation and to determine whether there is any actual improvement in availability and application of executive management information after implementation.

b. To ascertain the influence cost reduction and cost avoidance have on the implementation of information management and technology for the establishment of electronic government and governance.

c. To ascertain whether effectiveness and efficiency of a department or an organisation within a department, have any influence on the concept of applied information management and technology.

d. To determine to what degree all participants in the applied information management and technology environment, for the formulation and implementation of policy recognise performance measures and measurements both prior to and after implementing information management and technology solutions.

e. To determine to what extent management should be involved in the decision to implement information management and technology for policy formulation and implementation and to what degree the management is effected by the decision.

The secondary objectives, also the forces, can be stated as:

a. To ascertain whether the human resources element plays any significant role in the decision to apply information management and technology.

b. To determine to what degree culture should be investigated or taken cognisance of when the decision to apply information management and technology has been taken.

b. To determine to what degree the application of applied information management and technology necessitates a new training curriculum at all levels and, what is the effect on the knowledge base of the existing public servants.

c. To ascertain what degree of control at all levels are gained or lost when implementing applied information management and technology for the establishment.

d. To determine to what degree, if any, the organisations should adapt after the implementation of applied information management and technology.

The denominators (or transversal elements) are represented by the following five objectives to be achieved:

a. To determine the type of and depth in research to the application of applied information management and technology prior to implementation and whether this was enough to facilitate the implementation thereof in a complex service oriented environment.

b. To determine whether it is actually an economically viable solution for public enterprise to contract in on the implementation of applied information management and technology.

c. To determine what the maturity levels were prior to the application of information management and technology being implemented and whether a growth in maturity had occurred.

d. To determine to what extent the current information technology can accommodate a concept so reliant on accurate data and real time information to management in order to make the implementation thereof a success.

e. To determine to what extent the application of information management and technology was communicated horizontally and vertically in the public service as this is considered a necessity for successful acceptance and utilisation and what policies, if any, support the communication initiate.

1.4 Hypothesis

The hypothesis that may be derived from the problem statement could be formulated as:

The public service of South Africa require the implementation of definitive driving forces in order to improve its management capability through information management and technology, imbedded in an integrated management and information management approach, utilising the operational and development capabilities of the existing and planned management information and technology environment.

The hypothesis implies the integration of the information required for the execution of the core function of a department within the public service of South Africa, with the supporting elements of the operational environment of the department, which are logistics, human resources, finances, technology systems and documentation. The integration also implies the incorporation of the development elements, which are design and system expertise, reliability, availability and maintainability of information, the configuration management of the said information, the functional design specification and the management of the data requirements of the said information.

Imbedded in this hypothesis is the relationship between the various dependant variables that are simultaneously unique yet interdependent. They are:

a. Telecommunication and Information Management

b. Freedom of Information

c. Applied Information Technology

d. Economics and Affordability

The relationship between information technology and telecommunication and information management is obvious. Applied information technology cannot exist without the use of telecommunications and the *ipso facto* result of this combination is the management information. Furthermore a synthesis exists between the freedom of information for information management and the integrative application of the information technology and communication requirement. Lastly, the congruency of the economics and affordability as an influence on the variables is present at all times during the process of policy making and implementation. Economics and affordability in this instance refers to budgetary considerations, which in

turn, reflects the cost of information as determined by cost benefit analysis.

The need for specific criteria, for example the functional running of the specific departmental structure or the need for data interpretation must be explored and decided upon. This is to determine the required management and administration information and the availability thereof. Furthermore consideration has to be given to the usage of free data such as is available from the Internet or service providers (Schalken & Tops, 1999:144-145). Throughout, the link with the communication arena will be described. Aspects such as the World Wide Web (WWW) established as a management and administrative tool but now utilised as an integrated database to provide information on the Internet has grown in popularity (Stair & Reynolds, 1998:19). Against this backdrop the current concept of performance management and the proposed methodology to follow will be considered. The whole drive towards e-commerce will also be considered as it impacts on all spheres of government.

1.5 Constraints

A constraint of this research is the lack of literature on the specific topic of applied information management and technology for the establishment of electronic government and governance in the public service. Various countries such as The Netherlands, the United Kingdom and the United States of America are experimenting with the concept of electronic government and governance but for the purpose of voter participation, political communication or party political gains (Silverman 1999, December 10; 2000, October 5 and 2000, September 10 [WWW documents]). In order to circumvent the constraint, the research was expanded to countries, which to some degree facilitated

the concept of applied information management and technology in policy formulation and implementation.

A further constraint of this study is the new Republic of South Africa democracy design as it is being developed around the current budgetary and democratic scenario. These scenarios set results in political strategies that could at any time be modified and thus change the research parameters. In order to circumvent this constraint the research was limited to the research period.

An assumption of this study is that in the public service in the existing democracy will still rely on a single point responsibility concept, as the Accounting Officer/official must report to the Public Accounts Committee regarding all expenses. Should any governmental policies change regarding this accountability policy, the research focus must be revisited.

1.6 Research design

The research of this thesis is centred on an empirical and qualitative design. The data required for this research was obtained by firstly doing a literature search. The first activity herein was to apply the Internet and available Uniform Resource Locators (URL's) especially those linked to libraries and research institutions in order to ascertain the current *status quo*. Secondly the normal research as per available documents and other forms of literature was consulted.

Interviews or discussions with selected senior public officials augmented the literature study. The thesis is formulated around an empirical literature and environmental research. Strongly supporting this methodology is qualitative interview or discussion based study in support of the findings. The literature and environmental method was chosen as it facilitates a contextual approach as is followed by this

thesis. The qualitative method gives a synopsis of the overall domain phenomenon using cases and in this instance specifically, personal interviews, which collectively supply an internal validity to the thesis. The thesis, as per the frame of reference, by no means professes to have a general validity, as the study is limited to the South African environment and furthermore to departments within the national Government, as indicated in the frame of reference.

The research unit is a small sample of public service managers at senior and middle management within the public service related to the information technology support environment. They were selected due to their involvement with existing information and data management and due to the situation that gave rise to this research report. This resulted in a more informal approach based on personal interviews. Certain individuals in the support and mostly parastatal sector that had the public service as its customer were also interviewed in order to give the research report an unbiased base. This approach does impose certain limitations as the personnel interviewed were from a limited source. The interviewees are however all capable of delivering suitable contributions regarding the problem statement of non-application of information management for the establishment of electronic government and governance in the public service.

1.6.1 Research population and sample

The sample size for this research is limited to selected senior governmental officials involved in the application of information technology as an executive management tool in various government agencies.

1.6.2 Target population and sample size

This thesis is literature bound with supportive data supplied by the interviews within the governmental departments. The exact sample size

is therefore a variable. The target population with regard to the governmental departments is limited to the Independent Electoral Commission (IEC), the Department of Defence (South African National Defence Force -SANDF) and the Department of Justice and Constitutional Development (DoJ), as these departments are known to make extensive use of technology-based management information at some levels.

1.6.3 Study area demarcated

As the background research indicates, no topic addresses the issue of information management and technology in public policy making and implementation in South Africa (Silverman 1999, December 10; 2000, October 5 and 2000, September 10 [WWW documents]). The State Information Technology Agency (SITA), in virtually all instances, control the public sectors information and functional databases. Yet no central information data is available and no or little management information other than predetermined reports may be obtained. Even in this situation reports are time consuming to prepare and, in terms of managerial requirements, late.

Furthermore, various government departments all initiate their own requirements with regard to systems. There is also no existing architectural design for systems or proposed systems other than in the Independent Electoral Commission, the Department of Defence environment and those planned for the Department of Justice (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000; Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), Independent Electoral Commission, 1999 and Project Manager Digital Nervous System, Department of Justice and Constitutional Development, 2001).

The study area is thus limited to the public service and related supportive institutes such as the State Information and Technology Agency (SITA) including the Department of Defence (South African National Defence Force). Benchmarking will be done against private industry locally and against international public services.

1.7 Research questionnaire

The research instrument, a semi-structured questionnaire, was developed for this purpose (see Appendix A). This approach was selected due to the fact that the problem statement is best suited for open-ended questions from which the research model could be proven or disapproved. This approach was also selected due to the fact that its operational specificity is based mainly on sensitised concepts and secondly on the intuitive experience to label the phenomena.

The questionnaire is loosely constructed in various parts in order to ascertain the interviewee's relative stance towards the implementation of applied information management and technology for the establishment of electronic government and governance and whether policy is in place to support this drive. The relativity is emphasised, as the questions are open-ended and could result in virtually any answer being given. In all cases it was stressed beforehand that an open mind had to be kept and any aspect, however remote, could be discussed. The categories addressed in the questionnaire were selected as they logically structure the questionnaire and contain all the driving forces and denominators as suggested previously. These categories are as follows:

a. Background;

b. Applied information management and technology;

c. Departmental culture and structure;

d. Transversal support structures; and

e. Conclusion.

These categories also guided the interviewee through the process to truthfully give his/her opinion on the aspects such as the absence of the driving forces during implementation of applied information management and technology for the establishment of electronic government and governance. Obviously these shortcomings, when addressed, should result in the successful implementation of applied information management and technology for the establishment of electronic government and governance and policy to support this. The discussion around the questions then leads to confirmation or rejection of the statement. The questions also had to prove the depth of the respondent's understanding of the problems in implementing applied information management and technology for the establishment of electronic government and governance successfully.

Considering each of the questionnaire sections the background has as its purpose to determine the interviewee's background regarding applied information management and technology for the establishment of electronic government and governance. These questions deal, with amongst others, the interviewee's perception of the concept as well as this person's feeling regarding the effectiveness and efficiency elements required to optimise executive management. Also required is information on the understanding of the cyclic or selected availability. A third aspect ascertains the general stance of the interviewee with regard to the impact of integrative executive management. Given that the application of information executive management and technology for the establishment of electronic government and governance is implemented with cognisance being taken of the driving forces required for such an action and will be covered by the denominator research.

The second section deals with applied information management and technology for the establishment of executive management information for electronic government and governance. The line of questioning had as its aim to validate the respondent's opinion towards the literature's theoretical stance that applying information technology as an executive management tool results in improved effectiveness and efficiency (driver). This section also had to determine whether the respondent is of the opinion that the required executive management information is available and whether it is applied or not. This section also had to validate the understanding of possible cost reduction and avoidance should such application occur. It furthermore had to solicit responses in terms of improvement regarding the improvement of effectiveness and efficiency. The aim was, ultimately, to determine the method by which performance is measured and the related improvement, if any, in executive management capability. This then led the respondent to compare the existing scenario with the possible future scenario and solicit a comment regarding the route taken by the specific respondent's environment. In this scenario the respondent's response is either not opting for the application of information management with available technology or for applying available information management with available technology for the establishment of electronic government and governance.

The third section deals with the departmental culture and structure. The questions in this section relate broadly to the secondary objectives (forces). These aspects are of importance as they support the basis of argumentation supplied by the preceding section. These questions lead the interviewee into a general discussion regarding the acceptance within the human resource or staff environment of the concept of information management with technology for the establishment of electronic government and governance. It furthermore considers the role culture has in the acceptance of this methodology for executive

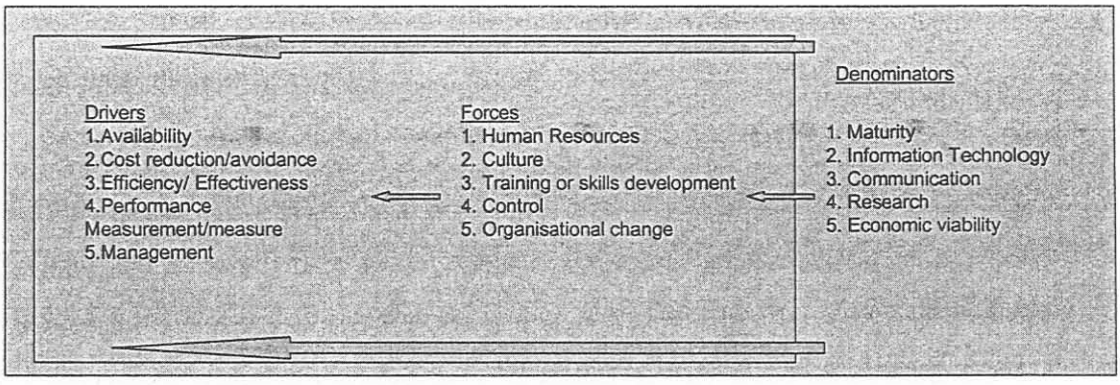
management optimisation. A further output of these questions is to determine the relevance of current training and development and required training and development with regard to the culture and human resources of the department. Resultant from the aforementioned, this will lead to a discussion with interviewees' regarding possible departmental impacts and/or changes. A final issue to be resolved with this line of questioning is to determine the impact if any on the control of both information and management.

The fourth section deals with the aspect of the transversal support structures. These are structures or elements in support of both drivers and forces thus cross-cutting all drivers and forces similar to a matrix composition (*Infra* Figure 1.1). The questions within this section relate to the aspect of the maturity of the public service with specific relationship to their capability to apply information management with technology for the establishment of electronic government and governance. This question is in support of the requirement, if any, for training or skills based empowerment. The questions further relate to that of a supportive information technology base (or infrastructure) from which executive management information may be obtained, in order to make the transition to applied information management through technology for the establishment of electronic government and governance. These questions are posed in order to validate the answers obtained from the first section with specific reference to the availability of information. Interviewees are also questioned with regard to the inter- and intra- departmental communication by which management information is communicated internally and externally. These questions are posed in order to validate the answers obtained from the section on organisation culture (preceding section). An aspect that has an essential bearing on the research is that of research with regard to applicability of information management with technology requirements for the establishment of electronic government and

governance. These questions are posed to determine the applicability of management information in the existing environment and will either support or refute the statements obtained from the questioning in section one (drivers). Lastly the aspect of economical viability will be explored through questioning the interviewees with regard to existing budgets and budget constraints. These questions will be posed to validate the answers from both preceding sections.

The fifth and last section concludes the interview. The interviewee is lead into an open-ended discussion regarding his/her opinions on the application of information management through technology for the establishment of electronic government and governance. Availability of structures, information and skilled staff are discussed. Existing standards and norms with regard to performance measurement and performance measure are addressed. All discussion and questions will be used to validate preceding argumentation. Deviations from previously stated answers were further explored.

Figure 1.1: Driving Forces and Denominators



Source: Adapted from Meyer, 1994:5.

1.8 Methodology for data gathering

Considering the research approach for the thesis, the nature of the interviews, the fact that the questionnaire was semi-structured and that

the respondents have diverse management approaches, resulted in the findings being directly related to the questions of the questionnaire. This in turn leads to the support of the driving forces identified and the supportive elements to the postulated problem. The questions merely solicited a desired communication rapport without prescribing or leading the respondent to a particular answer.

The questions were designed to both extract the fact that cognisance was not taken of all driving forces and also to determine the interviewee's stance towards the problem statement of the report within the ambit of the specific question. This was to determine the applicability of the question with regard to not only to the problem but also to the relevance of the aspect of drivers and forces.

1.9 Critical aspects for research

Based on the theoretical analysis and the interviews conducted, it is expected that the following examples of requirements in the implementation of information management through technology for the establishment of electronic government and governance will emerge from the empirical analysis:

a. That although data is available little, if any, is applied in the role of enhancing decision-making executive management through the application of statistical inferences, data manipulations nor is this information necessarily applied in the formulation of policy. On the other hand, functional management, i.e. managing the functional or line/task environment is, to a great extent catered for. Both are, however, required to optimise and improve effectiveness and efficiency in the public service as a whole.

b. That although initially the development of a technology infrastructure might be expensive the long-term benefit is

improved effectiveness and efficiency together with improved productivity. These executive management elements do in the long run reduce operating cost. However, the cost reduction benefit is not always translated in executable policy. Also, that with a solid hi-technology infrastructure maintenance and upkeep over time will become more cost effective, as upgrades due to technology enhancements become cheaper. Furthermore, that implementation costs should be spread across the life cycle of the project thus reducing the once-off cost.

c. That due consideration was given prior to going the route of information technology with the aim of improving effectiveness and efficiency. That in many instances this was the primary driving force for implementing some form of information technology. That the actual implementation plan for achieving effectiveness and efficiency was however not executed through either formulated and implemented policy or other guidelines. That due to the fact that partial accomplishment was attained through improved efficiency by optimisation of transactional/functional tasks (line function) little attention was being given to true executive management information.

d. That information management and technology was realised purely from the perspective of transactional/functional activities. That again little, if any, attention was given to the optimisation of the strategic managerial functioning, in the sense of statistical inferences and data manipulation of information, for the improvement of the department or organisation as an integrated whole with or without implementable policy.

e. That the aspect of management is purely localised to the transactional level and virtually all systems designed ignored this role in the process. That virtually in all situations additional tools

had to be used to manipulate data or do statistical inferences for the purpose of improved management nor for the formulation of implementable policies.

f. That improved control over information and management has not been realised due to the absence of correct management tools and application as well as communication.

g. That insufficient attention is generally given to the existing work force and human resource component, or the transversal impact thereof on the department. That the impact of the information technology implementation is not always understood. That the human resources at various levels are usually ill equipped to handle the migration to an information management and technology environment. This is in most instances applicable to implementation of transactional/functional systems as well.

h. That the departmental culture was not taken cognisance of, prior to implementation. That the culture of the organisation was not considered and that little or no action to prevent culture shock was considered.

i. That departmental design was not process analysed or restructured so as to manage the transformation during and after implementation.

j. That little, if any, training programmes or skills upliftment programs to facilitate a change in the management approach was implemented. This pertains especially to management levels.

1.10 Implementation of research findings

Should the expected critical aspects for research be found to be validated by both the theoretical and the empirical research it will be a logical requirement to suggest a possible solution to the findings. Policy adaptation to facilitate the transformation to an integrated information management environment will have to be promulgated and implemented. In order to assist in this transformation, a model to address these problems will be postulated.

1.11 Definition of key concepts

This thesis presupposes that management comprises two aspects that when placed or used symbiotically, comprise the concept of management. These two aspects are the transactional management capability relating to line, staff and functional orientation and required for day-to-day decision-making with regard the day-to-day tasks. The other is executive management information required for the future strategic planning and positioning of the departments and organisations.

Furthermore, in this thesis, the following definitions and descriptions will apply to the concepts used:

1.11.1 Information technology

According to the Director Enterprise Information Systems Architecture, Department of Defence (South African Air Force), information technology encompasses the full ambit of information, technology and communication of information. In the first instance electronic information must be transmitted by means of satellites, modems, and/or telephone lines. Encryption and decryption tools (tools that code and decode data or information prior to and after transmission thus

improving the security of the data or information), are optional in all these scenarios. Information technology has, broadly speaking, two components, of which the one is the technology component, encompassing the aspects of hardware such as computers, and the other the software component such as Microsoft Office or Microsoft Explorer (the enabling tool). A natural spin-off is the masses of information that may be gathered or accessed by means of the database concept, and the inherent capability, if correctly managed, for the establishment of electronic government and governance.

Concepts that are used in the application of the cyber-highways are the following:

a. Internet: Herein lies the inherent capability of computers to communicate with one another and also to access databases of information. The capability of this accessibility is linked to what is known as computer addresses such as ".gov." which represents government sites, ".org." which represent organisations and the like (Stair *et al*., 1998:307).

b. E-mail: This is the most basic method of talking to each other and could be set-up in groups. This facilitates the sending of messages to the addressees who could be local, national or international (Goldstuck, 1998:18).

c. Usenet and newsgroups: The Usenet provides a centralised news service and acts as an information retrieval mechanism facilitating access to databases for the user. Newsgroups are on-line discussion groups in which interactive communication is possible (Stair *et al*., 1998:15-16).

d. World Wide Web, Web Browsers and Search Engines: This is the collection of independent computer addresses to be made accessible to any user who has access to a computer and a

telephone line. The Web browser acts as the interface and links the user to the data requested. Searches are conducted by utilising search engines with key word or phrases (Stair *et al*., 1998:306-307).

1.11.2 Democracy

The definition applicable to Democracy is democracy for the people by the people (Constitution, 1996). Democracy is described as a mechanism of ruling. According to Snellen (1999:50), a democracy is a population that governs itself. In this thesis the concept of democracy will be applied in the context of three democratic perspectives to wit the populistic democracy, the liberal democracy and the republican democracy.

1.11.2.1 Populistic Democracy

Populistic democracy is a democratic view that represents the majority point of view and is based on collective judgement. Quoting Rousseau (III-15), Edwards (1999:37) states that this view is dependent on factors such as equality and simplicity, and is only feasible in small communities. Representative governance also forms an essential part of this view. This view presupposes that representatives are well acquainted with the needs of their voters. Ultimately the application of this view implies that the representatives ensure that the governance is in accordance with the majority party principles (Edwards, 1999:39).

Snellen (1999:52) is of the opinion that this form of governance, which the author refers to as representative democracy, is wrong due to complexities such as diverse interests and time-consuming deliberations. In terms of information technology, this methodology might represent greater accessibility and voter participation. Electronic access to records would enable voters to make more informed decisions and generate greater democratic transparency (Edwards, 1999:40). A higher turn-around and response to referendums/polls would be achieved if information technology were applied. The populistic democracy perspective represents the majority point of view and is based on collective judgement (small community based) and that

governance is in accordance with the majority party principles (Edwards, 1999:39).

1.11.2.2 Liberal Democracy

Liberal Democracy is a view that represents the collective choices and is populistic, thus liberal in nature. The principle of freedom of the citizen is highly rated in this view (Edwards, 1999:40). This view utilises the presupposed concept of ideology, which *ipso facto* relieves the citizen of the requirement for a broad base of information.

Edwards (1999:41) states that by minimising the need for information, this reduces the information costs. Downs, quoted by Edwards (1999:41), states that perfect information to both political parties (about the needs of the voter) and perfect information to the voter (about the political party's agenda) could result in a collapse of a democracy due to lack of strategic mobility in any way. Snellen (1999:54) who states that the single-issue focus could introduce incompatible and non-integrative policy issues supports this view.

Snellen (1999:55) refers to this democracy as a direct democracy. Thus political parties and representatives will adopt policies that are more or less in line with voter's expectations thus enabling the political parties to follow majority strategies. Again the counter-argument could be raised in that voters are influenced through specific means to consent to specific policies.

The liberal democracy view also presupposes that representatives of parties are to a certain degree in a sustained balance of power and derive their power from their individual electoral mandate (Edwards, 1999:43). As a balance of power exists, so to does a balance of information requirement exists between the parties and the voters, but maintained through the imbalance of information (selective information). Contained and selective feeding of information could influence voters in

a particular direction on specific issues in order to maintain the strategic political edge. This implies less information available on-line. On the other hand, generalist actions such as poling and referendums could still be done electronically with greater success than in the past, by applying information technology.

There is no doubt that in this view of the application of information technology would be beneficial to the representatives and the public service that support information management and technology. This is due to the flow and availability of information. The principle of freedom of the citizen is highly rated in this view (Constitution, 1996:1(1)(a) and Edwards, 1999:40), relieving the citizen of the requirement for a broad base of information thus reducing the information costs.

1.11.2.3 Republican Democracy

Republican Democracy is a view that is very much the same as the populistic view but varies in terms of the mutual deliberation and openness (or common good) of debate (Edwards, 1999:43). Legitimacy of issues (or agendas) is settled through deliberation. These deliberations might then reflect on a more pluralistic society (Edwards, 1999:44). Snellen (1999:52) refers to this form of governance as that of "democratic constitutional freedom".

The republican democracy view, however, might be the soundest form of participative governance with the interest (and agenda) of the voter and not the political party at stake. Within the context of this view, the relationship between the voters and the representatives is of such a nature that the representatives need to know and understand the voters concerns and issues in order to determine the political party's agenda. Snellen (1999:52) supports this view as the best plausible as it restricts the government interference to those sections where it is required. Thus, this view supports the concept of descriptive theory of representation (Edwards, 1999:45). The descriptive theory of

representation implies that voters are active participants in the democratic scenario with a high information need in order to sustain their requirement for acceptable solutions rather than correct solutions.

In the republican democracy view, similar to the liberal view, the balance of power concept also holds true for representatives. The electoral mandate dictates the power base and is maintained by the incumbents as long as they comply with their (voting) power base. Due to this view's deliberation point of view, information technology will best suit it for communication between representatives and citizenry. Information technology will be able to facilitate not only two-way and also group and multi-point discussion but also facilitate in opinion forming and soliciting. The application of information technology for the use in public debates (Edwards, 1999:46). Access to public debates will enable the representatives and the citizenry to remain current with their legislature.

Remaining in touch with the legislature and the voter might be the soundest form of participative governance with the interest and need of the voter at stake and given attention and not the agenda of the political party. Bureaucracies (for example the spheres of government and their supporting departments) support most political activities. This might lead to unnecessary time delays, if not managed correctly, in the formulation and implementation of policies, in response to voter's expectations. It is important to note that in order to improve relationships in and amongst populations, these bureaucracies must reflect the composition of the country. This will then have a *de facto* influence on the governance of the population (Snellen, 1999:57). The interdependency of media and the process of opinion formation are also well known (Graber, 1995:555).

1.11.3 Electronic governance in general

Access to the cyber highway is through the use of the telecommunications network be it telephones or satellite. More and more use of satellites is being applied. This method is however still controlled by the availability of telephone and satellite services (Taylor *et al*., 1999:63).

In the application of the information, the technology applied refers to aspects such as e-mail and bulletin boards through which access to committee meeting records and agendas are obtained. For this purposes web pages are generated containing the electronic links to the different aspects. More commonly these links are referred to as URL's (Uniform Resource Locator). In applications where general use is made of e-mail and committee agendas and minutes, the political incumbents have more time available to apply to their actual task as representatives of the citizenry (Taylor *et al*., 1999:64). Being more representative of the citizenry directly relates to the aspect of better governing through the use of applied information technology. As much as the global village concept is gaining ground so to is the concept of Electronic Village Halls (EVH). The purpose is to allow maximum access to all citizenry to all information with regard their governance and ultimately to electronic data interchange (EDI) (Taylor *et al*., 1999:64). Again this can also be related to the improved application of electronic data by converting raw information into usable executive management information. The actual application of this function is generally low with the United States of America being the most advanced. The United Kingdom and Western Europe are on average at this time below the 20 % in terms of accessibility of information but improving on a year-to-year basis (Taylor *et al*., 1999:66).

An aspect as yet not explored within many governments is that of electronic documentation. Electronic documentation as a form of

applied information technology is widely used in the private sector to great success and productivity improvement. The process of electronically capturing documentation does not eliminate the use of paper but greatly reduces it. Vintar (1999:100) reflects on this process as being applied in Slovenia. Similarly, Old Mutual and Metropolitan Life noted successes in South Africa. In both instances productivity was improved and storage and facility costs reduced (Director, Xcel, 2000).

In all that is said one has to consider the information (management decisions or otherwise) being made available or imparted through the use of electronic media. Bellamy *et al.*, (1999:79) refer to this as electronic exchange of information with the public (EIP). The methodology of applied information technology enables (empowers) the citizenry through the use of real time information. It also enables them to communicate with their representatives in real time environment. This real-time communication implies that a direct democracy is more real and available to those who have access to the information (Bellamy *et al.*, 1999:80).

Information technology applied correctly will improve the flow of information and make more information assessable to the citizenry. The feedback loop from the citizenry in turn might lead to improved executive management and administrative decision-making which in turn leads to improved policy making. This implies better and improved communication between the office-bearers and their support base (Vintar, 1999:97).

1.11.4 International electronic governance

Information technology allows the politician and the citizenry to be kept up to date with actual needs. In the United States of America this communication is achieved through interactive opinion polls and preferences are determined by the results of these polls. This

interactive communication proves that optimised (election) management is possible through the application of information gleaned from the Internet. Interactive communication may lead to voter's opinions being influenced by the application of, for example, group discussion on the Internet, videoconferencing and bulletin boards. Thus politicians manage (manipulate) the citizenry to follow a specific though by putting it across in terms of their preferred environment, if this environment is known. This influencing is achieved by focussing or targeting an area's needs (Van de Donk *et al.*, 1999:18-19). Abramson, quoted by Van de Donk *et al.* (1999:19), reflects that the United States of America applies video and mail facilitation to great success in order to inform the citizenry about the representative's parliamentary activities.

Similarly, Canada has adopted a public route by introducing electronic mail in their postal service. In addition to regular postal services, Canadians can now electronically send and receive letters and utility bills and taxes over the net (Time, Dec 13, 1999).

Not to be left out and definitely to be considered, as an African renaissance example, is the Jordanian example of applied information technology. Based on relatively scarce data, the Jordanian public service adopted the use of information technology in the department in order to improve the management and administration capability. In addition to this the use of Internet activity in the ever-expanding application of electronic technology, is benefiting the Jordanian democracy. The application of e-mail and other Internet activities not only broadens the average Jordanian citizen's scope but also improves the democratic participation and public management and administration (Ahmad, *et al.*, 1998: 117-134).

An interesting perspective is that of the Mexican public service, who also went the electronic way. Some 218 accessible governmental sites

(Uniform Resource Locators) exist in Mexico. The Mexican government determined that the citizenry had the right to information and approached the situation from a client for information perspective. The Internet plays its role in making information available to the Mexican public. Again the affordability and access by the masses are problematic in terms of reaching all of the citizenry (Gutierrez , *et al*., 1999:19-31).

In summary one may say that the concept of creating not only a new management styled democracy but also a conversational democracy is in the happening. Throughout the impeachment hearing of Clinton the concept of an electronic town hall as advocated by Ross Perot became a reality. In as much as the Republicans wanted the hearings to stop so much the Democrats exploited the situation. Interesting enough, all ambits of the communications media, from the printed media to the electronic media, where involved (Tapscott, 1999:35).

1.11.5 The role of the media

The role of the media may best be described as that of agenda setting. Herein lies the policy and media agenda setting, which addresses the political and administrative agendas of the political groups and the public agenda that is obtained by polling. It is thus clear that agenda setting is nothing else than a schedule for public discussion (Weiss, 1992:377).

The role of the media in this day and age is greatly influenced by technology in that electronic and mechanical means are utilised to communicate. Attention must, however, be given to aspects such as campaigning and cross-cultural influences. It is in this influencing that the vital statistics of failure or success, or a mixed bag of both, lie (Weiss, 1992:377-378).

1.11.6 Political communication

The purpose of political communication is to influence the broad public in reacting in a particular political way. The communication will be planned through the agenda setting process and executed via the actual communication methodology. Through this rational, emotional or economical influencing is applied. It is therefore obvious that the result or the success of the communication should be measurable and according to the planned agenda (Coombs, *et al*, 1998:203-217 and Garber, 1982:555-563).

The costs of communication through any and all means are to be established preferably in advance of the action being initiated. Virtual (electronic), news (advertisements and television time) and the printed media must be compared to the message and the delivery requirement (research) as well as the importance of the message to be conveyed so as to apply appropriate costing components (political economy) (Coombs, *et al.*, 1998:203-217 and Schalken, *et al.*, 1999151-154).

1.12 Structure of thesis

The first chapter deals with the introduction and research design. This chapter introduces the field of study and supplies a background to the problem and stating the problem, the hypothesis and the objectives of the study. It also defines the research methodology and demarcates the field of study and defines the structure of the thesis.

The second chapter is the description of the underlying principles as required for the implementation of policy formulation and implementation. This chapter not only defines policy but also describes the essential requirements for policies.

The third chapter describes the principles underlying information management and technology policy in South Africa. This chapter also

introduces the concepts of information technology as a solution provider. This chapter furthermore addresses the aspect of applied information technology, improving democracy through the application of applied information technology and addresses agenda setting and communication in the field of information technology.

The fourth chapter addresses the national and international trends on information management and technology. This chapter extends the definition of the problem and the research objectives.

The fifth chapter deals with the research findings of information management and technology in relation to the driving forces and denominators. This chapter also deals with the empirical situation in selected examples.

The sixth chapter is the analysis of the literature and empirical research findings and deals with the theoretical application of the findings, the literature study and the empirical approach with the resultant outcomes of the findings. In this chapter a model is proposed to assist the public service departments in improving policy formulation and management in general with the aid of improved management information.

The seventh chapter is the value assessment of the research and resulting model. In this chapter the specific focus is the attainment of the solution for the problem statement after which recommendations and conclusions are drawn.

1.13 Future studies

From this thesis future studies could be conducted in the fields of strategic intervention and transactional management. The technical content of strategic interventions such as the field of architecture and systems design could be further explored.

In terms of the transactional level, the fields of transaction input to the managerial level might be explored. So too might the strategically importance of executive information be explored.

In terms of the transactional level the application and worth of transactional information in the executive information environment might be explored. All the suggested exploration should, however, be done against the backdrop of the public service.

Further studies could also be in the field of applied integrated information systems. The proposed model, applicable to all levels of management within the public sector should be further explored. These studies should cover aspects such as integrating the proposed model with the various elements as proposed in the model.

1.14 Conclusion

This chapter dealt with the problem definition and the related research intentions. In this the specifics of the problem were explained, as was the reasoning for the current problem. The text dealt in-depth with the intentions of the thesis as to what is to be achieved. The chapter also supplied the reader with the assumptions and constraints under which the implementation of information management through technology for the establishment of electronic government and governance has to occur. This chapter had as its second aim to introduce the model of the report the research is based upon. It also pointed out the results, which are expected to be achieved, based on the type of questioning. This chapter's value can be seen as the basis for the functional analysis where the main features of the postulated problem of the report are to be validated or negated. In this particular case, validation is expected. From this chapter the next logical point will be to look at the analysed interviews in order to ascertain the relevance to the theoretical and expected results.

The contribution of this chapter to the overall problem statement is found in the fact that it sets the basis against which the theory and the empirical research will be validated. This chapter basically sets the stage against which the researcher's problem statement will be tested.

CHAPTER 2

PRINCIPLES UNDERLYING POLICY FORMULATION AND IMPLEMENTATION

2.1 Introduction

In the preceding chapter an introduction was given and the research design of this thesis explained. This entailed an introduction to the field of information technology in public management and implementation in South Africa and supply background regarding this problem. Other aspects addressed were the problem statement and related objectives, defining the research methodology, demarcating the field of study and defining the structure of the thesis.

This chapter has as its aim to introduce the principles underlying the requirements for the formulation and implementation of policy in public sector to the reader. The spectrum of available literature will be described and related to the broader concept of the applied information technology. Elements that could bear relevance to the importance, formulation implementation and monitoring of policies in the public service will be identified and explained and in later chapters be described and validated.

The importance of this chapter is found in the fact that it forms the theoretical basis of the arguments regarding the requirements for formulation and implementation of policies in the public sector. It is also the basis from which an argumentative basis is formed regarding on how data is applied in the public sector for the formulation and implementation of policies.

2.2 Background

The question may be posed as to what policy is. According to Dye (2002:xi) policy is what is concerned with who gets what in politics but more importantly, why will it make a difference. Definitions relating to what policy is, are plentiful. Anderson (1984:2) is of the opinion that these definitions are not always successful. In terms of Anderson (1984:2), policies are:

".. broadly defined as the relationship of a government unit to its environment"

Fox and Meyer, as quoted by Kuyo, *et al*., (2002:73), states that policy is

".. authoritative statements made by legitimate public institutions about the way in which they propose to deal with policy problems"

Anderson, as quoted by Kuyo, *et al*., (2002:73), defines policy as:

"*..a proposed course of action of a person, group or government within a given environment providing obstacles and opportunities which the policy was proposed to utilise and overcome in an effort to reach a goal or realise an objective*"

From the definition supplied it becomes clear that policies are the mechanism that government employs to deliver on the requirements and needs. It also becomes clear that policy, and policy formulation, is dynamic in nature and needs to be continuously revisited and reconsidered in order to be effective (Kuyo, *et al.*, 2002:73).

The circle of the policy making process consisting of policy analysis, policy formulation, policy implementation and policy evaluation, requires definitions as well. According to Nagel (1988:3) the definition for policy analysis is the process:

"....of determining which of various alternative public or governmental policies will most achieve a given set of goals.."

Putt, *et al*., (1998:19) defines policy research as

".. the differentiated set of activities that touch public policy at numerous points ... (which) do share characteristics..."

According to Houston (2001:1), policy making in South Africa (and not by definition) was:

".. towards participatory and direct democracy."

Having covered various aspects of policy in terms of formulation, definition, analysis and research the consideration of policy implementation is to be addressed. According to Putt, *et al*., (1998:357-380), policy implementation should be treated like a project. This implies managing the policy required for implementation by means of project management principles.

An aspect neglected on many occasions is that of evaluating the implemented policy. Policy evaluation is not to be confused with policy monitoring as policy monitoring has as its aim the causes and consequences of policies and describes the relationships between policies (Dunn, as quoted by Kuyo, *et al.*, 2002:90). Evaluation on the other hand, does a critical assessment of the implemented policies and determines the worth of such policies (Kuyo, *et al.*, 2002:91). According to Nagel (1988:213), the test for the policy is in being innovative yet lasting, theoretical yet practical. According to Anderson (1984:134-136), the evaluation should be:

"..the estimation, assessment, or appraisal of policy, including the current, implementation, and effects."

According to Dye (2002:312), complex definitions are offered as to what policy evaluation is. According to Dye (2002:312-313) policy evaluation

essentially is learning about the consequences of an implemented policy.

In terms of this section the basis for the policy formulation and implementation as well as the evaluation of such policy has been laid down. The aim of this section is to form the basis for the argumentation in terms of the requirements for and of policies. The research for this thesis will not cover the need aspect of policy formulation but rather focuses on the requirements for policy formulation and implementation.

2.3 Requirements for Policy Formulation

Policy formulation does not exist on pure instinct. This might be the case in many policies generated by central government, for example what they think is best for the populace. These policies include the social development bills, the anti-smoking bills and a number of other acts implemented. Dye (2002:11) state that models is used in the policy-making process. These models are (Dye, 2002:12-29 and Cloete, *et al.*, 2000:36-37):

a. Institutional – This model is utilised when government authoritatively determined, implemented and enforced.

b. Process – This model is applied when various activities with relationships to the public policy are grouped together.

c. Rational – This model is applied when maximisation of social gain is required.

d. Incremental – This model is applied when past performance of policies are evaluated and improved on.

e. Group - This model is applied when pressure groups influence the policy making process.

f. Elite – This model is applied when the preferences and values of the governing elite are enforced.

g. Public choice – This model is applied when non-market decision-making based on economic studies influence policy formulation.

h. Game theory – This model is applied when no independent best choice is available.

2.3.1 Institutional model

Government institutions are responsible for the definition and implementation of policy and policy only becomes public policy when adopted by the governing institution (Dye 2002:12). Three characteristics are attached to public policy. According to Dye (2002:13) these are:

a. Legitimacy, which implies legal obligation and co-operation when implemented.

b. Universality, which implies adherence by all of the populace.

c. Coercion, which implies that through the process of legal litigation, people may be imprisoned if they should not adhere to the implemented public policy.

According to Cloete *et al.*, (2000:37) the aspect of potential changes in institutional structure must be considered when implementing policy. This is due to the potential ramification of any new public policy on the existing structure or through the passing of the public policy, the requirement for establishing a new structure (Dye 2002:13). According to Cloete, *et al.*, (2000:37) this modelling technique is ideally suited for the evaluation between public institutions.

2.3.2 Process model

The process model stems from the behavioural political science. The behavioural studies had as its aim to determine patterns in activities. These patterns became processes (Dye, 2002:14). Cloete, *et al.*, (2002:39) refers to the process model as the systems model and describes it as one of the most valuable tools for policy analysis.

The process model, which follows the basic premise of input, process and output (*Infra.* Chapter 4, figure 4.1) usually has the following outline (Dye, 2002:14):

a. Problem identification of the policy problems facing government.

b. Setting the agenda by focussing the attention of the media and the populace on the potential problem that needs to be resolved.

c. Formulating and developing the policy required.

d. Enacting the policy by legitimising it.

e. Implementing the policy through the identified organisations and departments.

f. Evaluating the policies to determine effectiveness.

Dye (2002:15) states that the process model is ideal in terms of understanding the way policy should be formulated and should not focus on the substance of the policy formulation. Cloete, *et al.*, (2002:39-40), views this as a disadvantage of the process system as it does not describe the transformation or political change involved in policymaking. However, having a process to adhere to when formulating policy has the advantage of having a planned approach thus minimising the potential oversight of important issues.

2.3.3 Rational model

The rational model is set to achieve maximum social gain by ensuring that the potential policies gain to society exceeds the cost to government (Dye, 2002:16). Operative in the rational model is that a cost benefit analysis resulting in maximum potential financial saving, might not be the best solution. Optimum social gain is the operative concept (Dye, 2002:17). Nagel (1988:7), however, warns that the decision-making process based on the rational model has to have adequate information as it is statistically based.

The rational model requires alternatives, as it is a decision-making methodology that facilitates the rationality of policy formulation (Nagel, 1988:7 and Dye, 2002:17). The decision-making methodology relates to the process approach (*Infra.* Chapter 4, figure 4.1). Information regarding the policy is to be analysed and formulated put into the system, processed in terms of goals and objectives setting as well as preparation for implementation inclusive of the cost benefit analysis and a decision taken on the best policy solution (Dye, 2002:18-19).

2.3.4 Incremental model

The incremental model is based on historical events but applies modifications to these events (Dye, 2002:19). Lindblom, as quoted by Dye (2002:19), states that the incremental model is at flaw in that annual reviews of existing and proposed policies do not occur. These reviews should, amongst other, consider societal benefits and from the results of this analysis propose modifications to existing public policy or propose new policies (Dye, 2002:19).

In many cases governments agree to continue with existing policies as they do not have sufficient time, information, funding or the capacity to do cost benefit analysis with regards to new policies (Putt, *et al.*, 1989:311 and Dye, 2002:19-20). Modifications to existing policies as

well as new policies to support existing public policies are also not proposed due to uncertainty about the consequences thereof (Dye, 2002:20).

The incremental model has inherently the aspect of sunk cost or cost already incurred in previous public policies (Putt, *et al*., 1989:311 and Dye, 2002:20). In these cases the government consider the cost already incurred as an investment and preclude any change to their investment (Dye, 2002:20).

2.3.5 Group model

As representatives of the voting populace interest groups form a very important facet in policy formulation due to the pressure they bring about on government (Cloete, *et al.*, 2002:35). Interest groups are usually bound by the common goal to bring about change, through demands, in government to the benefit of the populace they represent (Dye, 2002:21).

Interest groups are also in a struggle of their own in that the group with the greater power could force a decision in its favour whereby a group could loose influence in favour of the stronger group (Cloete, *et al.*, 2002:35-36). Optimum group influence is obtained when, at any given time, the groups are at a state of equilibrium, which in turn is determined by the groups' influence (Dye, 2002:21).

Numbers, status, wealth, leadership and internal cohesion determine group influence (Dye, 2002:21). According to Cloete, *et al*. (2000:36) policy-makers are sensitive to the demands of the interest groups and cognisance is taken of their demands when formulating policies. Interest groups who share members (individuals with multi-membership) also maintain the state of equilibrium through the moderation effect on demands (Dye, 2002:23).

2.3.6 Elite model

The elite model, also referred to as the mass model, is based on the assumption that a small elite group is responsible for policy decisions (Cloete, *et al.*, 200:33). Dye (2002:23) views the elite model as a method by which the governing elite enforces their preferences. This approach implies a downward flow in terms of management as the policies are determined at governmental level and executed by the bureaucracy without gaining the consent of the voting populace (Cloete, *et al.*, 2000:33). The elite model is based on the premise that the elites have the power and give policy directions to the administrators from were policy execution is initiated (Dye, 2000:24).

The elite model actually suggests that the voting populace cannot formulate policy as they are ill informed and that the domain of policy formulation therefore rest with the elite or government as they influence public opinion (Dye, 2002:23 and Cloete, *et al.*, 2000:34-35). The implication of the elite model is that it implies that the voting populace does not play a role in policy formulation thus changes come about through the elites, to redefine their own values especially when events threaten the system (Dye, 2002:24).

Although the elite set policies for survival based on the premise that the populace is uninformed and largely passive, conflict within the elite may occur (Dye, 2002:25). According to Cloete, *et al.*, (2000:35) the point of view that the larger populace is uninformed with the elite in total control is oversimplified as the elite may play only a pivotal role in the decision-making scenario implying some form of voting populace participation.

2.3.7 Public choice model

The public choice model is related to non-market decision-making based on economic analysis to public policy (Dye, 2002:25). The

emphasis is on improving the societal welfare, which in this case coincides and supports the rational model (Dye, 2002:26).

Public choice as an applied model lends the society certain basic legal rights (Nagel, 1984:123). According to Nagel (1984:123) these rights are tolerated rights whereby the society allows implemented public policy, and affirmative rights, which are rights society grants. In the context of the public choice model affirmative rights will be policy that is accepted by society for the benefit of society (Nagel, 1984:123). In the case of tolerated rights, these rights would be accepted and allowed as they improve the social welfare of the society being serviced (Nagel 1984:123).

Interpreting the analysis of economics for public choice, Mayer (1985:66-67) states that public policy decisions made by government might be to the benefit of the society it serves (Mayer, 1985:66-67). This approach supports the institutional model (*Supra.* Par 2.3.1). Mayer (1985:66) identifies three types of goods and services that need governmental intervention to wit:

a. Public goods, which benefits the society and is nonexclusive.

b. Externalities, which are the effects of an action of one party on another.

c. Merit needs, which society does not want to invest in irrespective of the societal needs.

Following the approach of Nagel (1984:123), public goods and merit needs will be of affirmative nature whilst externalities would be of tolerated rights. According to Dye (2002:26) government and society enter into an agreement whereby government accepts the responsibility to protect society (Dye, 2002:26). From this responsibility it is accepted that government must perform certain functions that society cannot handle (Dye, 2002:26). Dye (2002:26), as does Mayer (1985:66), also

refers to this function of performance by government for the benefit of society, as public goods, and externalities (Dye, 2002:26).

2.3.8 Game theory model

The game theory model is based on decision-making with more than one participant (Dye, 2002:27). By applying this model, government would make a decision based on the best outcome of more than scenario as proposed by the participants (Dye, 2002:27). Outcomes in turn are based on the choices the participants make when setting scenarios (Dye, 2002:27). The game theory model is based on the "what if" scenario setting and therefore deductive and abstract and frequently portrait by means of a matrix (Dye, 2002:28).

Closely resembling the game theory model are the policy and communities models (Cloete, *et al.*, 2000:40). According to Cloete, *et al.*, (2000:41) these models utilise the concept of negotiations between stakeholders with regards to the best outcome of possible future events.

Cloete, *et al.* (2000:41) refers to the chaos, complexity and quantum models. These models would also construe a form of game theory modelling as they it approaches the policy formulation system from the assumption that society is in a state of dis-equilibrium (Cloete, *et al.*, 2000:41).

2.3.9 The process of policy formulation

For the purpose of this thesis the aspect of policy formulation must be considered from the perspective of five basics steps. These might and probably will differ depending on scenarios. For the purpose of this thesis the following five steps are of essence in the formulation and implementation of policies. These steps are inductively deduced from the literature studies of Anderson (1984:23-78 and 134-161), Putt, *et*

al., (1989:1-27), Dye (1987:349-373) and Bobrow, *et al.*, (1987:200-214):

a. Research – Into the requirements for the (potential) policy.

b. Analysis and agenda setting – Analysis of the environment for which the policy is intended and the sensitising of media and populace.

c. Formulation – Of the basic principles to which compliance is required.

d. Implementation – Of the defined and formulated policy.

e. Evaluation – To determine whether the implemented policy achieves the aim it was designed for.

Integrated, the aforementioned elements facilitate the total design features for policies. Bobrow, *et al*. (1987:18-19) refer to this integrative process as the:

" pursuit of valued outcomes through activities sensitive to the context of time and place."

2.3.10 Research

According to Putt, *et al*. (1998:1) research with regards to policy is done by decision-makers. The process is based on gathering and interpreting information but may involve a number of role players and stakeholders (Putt, *et al*., 1998:8). Anderson (1984:47) refer to research as a problem being converted into an issue, which requires a governmental solution to resolve it. Bobrow, *et al.* (1987:18-19) refer to research as a design phase when the contextual and actual activities need to be resolved.

Research into potential public policy must be responsive and sensitive towards its intended users otherwise it fails in its aim and purpose (Putt, *et al.*, 1998:9). According to Putt, *et al.* (1998:10), research into policy takes place alongside a diversity of organisations and stakeholders.

Bobrow, *et al.* (1987:19), state that the manipulation of goals often impacts on policy formulation. During the research phase into potential public policy it must be accepted that an imperfect fit will be present (Bobrow, *et al.*, 1987:19). Research according to Putt, *et al.* (1998:8-9) indicates that policy is eventually formulated in terms of decisions made by decision-makers based on information gleaned from staff supporting the process. From the text these are gathered to be in the line-function obtaining information as per transactional level (Putt, *et al.*, 1998:9). According to Anderson (1976:7-9) policies are initiated by means of issues or needs. Research into these needs and issues require three core elements (Bobrow, *et al.*, 1987:19). These elements are:

a. Clarification of values in order to provide for clear guidelines.

b. Characterisation of the context of the policy.

c. The society that will impact and benefit from the policy.

Consensus on societal values and returns will need to be obtained in order for the public policy to be accepted by the potential role-players and stakeholders (Bobrow, *et al.*, 1987:20). According to Putt, *et al.* (1998:10) research into policy-making has necessitated the development of applied technology and information manipulation.

2.3.11 Analysis and agenda setting

Analyses of policy goals are linked to the research done on the requirement for policy (Anderson, 1984:47). According to Putt, *et al.* (1998:41-42) policy is analysed and initiated through the process of information dissemination. Further analyses of needs are done by the

department concerned and based on information available to the decision-maker with regards to the policy formulation (Nagel, 1984:3-4). The problem arises when policy analysis is not done with near perfect information (Anderson, 1976:8). In the scenario where policy analysis is done without applying near perfect information, solving the problem will not be easy if not impossible (Anderson, 1976:8).

Policy needs to be analysed along the near perfect goals of effectiveness, efficiency, cost benefits and social determinants (which are not examined in this thesis) (Anderson, 1976:5 and Mayer, 1985:115). Mayer (1985:115) also states that the determination of goals rest with the decision-making incumbents. According to Putt, *et al.* (1998:253-274), the analysis for policy formulation is not only important but also imperative. According to the author, statistical analysis of any decision and, therefore, executive decisions, should be based on statistical inferences of the problem (Putt, *et al.*, 1998:257-268).

Agenda setting forms an integral part of the policy analysis framework, as the agenda setting will ultimately result in the acceptance, or rejection, of the proposed policy (Cloete, *et al.*, 2000:98 and *Infra.* Chapter 3, par 3.11). Policy analyses include the decision as to what the problem is and what will be decided (Dye, 2002:36). Within the analysis phase, policy agenda setting is thus a deliberate process of planning and action, which defines and prioritises issues and problems and most importantly obtains support for the proposed solution (Cloete, *et al.*, 2000:98).

In policy analysis the formulation and definition of the problem or issue is of great importance and influences the method in which agenda setting has to be executed (Cloete, *et al.*, 2000:99 and *Infra.* Chapter 3, par 3.10). Analysing the problem for policy formulation requires the problem status to be modified and become an issue (Anderson, 1984:47). Preventing a problem to become an issue is a strategy

employed by government so as not to make a decision on a problem (Dye, 2002:37). According to Dye (2002:37) when the dominant elite does not make an issue out of a problem, it is to focus attention away from the said problem, as a solution to the problem might not be in their best interest (Dye, 2002:37).

For agenda setting to be activated a problem must reach crises proportion and no longer be ignored by government, achieve particularity, have an emotive aspect which attract media coverage, have a wide impact, rise issues about power relationships and concern issues which are fashionable for governments (Cloete, *et al.*, 2000:101). Bobrow *et al.*, (1987:20) state that agenda setting is to capture the context and to clarify the values and direction of potential policies. According to Anderson (1984:50) specific problems and issues may attract more attention of the media and due to this additional attention, be converted into agenda items for policy formulation.

2.3.12 Policy Formulation

Dye (2002:41) state that policy is usually formulated by staff members rather than the decision-makers, but is commonly based on the knowledge of what the decision-makers want. Input for the formulation of policies may be obtained from various sources but in all cases information is a requirement (Anderson, 1985:54-55). According to Anderson (1976:51) policy formulation involves the development of appropriate action in dealing with issues. Mayer (1985:137) states that the formulation of policies should be based on objectives related to defined goals. According to Mayer (1985:138) these objectives must be measurable and contribute to increasing effectiveness of the governing process. Cloete, *et al.*, (2000:115) state that cost effectiveness and the cost benefit of policies should be determined through the use of analytical processes before the formulation of such policies.

Policy formulation has two activities within its ambit. They are firstly, the decision taking activity, in other words, is an outcome in the form of a policy a requirement, and secondly, the actual drafting of the policy (Anderson, 1984:55-56). Prior to implementing policy and, hence part of the formulation process, is the review process. Mayer (1985:176-178) and Anderson (1984:61-65) state that the review process must encompass both internal and external reviewing. It is also important that ultimately the proposed policy addresses the cause and not the symptoms of the problem it is meant to resolve (Anderson, 1976:53). Cloete, *et al.*, (2000:137) refers to forecasting as a means to obtain the best solution with regard the optimum solution with regards to policy formulation. Applying the forecasting methodology implies the use of statistics, making assumptions and interpreting current and historical data (Cloete, 2000:138-139).

2.3.13 Implementation

Implementation of policy does not end with the due process of signing and making the policy a law (Dye, 2002:50). Cloete, *et al.*, (2000:164) state that policy implementation was always considered the administrative process and largely ignored. Implementation involves the allocation of the policy to the relevant department, allocating a budget and specifying accountability for the execution thereof (Dye, 2002:50-51 and Mayer, 1985:183-184). Mayer (1985:182) also states that the implementation process must be planned to ensure the successful transition of the enacted policy. Although there might still be a lack of convergence in the field of policy implementation, the importance of the matter must not be underestimated (Cloete, *et al.*, 2000:169).

Policies, after being passed as laws, now becoming public policies, must produce results otherwise the need thereof was non-existent (Anderson, 1976:193 and Putt, *et al.*, 1989:45). The implemented public policies require rules and regulation to manage the policies and

determine departmental mandates (Dye, 2002:52). Should the implemented policy result in the change or creation of a new department or organisation within an existing department, attention must be given to budgets, staffing and facilities (Mayer, 1985:182). The implementation process should be managed as a project, which is defined as having a definite beginning and end (finite) with specific resources allocated to the project to undertake the scope of work (Cloete, 2000:193-196).

Care should be taken when implementing policies that distortion or discrepancies does not occur which could lead to the policy being ineffective (Mayer, 1985:183). Furthermore implemented policies must have developed measurement criteria whereby informed decisions may be used to realise the policies intent (Putt, *et al.*, 1989:46). Policies developed and implemented by the bureaucracy alone (top down approach) might have less of an acceptance than a policy developed and implemented through interest groups (bottom-up approach) (Cloete, *et al.*, 2000:169-174 and Anderson, 1976:193). According to Cloete, *et al.* (2000:178-186) an interdependent 5-C protocol for policy implementation exists and assists the process of policy implementation The 5-C's are content, context, capacity, commitment, clients and coalitions and have a causal relationship with the policy implementation system (Cloete, *et al.*, 2000:178).

2.3.13.1 Content

Lowi, as quoted by Cloete, *et al.* (2000:179), states that the content of policy has three characteristics to wit distributive, regulatory and redistributive. According to Lowi the distributive function creates welfare for the populace and is thus value adding. The regulatory policies determine rules of conduct and include non-compliance actions. The redistributive policies are in turn aimed at redistributing wealth thus adding value to one group at the expense of another. In terms of Lowi's

perspective, governments utilise policies in a coercive fashion (Lowi, as quoted by Cloete, *et al.*, 2000:180).

According to Cloete, *et al.* (2000:180) the content of policies should not be an end in themselves but a means to an end. The mediation between the ends and the means to an end within the policy formulated should be deterministic in terms of content of the policy.

2.3.13.2 Context

It is important that the context in which the policy is developed and placed is of such a nature that it addresses the problem it is to resolve. The design and development of any policy has to comply to specific social, political and economical issues and place these issues in the correct context within the policy being designed and developed (Cloete, *et al.*, 2000:180).

The context of the designed policy will also be influenced by the institutional mechanism it has to pass through in order to become enacted. However, the interaction with human factor may lead to more favourable acceptance of the proposed context than the hierarchical regulation (Cloete, *et al.*, 2000:181).

2.3.13.3 Commitment

Governments must have commitment when they design, develop and implement policies. This commitment may be equated with the concept of buy-in in other words, acceptance of the partnership. This commitment, buy-in or partnership is applicable to all levels that share in, or benefit from, the policy. The commitment must be based on, not only satisfying the populace and popular need and needs, but also being cost beneficial to all parties concerned. In terms of the cost benefit, the analysis that pre-empts the design and development of such policies should be tested against a cost benefit analysis and

acceptance possibility test. There will be no benefit irrespective of the cost benefit analysis if the policy is not executable either by means of impracticalities or non-acceptance (Cloete, *et al.*, 2000:181).

In the context of obtaining commitment from all parties concerned, a bottom-up and top-down approach will in all likelihood have the most success. In the bottom-up approach the needs of the populace is acknowledged and in the top-down scenario the legitimisation of the policy is made clear (Cloete, *et al.*, 2000:181).

2.3.13.4 Capacity

Implementation of all policies is determined by the capacity of government. Capacity in this regard refers to the tangible ability and having the resources, the knowledge and the funds to implement a proposed policy. Capacity also refers to the intangible resources such as commitment to, and leadership for, the implementation of policies (Cloete, *et al.*, 2000:182).

The criticality of the capacity lies not only in who gets what, when but also how the capacity can be created and operasionalised. Obtainment of capacity such as lack of knowledge, insufficient funds and commitment, may be a critical problem but options to bridge them, are available. Capacity building is an option if it is deemed a necessity. The lack of knowledge can be overcome with skills development in order to achieve administrative capability for the implementation of policies. Similarly, funds can be acquired from government (Cloete, *et al.*, 2000:182).

Capacity is to a great degree based on the approach followed for implementation. In this situation the question is whether it should be a centralised or decentralised approach, as the planning implementation and control will depend on the decision reached. In this, the decision to implement or not to implement is based on the governments decision-

making factors such as cost benefit, coercing or added value for the populace and accountability to all is important (Cloete, *et al.*, 2000:183).

2.3.13.5 Clients and Coalitions

It is important to recognise the potential power shifts when formulating policy for implementation within pressure groups. This power shifts may lead to coalitions being formed for the benefit of the policy or policies to be implemented in order to benefit the populace the policy or policies are to benefit (Cloete, *et al.*, 2000:184).

It is the responsibility of the policy makers to determine the potential clients and coalitions prior to the design and development of policies in order to ascertain the acceptance of such policy or policies. All parties concerned must be involved in the policy making process in order for the policy to be accepted when implemented and ownership taken for the execution thereof. Although all parties must be involved, care must be taken not to be derailed by an insignificant few. The 5-C protocol may be seen as an activity that can carry out implementation to the best interest of all concerned but a dogmatic approach must not be followed (Cloete, *et al.*, 2000:185-187).

2.3.14 Evaluation

The final step in policy formulation and implementation is that of evaluating the implemented policy (Anderson, 1984:134). This is to determine whether the policies are achieving their objectives in terms of improved effectiveness and efficiency and whether they are adding value to the process they were designed for and what the cost implication of the policies are (Dye, 2002:54 and 313 and Cloete, *et al.*, 2000:211). It is possible that from this process of evaluation, the process of policy formulation, inclusive of research, may start again if found that the original policy is failing in its intended outcome

(Anderson, 1976:259). Cloete, *et al.* (2000:211) state that linking policy success to outcome achievement is preferable.

A method commonly used for evaluating policy is to determine whether it is politically feasible. This method does not consider societal impact but rather only party political gains or effectiveness and efficiency (Anderson, 1976:260). According to Anderson (1976:260 and 1984:135) it is only when the societal impact in outcome realisation is achieved that evaluation of the implemented policy can be done and ascertained. What governments could do to improve policy evaluation is to implement systematic program evaluation which entails comparisons typical of the before and after situation (Dye, 2002:317 and Dye, 1987:356). Cloete, *et al.* (2000:213) also state that, amongst other, the sustainability of policies after implementation should be evaluated. According to Cloete, *et al.* (2000:215-216) the evaluation process should be managed and properly planned along similar lines to project management.

Policies may not achieve their intended outcome due to a number of reasons. Dye (2002:326) states that when politics substitute analysis this could lead to a failed policy. Other reasons are that the administration of the implemented policy is less efficient than required or that the implemented policies have incompatible goals thus creating conflict (Anderson, 1984:152-153). From the research perspective reasons for policies not achieving their intended outcome are found in the lack of research and lack in the application of information with or without statistical inferences (Nagel, 1988:122-126 and Putt, *et al.*, (1989:53). Cloete, *et al.* (2000:249) state that policies fail due to a number of reasons. These reasons include bad design, external unavoidable reasons impacting on the success thereof, poor research and implementation planning or other unplanned or unforeseen resource constraint. Putt, *et al.* (1989:53) also state that policy evaluation is an ongoing process and should work with policy analysts

and management to collect accurate information for improved policy formulation on an iterative basis.

2.4 Information for policy formulation and implementation

Policy formulation requires accurate and suitable information in order to do statistical inferences (Anderson, 1984:141; Nagel, 1988:174 and Nagel, 1984:359). One particular information problem experienced according to Anderson (1984:142) is the absence of cost benefit analyses during the policy research phase and after implementation. Based on this type of analysis it should become apparent that a particular proposed policy will be either to costly or that the benefit will be greater that the cost incurred (Anderson, 1984:142). Anderson (1984:142) states that in the absence of experimental data the use of quasi-experimental data, that is data that is semi inferred, lends better results when planning policy implementation.

Bobrow, *et al.* (1987:83) state that the information processing approach is important in reaching decisions on policy formulation. When doing research and analysis for the formulation of policies, the reanalysis of existing data is the least expensive *vis-à-vis* initiating new studies or obtaining new information (Mayer, 1985:135). However, through the use of software or optimising existing software in decision-making, data may be converted to usable information in order to achieve policy goals (Nagel, 1988:129).

Kruskal as quoted by Putt, *et al.* (1989:254) states that:

".. a government works better if it has reliable and impartial information"

and also that:

".. body of methods for obtaining and analyzing data in order to base decisions on them"

Although statistics suffer a credibility risk, figures visually presented in a statistical format, lessens the risk in policy formulation and implementation (Putt, *et al.*, 1989:254). Statistical analysis could predict policy outcomes and may be able to consider the cost and cost benefit of such policies prior to them being formulated or even implemented (Nagel, 1984:364).

2.5 Conclusion

This chapter dealt with the process and requirements for policy formulation. Essentially five steps were identified by which process policy should be formulated and ultimately evaluated.

Policy research as a requirement for policy formulation is of essence as this determines the need for the proposed policy. Analysis of the needs lead to the definition and formulation of the policy or policies. From this perspective the policy or policies are passed by government and become law. However, the process is still not completed until the evaluation of the policy or policies have taken place. The evaluation may in turn lead to the requirement for more policies or the amendment of the existing policies. The process of evaluation is also a continuous process.

An aspect of importance noted during the policy formulation and evaluation process was that of the availability of reliable information. Further emphasis was placed on the capability of statistically inferring this data into decision-making information to be applied when evaluating implemented policies.

The contribution of this chapter to the overall problem statement is found in the fact that it sets the basis against which the theory of policy

formulation and implementation applying information management and the empirical research will be validated. This chapter essentially sets the stage against which the researcher's problem statement will be validated.

CHAPTER 3

PRINCIPLES UNDERLYING INFORMATION MANAGEMENT AND TECHNOLOGY POLICY IN SOUTH AFRICA

3.1 Introduction

In the preceding chapter the underlying principles for the formulation and implementation of policy were stated. These have bearing on the thesis in that both the utilisation of information management in the obtainment of data is required in order to formulate executable policy.

This chapter has as its aim to introduce the principles underlying the requirements for the implementation of information technology in public policy making and implementation to the reader. The spectrum of available literature will be discussed and related to the broader concept of the applied information technology. Elements that could bear relevance to the importance of applied information technology in the public service will be identified and in later chapters be described and validated.

The importance of this chapter is found in the fact that it forms the theoretical basis of the arguments regarding the application or lack thereof of information technology in the public sector. It is also the basis from which an argumentative basis is formed regarding on how data is applied in the public sector.

Research indicates that much is written about the capability of the information age and information technology on the public sector. The main problem is that most of this literature focuses on the application

thereof on the line function of the public sector and not much is published on the application of the data capability on the management of the public sector (Van de Donk, *et al.*, 1999).

Second to this is that virtually no information relating to the application of the management of the information available is known. Compounding this issue is that most public service tools do not facilitate the conversion of line or operational data to management information (Coombs, *et al.*, 1997:203).

3.2 Communication

No electronic governance, and electronic information management, required for the formulation of policy, is possible without electronic communication. This communication has two aspects to it. They are the actual or true communication of fact (for example information) and the physical communication (tele-communications) by means of networks and construction (for example relay stations and satellite connections). The focus of this section will be on the actual or true communication and will not endeavour to elucidate on the technical aspects of tele-communications (Coombs, *et al.*, 1998:203-217 and Garber, 1982:555-563).

Communication is not an aspect that should be handled in isolation. Communication forms an integral part of the whole electronic governance issue. This holds especially true when required for policy formulation and implementation (Dye, 1987:7).

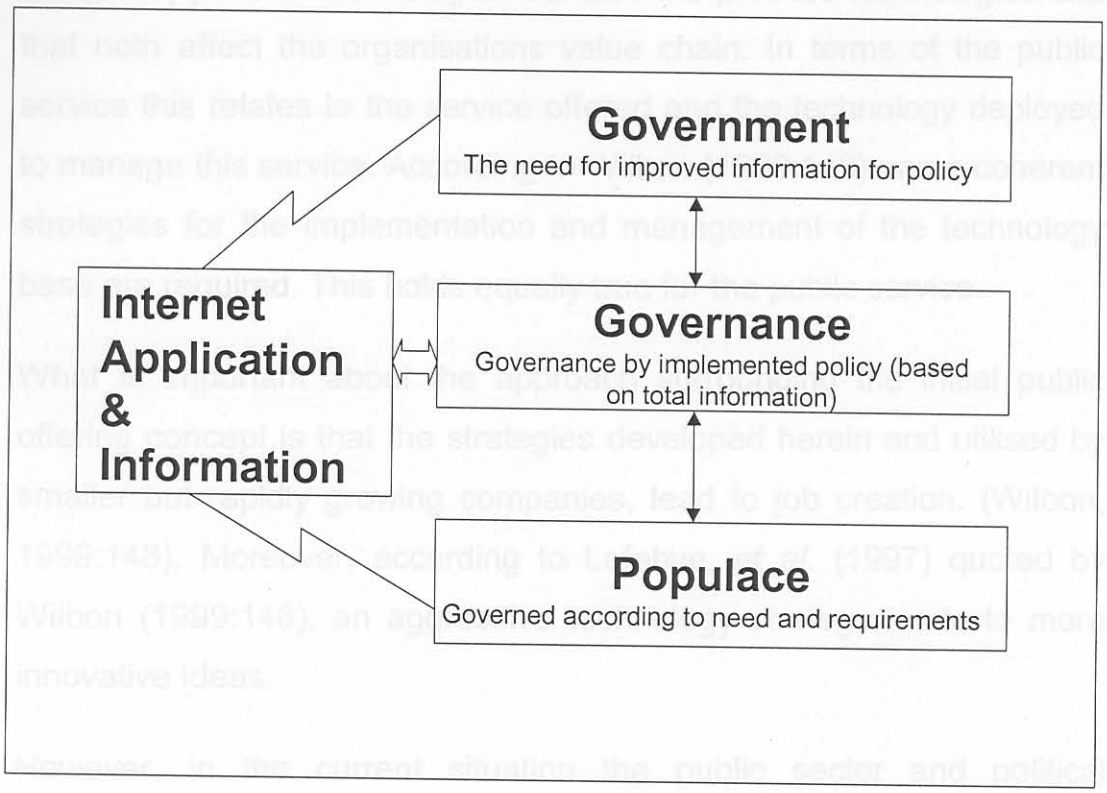
3.3 Information application for policy formulation and implementation

Coombs, *et al*. (1997:203) refers to the new concept of elites and elitism. Dye (1987:29) also refers to elite theory in which he states that the people are usually ill informed about public policy. This *de facto* implies poor communication and information application. Coombs, *et al*. (1997:204) do not, however, equate these concepts with the classical perceptions of have and have-nots but move to the innovation of the twentieth century called the Internet. In this context they are more concerned with the total telecommunication revolution linked to this innovation.

What should be stated categorically is that telecommunication is purely a vehicle by which data is transmitted. In this scenario leadership, knowledge and information are the elements required maintaining a government department. Communications (political or otherwise) on the other hand reflects the application of the various elements and refer to the process of influencing individuals. In this regard the focus of the work of Coombs, *et al*. (1997:204) will be on the process and not the technology *per se*.

Coombs, *et al*. (1997:204) quoting Grossman (1995:7), present a new view on the electronic democracy that argues that most studies of government, politics and the media start by examining the qualities of leadership that define political life. This view could graphically be presented as is depicted in Figure 3.1.

Figure 3.1: The Political Environment: Applied Internet Use



Source: Coombs, *et al*., 1997:204-205

In essence Figure 3.1 depicts an approach, which is both top-down and bottom-up in terms of leadership approach (Coombs, *et al*., 1998:204). It also depicts the constant interaction between the political environment and the need for management information. According to Coombs, *et al*. (1998:205), the growth in the application of the Internet for political communication will lead to a new knowledge elite. Derived from Figure 3.1, policy formulation is executed at governmental level and the implementation thereof is a function of governance. Hence, having applicable information available will lead to the formulation of applicable and usable policy and the implementation thereof (Dye, 1987:323-349).

When considering technology as part of the communication process, cognisance must be taken of the integrative nature of the total information management process. In this regard Wilbon (1999:147) is

of the opinion that the technology management must not only address the (firms) product technologies but also the process technologies and that both affect the organisations value chain. In terms of the public service this relates to the service offered and the technology deployed to manage this service. According to Wilbon (1999:148), more coherent strategies for the implementation and management of the technology base are required. This holds equally true for the public service.

What is important about the approach surrounding the initial public offering concept is that the strategies developed herein and utilised by smaller but rapidly growing companies, lead to job creation. (Wilbon, 1999:148). Moreover, according to Lefebve, *et al*. (1997) quoted by Wilbon (1999:148), an aggressive technology strategy leads to more innovative ideas.

However, in the current situation the public sector and political communication strategy is not so far developed. Coombs, *et al*. (1998:205), refer to the contemporary yet dated method of political communication as that of television and that this method is not as effective as one would hope. Their reasoning is based on the fact that time slots inhibit the actual message to get across to the receiver. There is, however, a method called sound-bites (Coombs, *et al*., 1998:205), which allow the participants to communicate lengthier segments. The sound-bite facility does not, however, overcome the inherent shortcomings of the television broadcasts time and cost limitations. According to Coombs, *et al*. (1998:205), this leads to a situation wherein the traditional voter is largely uninformed about the political process, the government functioning, and the governance outcomes and related issues. Coombs, *et al*. (1998:206) are of the opinion that no cognisance is taken as to the voter or user application or dissemination of the presented information thus ignoring the voter's or user's potential requirements for improved governance (Dye, 1987:15).

Coombs, *et al*. (1998:207-208) are of the opinion that in the United States, the mass media assumes the central role over political communication. The media effectively controls the message, the information and even presents guidelines for interpretations of the message. They herein refer to the economic and media elites of American politics. This holds true for the South African context as well. In this scenario the economic and political elites subsidise the information gathering process providing information at a lower cost. Obviously the dominating party controls the information available and, in turn, the suggested interpretation thus negating individuality of this action (Coombs, *et al*., 1998:208).

3.4 Knowledge and policy formulation and implementation

Conceicao, *et al*. (1998:181) state that knowledge is becoming the key strategic resource for economic development worldwide. Quoting Abramowitz and Dawid, Conceicao, *et al.,* (1998:181) state that the current growth in the knowledge base is altering the form and structure of economic growth.

Conceicao, *et al.,* (1998:183), quoting Wilson, state that increase in the need for knowledge has resulted in an increase in job creation. An increase in the job creation tendency was especially true to the first world countries and to a lesser degree the third world countries. A further result was that more of the developed countries workforce was employed in the service sector than the lesser developed countries indicating a relationship between level of development and service level (Conceicao, *et al.,* 1998:183). Again Conceicao, *et al.,* (1998:184) make the comment that there is a relationship between knowledge and employment creation and development as job creation is dependent on the knowledge and skills level of the populace.

The emergence of a new elite group referred to as the knowledge elite and as an Internet user may supplement information obtained through the mass media with information obtained from the Internet thus completing the full picture. Supplementing information allows the users (knowledge elitists) to re-present the information and formulate their own opinion (Coombs, *et al*., 1998:209). The re-presentation of information allows people to become empowered through the use of the Internet and allows the citizenry to become part of the knowledge elite as they can access information directly and conclude their own inferences (or spin-off on information) from this data/information. This data interpretation is enhanced when the public is allowed to post comments as participating members of a newsgroup or on a Web site. This in turn enables the government to promulgate applicable and executable policy, based on informed and real requirements and that are required to enhance service delivery. (Coombs, *et al*., 1998:211-212).

3.5 Mobilising for improved policy making and implementation

According to Coombs, *et al*. (1998:12-13), communicating with and mobilising the grassroots are extremely important. In order to facilitate mobilising, issues must be clearly stated as to reasoning behind such a matter and the action(s) required to resolve the issue. In this regard the Internet, as a solution provider, outclasses the mass media which suffer the inherent problem of limited space and a high cost aspects.

Browning (1996:61-62) does, however, offer a warning that online mobilising (his reference is organising) is not totally effective if not supported by one-on-one follow-ups. Browning (1996:56) is also of the opinion that interpretation of a suggested issue might not be correctly understood even if a detail online brief is supplied. Lastly Browning

(1996:56) warns against soliciting support for an issue through the Internet (cyberspace) as the Internet users represent a vast variety of political philosophies and various other skills.

Communication and information has to be explored in terms of the management paradigm in order to understand the need for information. In this regard, data, which is plentiful and resides in huge databases, needs to be re-worked to executive management information in order to facilitate the requirements of the manager to execute his/her task(s).

3.6 Public service and information management

With regard the presupposition of this thesis it needs to be understood that management comprises two aspects that need to be in harmony. These two aspects are the transactional management capability relating to line, staff and functional orientation and required for day-to-day decision-making with regard the day-to-day tasks. The other is executive management information required for the future strategic planning and positioning of the department/organisation.

The concept of management underpins the total ambit of all activities of the public sector. Herein is found that a move away from the classic top-down management of the public sector to the more acceptable (modern) methods of the private sector. The applications of these methods are obviously dependent on information and strategy in order to apply the data found in databases. This thesis will, however, not endeavour to formulate new management rules *per se* but rather utilise those that are pertinent to the topic of information management.

The management paradigm throughout the twentieth century developed from a closed functional bureaucratic approach with formal structures to a process and open systems driven approach (Roux, *et al*., 1997:18). In the present contemporary era various management improvement and

departmental restructuring mechanism are utilised to optimise departmental management. The phrase coined to this change management was business process re-engineering (BPR). Much is written about business process re-engineering (the process through which an organisation re-organises from a functional (silo) approach to a process driven organisation) which many of public service departments nationally and internationally underwent during the latter half of the twentieth century. The business process re-engineering approach is fundamentally based on the approach of input-process-output. Various toolkits are, however, available to execute the analysis and business process re-engineering exercise. At this time many government departments are still continuing this business process re-engineering exercise applying tools such as the IDEF™ (IDEntification of Function). This tool-set also incorporated a modelling ability in order to facilitate "what if?" scenarios (Interview with the Director, Xcel, 2000).

Doolin (1999:96), quoting Bloomfield and Danieli, (1995), refers to a socio-technical order. This socio-technical order refers to an implicit dualism between the socio-order and the technology order is made. The socio-order here may be compared to the bureaucracy as used by Turner, *et al*. (1999:296). The comparison is done in order to facilitate the relationship between an organisation's requirement for technology-based solutions and the management style in use in the public sector.

Project management as a management tool also originated around the latter half of the twentieth century. Implied in this process is the management of individual tasks (or projects as tasks could become a project in its own right) across functional boundaries. The management of tasks or projects, in turn, implies that within organisations strategic goals had to be identified and managed as an individual project from inception to completion. Turner, *et al*. (1999:296) are of the opinion that the project and process phase development was initiated at the same time to respond to the almost constantly changing nature of work and

management. Sparruis (2000), as a leader in the field of software engineering and project and process analysis in the South African scenario, follows the same approach.

Doolin (1999:96), quoting Law (1994), comments on the function of ordering as an effect of a process. According to Doolin (1996:96), ordering implicitly is applied as a management method of communication within the process approach. Ordering in turn has direct links to the bureaucratic style of management.

What becomes of importance to this study is the management model designed by Weber, translated and published in English and utilised in the latter half of the 1950's, referred to as the ideal bureaucratic model (Turner, *et al.*, 1999:299). This model based on a hierarchical, mechanistic and very functional approach with authoritative environment was utilised by virtually all public and private enterprises until the seventies. (It need be noted that technology development such as computer databases in the fifties was still in its infancy.) The Weber model (Turner, *et al.*, 1999:299) required that clear guidelines for management and workers alike, were developed. The development of guidelines at all levels did not leave much room for initiative, creativity nor the application of information as a management tool (Turner, *et al.*, 1999:299).

In an attempt to circumvent the strict guidelines imposed by the bureaucratic model, socio-technical networks were established to form a working whole. (Doolin 1999:97, quoting Law (1988)). According to Doolin (1999:97), non-human elements for example the information technology, form an intrinsic part in the coherence of this network.

Turner, *et al.* (1999:300) state that as the technology in the computer arena developed due to various reasons e.g. the space race, the Cold War, military requirements and the fragmentation of mass markets, the bureaucratic model of Weber (Turner, *et al.*, 1999:300) was challenged.

The challenge arose in that information was now stored and became available for the management task. Also, that all the afore-mentioned activities needed development detail only available in the developing databases of the computers (Turner, *et al*., 1999:300). The development of such items that was required for the space race resulted in a requirement for a management method not curtailed by the functional bureaucratic method (Turner, *et al*., 1999:300).

The project approach resulted from the order of magnitude of tasks the space race and military development created. These tasks had to be defined and sub-divided with a definite beginning and end date and defined outcomes or milestones (Sparruis, 2000). The project approach also resulted in a management methodology whereby the execution of the project resulted in cross-functional or transversal integration. The transversal integration of management was contrary to all bureaucratic functionality principles (Turner, *et al*., 1999:300). Problems experienced with the transversal integration of management are the breakdown in governance of the bureaucratic management approach and the working in more than one function (Turner, *et al*., 1999:299-300).

The transversal integration approach led to a re-think of the bureaucratic approach in terms of modelling it in accordance with process rather than function (Turner, *et al*., 1999:301). The adaptation of the bureaucratic approach introduced the Total Quality Management approach of the eighties (Turner, *et al*., 1999:301), in as much the requirement and need for executive management information to manage an organisation, grew. Doolin (1999:100) is of the opinion that drawing data (from a hospital system – the New Zealand public hospitals) and manipulating such data for financial and other purpose results in an executive information management tool for improved administrative and executive management. The executive information management process, including performance management and trend analysis, is then based on the wealth of data captured on a database.

Turner, *et al*. (1999:302) state that in the classical management and administration model the functional hierarchy serves to govern the organisation. However, for the function of project management, operational control is required. Hence the fact that governance is inward looking and operational control outward looking as operational controls effects more than one function (for example logistics, personnel, finances and the core business of the organisation) (Turner, *et al.,* 1999:302).

Doolin (1999:97) applies the New Zealand public hospital example to this scenario, quoting the **Health and Disability Act, 1993** (New Zealand) which transformed the New Zealand public hospitals into Crown Health Enterprises (operational control - outward looking). In transformation scenario, the New Zealand government endeavours to transform the health services into market related competitive entities (governance – inward looking at the administration and management of government at all spheres). In the transformation endeavour a focus is placed on improved operational control and governance to wit management, accounting and economics (Doolin, 1999:97).

Turner, *et al*. (1999:303), identify four elements for operational control to wit:

a. Process management.

b. Customer management.

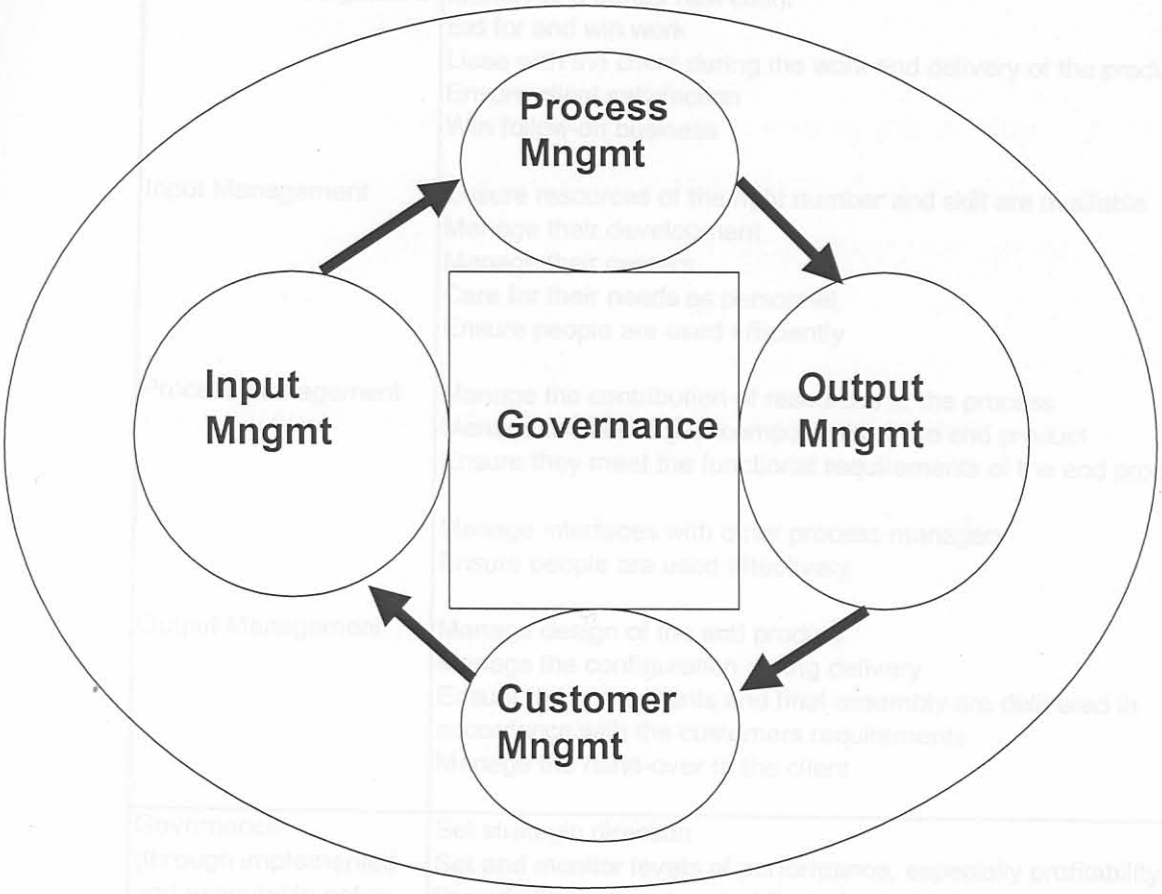
c. Input management.

d. Output management.

In terms of relevance to policy formulation and implementation in the public sector, it may be stated that process management relates to the transformation drive in the public sector for optimised service delivery. The identification of the processes to be utilised within the department

will be aimed at the core function of the department. When optimised, this in turn, will improve the service delivery to the customer. The customer, then, can be optimally managed with the resultant outcomes to the benefit of both customer and department. Input and output management is clearly an integral part of the optimised process as the process can only be initiated with input and be concluded with an output. Internally to the department, governance is improved. The interaction of these elements is depicted in figure 3.2:

Figure 3.2: The Four Elements of Operational Control



Source: Turner, *et al*., 1999:303

According to Turner, *et al*. (1999:303), each element of Figure 3.2 has a specific function and role. This is depicted in Table 3.1:

Table 3.1: Four Functions of Operational Control and Governance

Function	Role
Customer Management	Identify and attract new client Bid for and win work Liase with the client during the work and delivery of the product Ensure client satisfaction Win follow-on business
Input Management	Ensure resources of the right number and skill are available Manage their development Manage their careers Care for their needs as personnel Ensure people are used efficiently
Process Management	Manage the contribution of resources to the process Manage the delivery of components of the end product Ensure they meet the functional requirements of the end product Manage interfaces with other process managers Ensure people are used effectively
Output Management	Manage design of the end product Manage the configuration during delivery Ensure the components and final assembly are delivered in accordance with the customers requirements Manage the hand-over to the client
Governance (through implemented and executable policy resulting in processes)	Set strategic direction Set and monitor levels of performance, especially profitability Provide finance and control financial returns Provide technical expertise through centers of excellence Provide an audit function Control risk exposure

Source: Turner, *et al*., 1999:303

When applying these roles to the model depicted in Table 3.1, it becomes obvious that a department accentuates the added value and value chain principle (Turner, *et al*., 1999:303). However, in the classical model of management based on Weber, these activities are as portrayed in Table 3.1 to wit executed in series (Roux, *et al*., 1997:22). In the process approach they will be execute in parallel (Turner, *et al*., 1999:303 and Sparruis 2000). When considering the method in which governance is applied (Table 3.1), it is found that very rigid military type governance is applied to the Defence industry. On the other hand more empowering type governance is found when this

methodology is applied in the engineering environment (Turner, *et al.*, 1999:307; Director Enterprise Information Systems Architecture, Department of Defence, 2000 and Director, Xcel Information Technologies, 2000).

An interesting development in this scenario is the introduction of new information management components. According to Doolin (1999:98) the introduction of a new information technology management system in the New Zealand health services lead to a better visibility of the management and accountability functions within the service. This in turn improved the management functionality of the health service.

Doolin (1999:98), quoting Bloomfield, refers to the introduction of the information technology management (based on a project approach) as a socio technology introduction. Doolin (1999:98) also introduces a new element to wit departmental change (departmental arrangements development). Referring to what was commonly known as the line function Doolin (1999:99), quoting Malcolm, introduces a new concept known as service management. Herein is captured the application of the information of the databases of an organisation. Doolin (1999:107) is of the opinion that existing management reports obtained from databases is classical user-unfriendly and need to be addressed.

3.7 Information technology as a solution provider

The need for specific criteria e.g. functional running of the specific departmental structure or the need for data interpretation for management and administrative application must be explored and decided upon. Furthermore consideration has to be given to the usage of free data such as is available from the Internet or service providers (Schalken and Tops, 1999:144-145).

Electronic government and governance for application in the policy formulation and implementation scenario, is to be assessed and validated. This aspect must address the shift in paradigm from a manual methodology to an information technological arena and the application of the data already contained in databases for management and administration purposes. It must and will further address the aspect of utilising benchmarking in terms of the Information technology instead of the accepted base for decision-making. In this the realm of best practise suites will be brought to the fore. Coupled to this aspect will be the need for the continuous validating of best practise suites and methodologies.

In as much as the effectiveness and efficiency of the application of information technology is explored, the link with the communication arena is essential. Coupled to this will be the current public service approach of performance management and the proposed methodology to follow. Again the concept will be benchmarked against existing experiences.

The basis for this will obviously call on standards being set and utilised as well as the adaptation of innovations in the field of information technology. The whole drive towards e-commerce will also be described as it impacts on especially third sphere of government. Outsourcing the information technology component and the impact of the high technology industry is also a consideration from a cost perspective, given the rapid enhancements in technology.

3.8 Applied information technology

Information technology may be as modern as is obtainable but will not be able to be applied if a defined and integrated infrastructure does not exist for the utilisation thereof. Thus the point of departure for the information age is a capability to, not only transmit data, but also to

receive and make this data accessible to all users for management and administrative purposes. Data accessibility should apply to all three spheres of government. Taylor, *et al.* (1999:61) refers to teledemocracy. This, according to Taylor, *et al.* (1999:61), is the combined application of telecommunication and computers. In the application of electronic government and governance and the availability of information vis-à-vis the citizenry, these two aspects are interdependent. Access to the cyber highway is through the use of the telecommunications network be it telephones or satellite. In the current scenario the Internet or web based telecommunication is Tele-linked. More use of satellites is being applied. This method is, however, still controlled by the availability of telephone services (Taylor, *et al.*, 1999:63). Given the communication highway as the basis, the following step would be to enable (empower) the citizenry in order to grant them access to this information. Enabling the citizenry again leads to the capability of the office bearers to be empowered so as to improve management and administration through improved two-way communications. Information captured and made available should cover the total spectrum of the governance at all spheres (Taylor, *et al.*, 1999:63-64).

The basis for the application of information technology would probably be said to be well-populated geographic information service. This type of service, known as a Geographic Information System (GIS), is primarily built up of information pertaining to the total (political) referencing area. Again it must be said that a tool such as the Geographic Information System is a management enhancement tool in its own right. In the current application one could compare it to the information vehicle tracking services utilise for scheduling and tracking vehicle fleets. However, in the political application, typical data that should be contained in the system should reflect sizes of households, voters, general political orientation of such voters/households. More

general information such as conditions of living (squatter camps or established suburbs), local governmental conditions and orientation and the average financial situation within such a community, is also needed (Snellen, 1999:58: Interview with Project Manager Electoral Logistics System, Independent Electoral Commission, 2000).

By applying this tool-set the democratic role of bureaucracies will be strengthened as the Geographic Information System visualises the areas not only in terms of problems but also in terms of disposition. Relational databases will then be able to present categories and voter/populace distribution more readily. This points to improved management capabilities of departments. It will become easier to track movement of the voter/populace and determine the main reasoning for such an action (Snellen, 1999:58).

The advantage of such a system is found in the fact that appropriate planning may now be possible as specific geo-referenced areas might have unique requirements. By identifying the unique requirements, it may be found that politicians will be able to determine and focus on specific needs within a community. Focussing on specific needs will enhance the politicking capability of the party, if applied correctly. It is also obvious that no constraints should be placed on the availability of this type of information (Snellen, 1999:59).

3.9 Improving policy making and implementation through information management and technology

In the application of the information, the technology applied infers to aspects such as e-mail, bulletin boards, and access to committee meeting records and agendas. For this purposes web pages are generated containing the electronic links to the different aspects. More commonly these links are referred to as Uniform Resource Locators (URL's). In applications where general use of e-mail and committee

agendas and minutes where made, the political incumbents had more time available to apply to there actual task as representatives of the citizenry (Taylor, *et al.*, 1999:64). As much as the global village concept (with reference to communities being able to communicate locally, nationally and internationally), is gaining ground, so to is the concept of Electronic Village Halls (EVH) where local councils communicate electronically with there voters. The purpose is to allow maximum access to all citizenry to al information with regard their governance and ultimately to electronic data interchange (EDI) (Taylor, *et al.*, 1999:64). The actual applications of this function are generally low, with the United States of America being the most advanced. With regards to accessibility of information, the United Kingdom and Western Europe are, on average, below 20 % but improving on a year to year basis (Taylor, *et al.*, 1999:66). Accessibility to information leads to both the legislature and the voting populace in making informed decisions, which in turn may be related to improved policy formulation.

An aspect as yet not explored within many governments is that of electronic documentation. This form of applied information technology is, however, widely used in the private sector to great success and productivity improvement. This process does not eliminate the use of paper but greatly reduces it. The process primarily implies that all current transactions or files are electronically scanned into a central database and through the use of data manipulation made available in management reports or even as the original document if so desired. This in turn enhances the capability of the departments concerned in the formulation of executable and applicable policy. Vintar (1999:100) reflects on this process as being applied in Slovenia. In the South African context the Government Printers are now considering this type of application (Interview with Programme Director, Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, Independent Electoral Commission, 2000).

In all that is said one has to consider the information being made available or imparted through the use of electronic media. Bellamy, *et al*. (1999:79) refer to this as electronic exchange of information with the public (EIP). The methodology of applied information technology enables (empowers) the citizenry through the use of information that is updated and available continuously and at any time (real-time information). Real-time information also enables them to communicate with their representatives in a real-time environment. In turn, any proposed policy may be communicated to the populace for comment. This implies that a direct democracy is more real and available to those who have access to the information (Bellamy, *et al.*, 1999:80).

Information technology applied correctly will improve the flow of information and make more information accessible to the citizenry. This implies better and improved communication between the office-bearers and their support base and improved management capabilities, which might include policy proposals, for the office bearers (Vintar, 1999:97). Benefits that are obtainable by applying information technology at all spheres of government are as follows (Vintar, 1999:98):

a. Improved productivity through better time utilisation.

b. Improved access to information pertaining to the representative's field.

c. Eventual reduction of cost but definitely an improved utilisation of funds.

d. Improved management and administration due to improved reliability of data.

e. More transparent governance.

f. Improved contact with the citizenry.

g. Improved workflow that will lead to departmental optimisation.

h. Improved system design of the relevant tier/organisation.

i. Standardisation due to the improved workflow analysis.

Although Vintar (1999:98) cites two benefits that are more closely related to the application of information technology, three more should be added in terms of the South African frame of reference. Vintar (1999:98) is of the opinion that the two benefits applying most to the field of information technology are:

a. Improved access to information pertaining to the representative's field.

b. Improved contact with the citizenry.

However, considering the South African situation the following three should also be added to the list that is a direct outflow from applying information technology to optimise democracy:

a. Improved productivity through better time utilisation.

b. Eventual reduction of cost but definitely an improved utilisation of funds.

c. Improved workflow that will lead to improved management and departmental optimisation.

In essence it could be stated that all democracies should consider these three additional benefits in the application of information management and technology. In making the information more accessible to the citizenry, the common application of data being of a one way nature and being utilised by the representatives at their various levels, for amongst other policy formulation, now becomes a two way communicative and integrative process. This leads to the second benefit objective, to wit improved contact with the citizenry,

being attained primarily due to the integrative process as a result of perceived virtual one-to-one communication (Vintar, 1999:98).

Considering increased productivity, reduction in cost and improved workflow, the application of information technology will lead to a more productive system as both the representatives of the citizenry and the public servants will be able to focus on the real issues of the day. Combining this with more reliable data and improved workflow (the third added benefit), public servants and representatives will now be able to commit themselves to better governance of their particular sphere through improved executive management capabilities (Vintar, 1999:103). Improved executive management capability is stated with the presupposition that all spheres and all local government authorities have equal access and knowledge of their information management and technology capability. The second added benefit is an extremely contentious one due to the perceived notion that informationalising an authority is extremely costly. In essence the statement holds true in terms of initial capital layout. However, as technology becomes cheaper, the maintenance cost will be low. The benefit, however, needs to be found in the longer term as the productivity improves and due to the visibility of issues and information, funds can be directed in the right direction. Thus the initial and eventual cost of the system could be offset against benefits and savings obtained from other projects.

Vintar (1999:99) comments on the historic application of information technology as that of automation. In this the author's statement holds true for most national and international spheres of governance. It also holds true in terms of systems being implemented, thus implying a relative high level of computer literacy, but does not mean that the obtained information is used deductively or even as a political communicative tool. In defence of this situation one must say that the systems implemented were basically support systems for the finance, logistics and eventually for the human resource departments.

Approaching the information age the need for executive management information becomes essential for not only the management task alone but also for the maintenance of existing and formulation of new policy requirements. The expansion of borders and the increases in service provisions at all spheres necessitated and increased awareness of executive management information requirements. The citizenry's representatives realise that in order to maintain closeness and be in touch with their support base, real-time information pertaining to needs is required. The combination of needs and real-time information, as a requirement at all levels of government, forced a new outlook of the information technology available and the application within the governance and politicking scenario especially in the arena of policy formulation and implementation. This supports the two-way communicative benefit explained in the preceding paragraphs.

3.10 Information technology, agenda setting and communication

The media utilised in agenda setting and communication, may even be the Internet or any other super cyber-way, and must never be underestimated in the political arena. This concept is not new and it has been recorded that this combined with the use of information technology is a powerful tool (Browning, 1997:47). In the United States of America the Republican Party maintained a database on the presidential candidate of the Democrats (Mondale) by which inconsistencies in terms of policy statements where mapped and deviations exploited. Through this means the Republicans maintained the election initiative (Van de Donk, *et al.*, 1999:13).

In essence the integrative use of agenda setting, communication and information technology allows the politician and the citizenry to be kept up to date with actual needs. This achieved through interactive opinion

polls and preferences are determined by the results of these polls. So to may opinions be influenced by the application of for example group discussion on the Internet, videoconferencing and bulletin boards. The agenda setters may also manipulate the citizenry to follow a specific though by putting it across in terms of their preferred environment if this environment is known (Van de Donk, *et al.*, 1999:18-19). Abramson, quoted by Van de Donk, *et al.* (1999:19), reflects that the United States of America applies video and mail facilitation to great success in order to enable the citizenry to be informed about the representative's parliamentary activities.

The question may well be asked as to what the key issues are in electronic government and governance. The answer is to be found in the collective bargaining ability of electronic government and governance in that interactive communication is possible. As interactive implies a real time communicative process this in turn implies an educational process whereby the citizenry is educated with regard to not only the representatives agenda but also to the functioning of affairs of general interest of that specific sphere of government. This could be established through e-mail, group discussion facilitated by bulletin boards, Free-Nets or virtual communities (as used in the United States of America and Western Europe) and the like (Van de Donk, *et al.*, 1999:19).

In the South African situation, political communication is now only starting. Policy formulation and implementation based on electronic communication is in an initiation stage with the use of intranet applications in the South African Defence Force, Department of Justice and the Independent Electoral Commission. These departments are currently applying the electronic media in an experimental way to improve policy making and implementation (Interviews with Deputy Director General Corporate Services, Department of Justice, 2001, Director Enterprise Information Systems Architecture, Department of

Defence [South African Air Force], 2000 and the Manager Voting Station Infrastructure and Electoral Logistics [Chief Director], Independent Electoral Commission, 1999).

3.11 Integration

Agenda setters, through pressure groups, may apply information technology by means of polling, discussion groups and availability of information (media agenda setting) to influence citizenry with regard specific issues. In such a case the United States of America abortion lobby enabled the pro-life lobbyists to contribute to their activities with great success. The success of the lobbying also made the democratic process available to a broader base of the citizenry (Van de Donk, *et al.*, 1999:21). A further advantage of applied information technology and information management is the perception by the citizenry that they are approached individually. Applying this methodology, the representatives or even the public departments will be able to mobilise a greater support base and increase their sphere of influence. This *ipso facto* implies that the democratic process is in effect enhanced due to the dynamics inherent in the cyber agenda setting method. In effect the republican view of democracy may thrive of this as deliberation is the order of the day yet policy making and agenda setting remains in the hands of the citizenry. Dynamic electronic agenda setting will also be beneficial to the proponents of the liberal democratic point of view as the stalemate situation of agenda setting will be all but eliminated. The application of databases is of major cost cutting importance. Applying this concept with direct mailing enables the parties to reach larger groups faster and more easily (Van de Donk, *et al.*, 1999:25). Combining this with information from the geographic information service enables the agenda setters to form specific messages to specific target groups thus soliciting support. One definite advantage of this method is

that if applied correctly, the hostile press/media could be avoided (Van de Donk, *et al.*, 1999:25).

Existing methods of communicating political agendas will not be negated but rather supported. When political parties apply television, radio or other means, the individual already in communication on the issue will have better insight and understanding of the topic (Van de Donk, *et al.*, 1999:25). Extrapolating this theme means that actually less needs be said to achieve more impact thus minimising the advertising cost.

As a word of caution, information technology could lead to a distancing of the political representative or the public office bearer from the citizenry if applied incorrectly. If the media is allowed to highjack the process this medium of communication might well become the political cornerstone in terms of influencing the citizenry and relegating them (the citizenry) to a status of uselessness (Van de Donk, *et al.*, 1999:23).

3.12 Electronic information management

The application of the electronic information, geographic information service input and the relevant databases imply that agenda setters and policy makers can now utilise statistics in the strategy formulation. This in essence should lead to a more productive public sector in that representatives can now determine issues or agendas scientifically and more accurately compile the solution thus managing their departments professionally. An advantage of departments being better managed, combined with the accessibility of information, will also enhance the capability of investigative committees. This benefit alone should save costs to a great extent as much time is spent by representatives on these committees (Van de Donk, *et al.*, 1999:26)

The database concept and electronic documentation should also alleviate the politician's workload in that more detailed reports is available at any time, systematically and more readily. Progress with regard agendas (issues) would be more transparent (Van de Donk, *et al*., 1999:27).

The integration of the various public and private databases might assist government to optimise on its revenue situation. As an example serves the South African and United States of America situations where an integration of financial institutions, parastatals and public databases (now) enable the Receiver of Revenue to reach a broader tax-base and lessen tax evasion. The privacy debate regarding this issue is yet to be addressed. Other advantages are located in the day-to-day running of the public offices in that fraudulent transactions are more easily detected (Bekkers, *et al*., 1999:216).

3.13 Information management and technology in the International environment

Information technology per definition this media may be the application of the Internet or any other super cyber-way. The power of the electronic media must never be underestimated in the political arena. It has been recorded that the combined use of information technology and media application is a powerful tool (Browning, 1997:47). As stated previously, the Republican Party of United States of America maintained a database on the presidential candidate of the Democrats by which inconsistencies in terms of policy statements where mapped and deviations exploited. Through this means, the Republicans maintained the election initiative (*Supra* Chapter 3, par 3.10).

Information technology allows the politician and the citizenry to be kept up to date with actual needs as are applied in the United States of America. This is achieved through interactive opinion polls and

preferences are determined by the results of these polls. The citizenry may have opinions influenced by the application of, for example, group discussion on the Internet, videoconferencing and bulletin boards. Thus politicians manipulate the citizenry to follow a specific thought by putting it across in terms of their preferred environment if this environment is known (Van de Donk, *et al*., 1999:18-19). Abramson, quoted by Van de Donk, *et al.*, (1999:19), reflects that the United States of America applies video and mail facilitation to great success in order to enable the citizenry about the representative's parliamentary activities.

Similarly, Canada has adopted a public route by implementing policy on and introducing electronic e-mail in their postal service. In addition to regular postal services, Canadians can now electronically send and receive letters and utility bills and taxes over the net (Time, Dec 13, 1999).

Not to be left out and definitely to be considered, as an African renaissance example, is the Jordanian example of applied information technology. Based on relatively scarce data, the Jordanian public service implemented policies for the adoption and use of information technology in the institution. In addition to this the use of Internet activity in the ever-expanding application of electronic technology, is benefiting the Jordanian democracy. The application of e-mail and other Internet activities not only broaden the average Jordanian citizens' scope but also improved their democratic participation (Ahmad, *et al*., 1998:117-134).

In summary it could be stated that the concept of creating a conversational democracy is in the happening. As stated previously, throughout the impeachment hearing of Clinton the concept of an electronic town hall, as advocated by Ross Perot, became a reality. In as much as the Republicans wanted the hearings to be stopped, so

much the Democrats exploited the situation (*Supra* Chapter 1, par. 1.10.4). Interesting enough, all ambits of the communications media, from the printed media to the electronic media, where involved (Tapscott, 1999:35).

3.14 Requirements for electronic governance

Although Dinar (1996:1) points out that socio-economical problems continue to hamper access to information and communication technologies in Africa, the author is of the opinion that information technology in the public service as well as the greater private sector is on the increase.

Using Africa as an example, Dinar (1996:1) states that low levels of knowledge and inadequate skills have contributed to the failures of applied information technology at all levels. Herein the author states that knowledge, information and the use of communication are interrelated.

Dinar (1996:2) is also of the opinion that a cluster of technologies is responsible for the enhancement of information management. The cluster of technologies includes (tele-) communication and computers but does not preclude other means such as the Internet and Intranets. According to Dinar (1996:2) the four main technologies that are required for information access in developing countries are:

a. Desktop Publishing (Applying Personal Computers).

b. CD-ROM (Compact Disk Read Only Memory).

c. On-line access (Local and Wide Area Networks – LAN's & WAN's - such as University or Government servers).

d. Internet (through TCP/IP connections).

Desktop publishing has fast replaced the conventional typewriters and is still a growing technology in Africa. There are certain inhibiting factors such as skill levels and economic standards. CD-ROM's are a major asset in terms of maintaining large volumes of information in a relatively small and less costly environment vis-à-vis a conventional library. Similarly, on-line access enhances student and research capability in that virtual research through local and wide area networks is possible, eliminating the need to frequently visit research institutions. The availability of the Internet obviously renders more benefits in that the on-line capability is expanded internationally to any search engine to access virtually any required information source (Dinar, 1996:6-7).

3.15 Information management and technology in the South African environment

The South African Government, through its Batho Pele principle, committed itself to improve service delivery in the public service. It also committed itself to give citizens full and accurate information about the public service (**Draft White Paper on Transforming the public service**, 1997:6).

In the public administration environment today and with specific reference to the South African scenario, the masses of information contained within the information technology databases are not applied for executive managerial purposes. Executive information is required not only for decision-making but also for the purpose of formulating and implementing policy in order to improve governance. In most instances this information cannot or will not be applied, as the staff is not equipped (trained) on the one hand or the systems that contains the data are cumbersome and the information contained in various files and formats (Interview with Director Department of Defence Logistics Support Formation, Department of Defence, 2000).

On the other hand very relevant information contained in some governmental databases is privileged to the extent that it may not be made available to other government departments. As an example serves the very large and accurate Independent Electoral Commission (IEC) voter database that for ethical reasons may be neither viewed nor accessed by any other state department. (This excludes the operational or line function, which assists voters to check their details.) This constraint on access is because of the **Electoral Act, 1998** (Act 73 of 1998) and a Code of Ethics passed regarding the privacy of confidential information (interview with the Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), Independent Electoral Commission, 1999).

The State Information Technology Agency (SITA) has under its management a large amount of information not being utilised to optimise executive management but rather conclude the line function of the departments it manages the information for (Interview with the previous Director Commodities and Services, 2000; Director Department of Defence Logistics Support Formation, 2000). To this extent the Department of Defence (South African National Defence Force), serves as an example in that the corporate database contains all information pertaining to the personnel, financial and logistical activities in terms of the line function of the Department of Defence. However, in order to retrieve executive management information, additional and costly programs have to written to retrieve said information (Interviews with the previous Director Commodities and Services, Department of Defence, 2000 and the Director Department of Defence Logistics Support Formation, Department of Defence, 2000). Interesting to note that at this time, much of this information is not integrated thus the personnel section is not utilised to supplement the logistics database. There exists some integration between the financial information system and the logistical information system, purely from a

point of view to pay for services rendered (such as procurement) (Interview with the previous Director Commodities and Services, Department of Defence, 2000; Director Enterprise Information Systems Architecture, Department of Defence, 2000 and the Director Department of Defence Logistics Support Formation, Department of Defence, 2000).

The South African scenarios for the application of electronic government and governance has advanced further, faster than most foreign countries. South Africa has due to its constitutional commitment accepted the responsibility to make as much as possible of the democratic process visible to as many as who would want to know. In the process, the commitment to informational databases where *de facto*. The database commitment, *ipso facto*, implied utilising the information age and implied herein the information technology available to present to all that would want to know the democratic facts of South Africa.

The **State Information Technology Agency Act, 1998** (Act 88 of 1998) had as its aim to:

> *"Provide for the establishment of a company that will provide information technology, information systems and related services to, or on behalf of, participating departments and in regard to these services, act as an agent of the South African Government; and to provide for matters connected therewith."* (Government Gazette, 1998).

The **State Information Technology Agency Act, 1998** (Act 88 of 1998) had to create an environment within which the department will feature as the host to the accumulation of (transactional) data by which the department can manage itself. This management would have as aim to formulate and implement policy. However, transactional data cannot be utilised in isolation for the formulation of policy, as executive

management information is required to for decision purposes. Executive information in turn is derived from transactional data.

The establishment of the State Information Technology Agency paved the way for an already growing application of information available to the general public with regards the doings and functioning of South African Government. Prior to the implementation of the **State Information Technology Agency Act, 1998** (Act 88 of 1998), numerous (prosperous) provincial and local governments had web-pages set-up to enlighten the citizenry with regard the governmental functioning. The integration and data management of these sites could now be realised.

The State Information Technology Agency, together with the Department of Telecommunication, was given the task of not only bringing information to the citizenry in general but to establish a telecommunication infrastructure to support and maintain this. The telecommunication infrastructure requirement led to a tender being issued under upgrade the South African governments' information system infrastructure. This tender requested the supply and installation of computers and related equipment amounting to approximately R12m by the State Tender Bulletin on 3 July 1998. The aim of this tender was to provide the ten legislatures (National Parliament and the nine Provincial Legislatures) with an Information Technology infrastructure, office systems and connectivity. The legislatures would then build on this infrastructure using their own resources. Information Systems managers have been appointed at each legislature to optimise the use of the new technology. The development of information technology systems within and between legislatures will enhance access by members, staff and citizenry to key information, and will facilitate increased public access to legislative institutions. The purchase of the equipment was to be funded from the European Union Parliamentary Support Programme as part of the European Union funded

parliamentary support programme of R86 million. This support programme was initiated to assists with the training of members and staff, departmental development, public participation, and the employment of key support staff in each legislature (Naidoo, 1998 [WWW document]).

As part of the communication upgrade of the South African Parliament announced that an information strategy (issued by the Department of Post and Telecommunication on 4 March 1998) would be put in place. In essence this framework proposed the development of a national information and communication technology strategy for all three spheres of government. The key elements of the strategy were:

a. Improving the technology capability of government through the creation of a number of technology projects of which the foundation will be a high-speed fibre optic backbone.

b. Improving service offered to all citizens by offering a one-stop shop through the use of smart cards and public information terminals.

c. Developing legislation on cyber laws such as digital signatures and encryption that will allow e-commerce to become a reality.

The use of information technology would allow government to offer and efficient an effective standardised service to citizens in all areas on a 24-hour basis. This will be done through the introduction of public information terminals and community information centres.

The then Posts, Telecommunications and Broadcasting Minister, Jay Naidoo, said:

The result of this will be a much more dynamic interaction between government and the people and see a substantial reduction in bureaucracy. We want to see an increase in government efficiency

and effectiveness and in so doing, reduce corruption and fraud and improve ordinary people's access to government information. (Naidoo, 1998 [WWW document]).

It is not yet clear whether there is improvements in interaction, as many South African's still do not have access to basic amenities such as telephones and electricity. Furthermore, it is difficult to determine whether there is an improvement in effectiveness and efficiency as departmental baseline statistics against which the improvement was to be measured, is not known. Cabinet approval meant government could begin the task of co-ordinating the development of the strategy as well as individual projects to be introduced in the short, medium and long-term. Lastly, crime statistics on white-collar crime still indicate a high level of corruption and fraud.

The Department of Communications will also convene an investment cluster on information and communication technologies. This would include the departments of Trade and Industry, Arts, Culture, Science and Technology, Public Service and Administration, Finance, Public Enterprises and Justice. A further aim is to prepare legislation for electronic commerce, such as on-line procurement and tender submission (e-commerce), encoded signature for electronic documents (digital signature), on-line interaction and report exchanges (multimedia convergence) and coding/decoding for security purposes (encryption), as a priority. The cluster must also establish a committee to look into the development of a multi-purpose smart card. The smart card could then be utilised for identification purposes access to the government sites and elections, as the card will contain all the bearer personal information. Research and development of key applications for the one-stop shop and citizens on-line would be the resultant outcome. The Minister further announced that the development of a government on-line and Intranet (for government) and all applications to facilitate the development of a one-stop shop for government services using the

fibre-optic backbone developed by Telkom, would be implemented. (Naidoo, 1998 [WWW document]).

It is interesting to note that the government also considers the financial implication of this action in that the Minister reported that:

> *A cost benefit analysis will be developed by my office and presented to the budgetary committee during the next budgetary cycle* (Naidoo, 1998 [WWW document]).

Similarly during the 1999 elections a virtual satellite (V-Sat) infrastructure as well as an Intranet (an internal Internet to the Independent Electoral Commission) was developed by the Independent Electoral Commission to facilitate the 1999 National elections (Interview with Programme Director, Independent Electoral Commission, 2000 and Independent Electoral Commission World Wide Web). This infrastructure and on-line capability not only allowed the elections to be conducted in a real-time mode but also to have all results verified within seconds.

3.16 Conclusion

Electronic government and governance is about communication, agenda setting and the application of a new medium, to wit the information technology available, to improve the executive management capability of the public office-bearer. As the telephone, the tele-fax and television made major in-roads in the political spheres so too, the information technology age.

A hundred years ago applying the telephone to communicate world occurrences was as futuristic as the concept of electronic government and governance. The point to ponder upon is not the medium *per se* but the democracy involved.

Then again, the electronic age with its technologically advances, have as much to offer as the industrial age. It is not computers *per se* but rather the totally integrated information and communication age that offers the new horizon. The information age and the technology advancements are there to optimise speed and efficiency.

Aspects that are yet to be addressed with regard the purist sense of the application of information and technology is the utilisation of this medium after an election campaign. This is as yet to be utilised to its fullest. As yet no studies have been conducted on this topic after application.

Education of the masses, inclusive of all population groups, is essential to make the information era work. Compulsory computer literacy classes and special educational work sessions for adults should facilitate this issue. The practicalities of this might be hinder-some as many refuse to become computer literate. This will limit the growth of the electronic village concept especially in the South African scenario.

The consideration, however, is that public access to government information is important in terms of the functioning of government. This is with regard to citizen participation. Promulgated acts, which determine the limitation of public access and the disclosure of information by the state, should alleviate the potential friction with regard what is disclosed and what is not.

A key policy requirement is the achievement of a national communications infrastructure, essential for social and economic activity. This is important in a world where reliable and speedy communication is vital.

Problem-areas that need to be addressed are:

a. The high illiteracy levels that are dominant the demographic profiles of (mostly) the rural communities in South Africa.

b. The high incidence of crime such as theft of copper wire.

These may seriously impede efforts to establish electronic communities in the rural areas.

What is interesting to note is that the integration of an international community in terms of integrated Free-Nets and Digital Cities are now spanning the globe. This implies that an international medium might not be so far off. Interesting is that major governments (United States of America, Western European and Asian) are participating in this scenario.

Furthermore cognisance should also be taken of those aspects, such as, geographic information service that support computer technology in agenda setting and influencing, and integrate the functioning of these components to achieve both political freedom and political strength in the age of the new democracy.

Finally the comment could be made that in the international Public Administration and Management domain, masses of data are gathered by millions of civil servants and stored in databases primarily residing on mainframe computers. In order to retrieve this information or more correctly data, specialists such as computer programmers are required to write very specialised programs in order to conform to the requirements of management for executive management information. In actual fact, systems should be designed to accommodate the executive management information requirement without revering to secondary programming techniques. At this point, due consideration must now be given to national and international trends.

CHAPTER 4

NATIONAL AND INTERNATIONAL TRENDS ON INFORMATION MANAGEMENT AND TECHNOLOGY

4.1 Introduction

This chapter will focus on the academic and practical advantages attained through the use of applied information management and technology, or presupposed, to be attainable with the application of information management and technology (*Supra*. Chapter 2, par. 2.4 and Chapter 3,). Emphasis will also be placed on the communication and management processes including project and process management, in order to bring into perspective the need for such management information derived from such activities.

Research (Bajjaly, 1998) indicates that in the public sectors both nationally and internationally the trend towards information management through applied technology is on the increase. The perceived advantage of this type of management is found in the fact that information gleaned from applied information management through technology is pro-active in terms of its application. This is achievable through the use of modelling techniques applied to the information. According to Bajjaly (1998:75), strategic information systems for planning in the public sector are stated to achieve the greatest success from an investment in the new information technology arena.

All spheres of government should derive management decisions based on transactional and executive information. Concepts and ideas for policy-making and improved governance must then be based on these

decisions. Furthermore, the implementability of these policies should be based on the information and process utilised (Interview with the previous Director Commodities and Services, Department of Defence, 2000)

Based on the concept of vast amounts of data being available but not converted into information by which the executive management process can be sustained, the question to be answered is what has the public service been doing until now? It is clear, and this statement reflects not on any regime but on the public service as a whole, that the application of information was purely dependent on the need to execute a particular line function. Implied herein is that most public officials were so concerned about doing the right things that doing things right was not considered (Interview with Director Enterprise Information Systems Architecture, Department of Defence, 2000).

It is interesting to note that most information system (management) theory focuses on the private sector but that public sector is the world's largest consumer of information technology (Claudle & Marchland, 1990 as quoted by Bajjaly, 1998:76). Quoting Anderson and Dawes (1991), Bajjaly (1998:76) is of the opinion that government collects, collates and disseminates vast amounts of data and could, if correctly applied, gain a strategic benefit from this. It becomes apparent from Bajjaly (1998:76) that there is a distinct interest in the management of the various public service sectors to strategically position themselves through the information system (technology management) to respond effectively to changes in their environment (Anderson & Dawes, 1991 as quoted by Bajjaly, 1998:76).

4.2 Public service and information management: Selected international examples

The four international examples reflected on in this chapter was selected, as they were the best suited for the problem statement. Bajjaly (1998:75) is of the opinion that the public sector is not very interested in the new age information management, irrespective of the fact that it is more advantageous to apply information pro-actively in the management of the public sector. This lack of interest is most disconcerting. Even more disconcerting is the fact that very little integrative management principles are applied in the public sector management domain. The lack of integrative principles could be largely due to the (relatively) new nature of the concept of information management through applied technology. In the context of this thesis, integrative management refers to the integration of the various processes that make up the public service for example personnel management, logistics, financial services and utilities. One should not forget that the core function of the public service is to render a service. Thus comparing it to the private sector the core business that needs to be managed is that of service delivery. In the case of the national government, good governance based on sound policy should be the focus. Good governance based on sound policy should also be the priority for the second sphere (to wit the provincial sphere) of government. At the third sphere of government (local sphere), the priority should be to maximise functionally derived processes in order to meet the requirements of the populace.

The selected research countries represent an East versus West situation, thus being indicative of the management situations and needs in two distinct sections of the globe. The four examples also represent various spheres of government and levels of governance. Various other countries have experimented with information management and

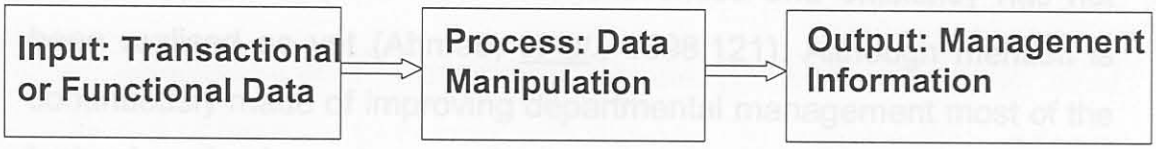
technology migration but there is a scarcity of information on these activities. These examples also represent both developed and developing countries.

The first example that will be presented is the Jordanian adoption of information technology in the public sector. The author of the Jordanian article reflects on the scarcity of data and literature on this subject matter with specific reference to developing countries (Ahmed, *et al.*, 1998:117-119). The second example is that of Mexico's local government but with the angle of information technology utilisation through the Internet (Gutierrez, *et al.*, 1999:19–31). The third example deals with the Peoples Republic of China and specifically with four large state enterprises, which applied information technology for planning support, planning methodology, data resource management and the information manager's role (Dologite, *et al.*, 1998:113-129). The fourth international example is the California Municipal experience. This example explores the way in which the Californian municipalities incorporated information technology into their civic operations for presumably improved management (Caves, *et al.*, 1999:3-12).

4.2.1 Jordanian example

The Jordanian research is based on forty-four Jordanian public agencies. The study does not differentiate between hardware (physical infrastructure) or application (software and operating systems) and the information and management process derived from such applications. It focuses on the introduction of information technology as a hardware solution with the resultant information and management as products from this tool (Ahmad, *et al.*, 1998:117). Once again the process approach may be derived from this perspective with data as an input (e.g. functional or transactional data), processed (with information technology) and then an output (e.g. executive management information) is derived (see Figure 4.1).

Figure 4.1: The Process Approach



Source: Englander, 2000:10

In Jordan, as is the case nationally and internationally, no large or complex public organisation, nor the administration and management of the social and economic programs of such an organisation, is possible without information technology (Ahmed, *et al*., 1998:118). Furthermore, a supportive environment and skilled staff in a politically stable climate are critical pre-requisites for the success of information technology application (Ahmed, *et al*., 1998:118).

Jordan's public sector information technology grew from having virtually no structure in 1970 to being the leader in the Middle East in present day. This was enabled primarily through the use of their (Jordanian) Royal Scientific Society, which is an active proponent of Information Technology. This society not only conducts research with regard to (management) requirements but also develops software for various applications in support of these requirements. With regard to this, the (Jordanian) Royal Scientific Society has conducted and concluded numerous studies and developments for various Jordanian public sectors including the Ministries of Justice, Foreign Affairs and the Department of Income Tax (Ahmad, *et al*., 1998:119).

The implementation of information technology in the public sector, nationally and internationally, but especially in developing countries, was to improve efficiency and effectiveness in order to

> *"... influence (on) how government agencies conduct business"* (Ahmed, *et al*., 1998:120).

However, due to the lack of an integrative approach to information technology, the improvement in effectiveness and efficiency has not been realised as yet (Ahmed, *et al*., 1998:121). Although mention is continuously made of improving departmental management most of the technology implementation reflects a focus on improved line function (doing the job better). The situation in developed countries *vis-à-vis* developing countries, is somewhat different in that management is more involved in information technology for improved administration whilst developing countries are still concentrating on improving there line function capability (Wilson, as quoted by Ahmed, *et al*., 1998:121). In many developing countries the implementation of computer technology is dependent on economic development (Ahmed, *et al*., 1998:121).

4.2.2 Mexican example

The Mexican approach to information requirement is not directly linked to the process approach but rather from the need to know within the functional perspective. The need to know may be described as a right to information and a right to be informed (Gutierrez, *et al*., 1999:19). Being informed, *de facto,* may be linked to the process approach as the need to know may be equated with the input mode, and the right to be informed, to the output mode as the resultant expectation. Embodied in the result is an activity, which may be equated with transforming data into information. The Internet, within the Mexican environment, is applied as a mode of both communication and information in an environment of political reform. Through the use of discussion groups, the Mexican citizenry can freely communicate (political) ideas. One of the major stumbling blocks is, however, the lack of access to the Internet. (Gutierrez, *et al*., 1999:20). A second major stumbling block is that the Mexican political scenario still maintains an authoritarian outlook on information availability. This control, in turn, results in the

lack of public policy to mandate access to governmental network (Gutierrez, *et al*., 1999:30-31).

The Mexican Local Government (municipalities) does not have sufficient computers to comply with the need to manage their districts. Furthermore, it was found that the citizenry was also ill-equipped for this day an age with regard to information availability and technology. Being ill-equipped, is mainly due to the lack of (communication) infrastructure development and hardware in the rural areas (Gutierrez, *et al*., 1999:21-22). The lack of infrastructure in rural areas, is also the main stumbling block in the South African scenario. Due to the developing nature of the Mexican information technology and the absence of hardware, the Internet was a solution to be followed in order to improve government management capability. This route was followed primarily because of the low cost implication (Gutierrez, *et al*., 1999:23).

The growth in the application of computers as a solution provider and information source in Mexico is considered to be the second highest in the Latin Americas. In this regard only Brazil surpasses it. The main constraint still remains in the lack of (communications) infrastructures (Gutierrez, *et al*., 1999:23).

Enlightening is that the Mexican Government, after initially using universities for Internet access, has now gone independent, thus enhancing the accessibility of the citizenry, the citizenry have access to the Internet, to the information of the government (Gutierrez, *et al*., 1999:23).

4.2.3 Chinese example

The Chinese example is based on the industrial reform that occurred in China from 1979. Herein there was a shift in responsibility for business planning and economic performance from government to the top

management of Chinese State Enterprises (CSE's). This was referred to as the contract-responsibility system where-in managers were given the responsibility for personnel, finance, and marketing and foreign trade decisions. The contract-responsibility system implied that the managers had to meet their agreed on targets or performance objectives but in exchange got total autonomy to re-invest residual income (Dologite, *et al*., 1998:113).

In contrast to the previous examples the Chinese situation was one of dominated Communist rule in which an open market economy was not encouraged. The Chinese government sensed that to compete globally, they had to move away from the closed systems (a system controlled by the government) approach to an open systems (a system whereby all citizens participated freely) approach. This lead to the birth of the Chinese State enterprises with a specific focus on Information systems. A new approach was required primarily due to the notion of being internationally competitive. The banking sector was the first to utilise the information technology advantages for functional and transactional management and tasks (Dologite, *et al*., 1998:113-114). [It needs to be noted that the executive information management facet is again absent].

In the Chinese example the reform from 1979 began with the transfer of more responsibility to the Chinese State enterprises (contract-responsibility system). This entailed the transfer of responsibility in planning and economic performance by top management (Dologite, *et al*., 1998:114).

In the Chinese example information mismanagement occurred (and still occurs) due to the legacy of inefficiency in the Communist management methodology. Managers reportedly understated capacity and overstated production in order to receive greater rewards. Furthermore, the Chinese concept of hired staff with life-long employment (similar to

the Japanese traditions) implies the non-retrenchment of unproductive workers, leads to further losses in revenue (Dologite, *et al*., 1998:115).

In the Chinese example it is found that in all of the Chinese State enterprises (the steel industry, the petrochemical industry, the general hospital and the harbour and port authority), no or very limited network capability exists for the interchange of data and more overly for management purposes. Furthermore massive duplication of data is evident due to the lack of an integrative system of data management and networking. It is also stated that managers spent more time on obtaining more hardware for functional or task driven actions than on managing the actual activity or Chines State enterprise which had been allocated to them. In the case of the Harbour Authority, a lack of government investment and lack of efficient use curtails management optimisation of this Chinese State enterprise. In the case of the General Hospital even though it is deemed the most modern due to the fact that it is government and more specifically Military controlled, the problems are the same (Dologite, *et al*., 1998:119-121).

4.2.4 Californian example

The Californian experience entailed an approach based on the principle of knowledge and specifically of networking. Herein the production and transmission of data and information play a vital role. An integrated system whereby data is exchanged in order to optimise management was sought after. The transformation to a state of optimised management is difficult, and an excellent communications infrastructure is a pre-requisite. The participating Californian municipalities explored and deployed various methodologies in order to embrace the concept of on-line public service. This might not necessarily be public management but certainly encompasses improved public service with the application of available data (therefore transactional activities) (Caves, *et al*., 1999:3-4).

The Californian experience is captured in the improved service delivery dilemma. A dilemma was that infrastructure planning (with specific reference to communication), did not meet the basic demands of the information technology age. The Californian solution was one of embracing the information technology age in order to establish smart communities (Caves, *et al.*, 1999:4). The Californian local governments were forced to respond to the requirement of the constituents as the citizens had become frustrated over the lack of service at the various levels of government. It was imperative for the Californian municipalities to identify the need for improved information infrastructure and technology for the improved service delivery of, amongst others, health justice, economic growth and education (Caves, *et al.*, 1997:5). The Californian approach of smart communities actually required from their citizenry to become informed in order to effectively participate in the public policy process (Caves, *et al.*, 1999:5). A smart community is any form of co-operation among counties, individuals, governing institutions, but never solely individuals, with the common aim that fundamental and not incremental changes should be effected. In this point of view management of the participating environment is addressed (Caves, *et al.*, 1999:6)

Electronic communication does not make human intervention obsolete. Caves, *et al.* (1999:6) argues as follows on this issue:

> "*Individuals will always be needed to create, process and respond to the request for information.*"

In this regard the Californian example implies that some form of intervention is required to process information for applied information management. The example, however, does not pertinently address the importance of *applied* information in favour of the *transactional* information (Caves, *et al.*, 1999:6).

The Californian experience is that the growth in the economy after the implementation of the smart communities' concept ensured a growth rate that ranks them seventh amongst the world economic powers. It is interesting to note that the telecommunication sector is the fastest growing and most vital of what is termed as the leadership industries (Caves, *et al.*, 1999:6). In terms of the success of the smart communities' concept the grouping of various counties into larger more marketable entities resulted in economic growth. It is also interesting to note that these local authorities created website whereby these smart communities were marketing themselves (Caves, *et al.*, 1999:7).

The Californian example is concluded with the fact that the information age is changing the way we communicate (Kennard, 1998). The experience of the Californians was rather that of improved telecommunication than improved management of the data available to them. Obviously much transactional management had to occur in order to make them as viable as mentioned. Importantly, customising and networking communities sustained their efforts. The information technology does appear to have opportunities for local government (Caves, *et al.*, 1999:11). The dissemination of information through the application of information technology paves the road for true executive information management and not only applied transactional data (Caves, *et al.*, 1999:12).

4.3 Public service and management: National trends

This section will deal with the aspect of regionality as well as the specifics relating to the South African environment. Herein will be described as the aspects of information technology application in the public service of the South African Government. Most of this information is taken from the interviews that were conducted as part of this research with senior managers from the Department of Defence

(South African National Defence Force), Independent Electoral Commission and the Department of Justice and Constitutional Development.

The Department of Defence (South African National Defence Force) has as its aim to optimise and maximises its capability in order to pose an offensive and defensive capability and therefore be a deterrent to any possible foreign onslaught. In this process certain line activities have to be performed in order to allow the operational function to be mobilised to its fullest. Executing the line functions in turn requires the support functions (for example logistics, personnel, and finances), to optimise both productivity and executive management processes and reduces cost or budgetary impact (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000; Director Department of Defence Logistics Support Formation, Department of Defence, 2000 and Director Human Resources, Department of Defence, 1999).

In the case of the Independent Electoral Commission (IEC), the aim of the IEC is to ensure free and fair elections. Cost also plays a significant role. The IEC therefore applies its resources and its contracted strategic partners to prepare for the elections while optimising financial and logistical resources (Interviews with Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), Independent Electoral Commission, 1999; Assistant Manager Electoral Logistics (Director), Independent Electoral Commission, 2000; Director Procurement, IEC, 1999 and Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, Independent Electoral Commission, 2000).

The Department of Justice has a business unit focussed on the development and implementation of information management solutions. At this time there are five projects being developed and implemented.

The aims of the projects are to improve the existing case (or docket) turn-around time in the courts. The remaining four projects are to establish an infrastructure to ensure connectivity and communication, computerise the Masters Courts, supply resources and develop skills within the department and to implement a management information system (Interviews with Deputy Director General Corporate Services, Department of Justice and Constitutional Development, 2001; Director Information Technology, Department of Justice and Constitutional Development, 2001; Project Manager Digital Nervous System, Department of Justice and Constitutional Development, 2001 and Project Manager Financial Administration System, Department of Justice and Constitutional Development, 2001).

These three Departments, the Department of Defence, the Department of Justice and Constitutional Development and the Independent Electoral Commission, represent areas of specific importance and performance in terms of South African Government departments' situations in the field of information management and technology. In the case of the Department of Defence, they could be considered the past leaders in the area of information technology and management (Interview with previous Director Commodities and Services, Department of Defence, 2000). In the case of the Independent Electoral Commission, they probably are the current and existing leaders in the field of information technology management (Interviews with Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), 1999 and Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). In the case of the Department of Justice, currently rated low in the field of information management and technology, they may be considered to be fast surpassing all other departments in the near future, in the field of information management and technology (Interviews with Deputy Director General Corporate Services, Department of Justice and Constitutional Development, 2001

and Director Information Technology, Department of Justice and Constitutional Development, 2001). These three departments therefore represent the furthermost and middle point of the spectrum of the study. These departments also represent extremities in terms of their service orientation with regards to the populace, hence the selection.

In this section the South African view on communication (which is an essential requirement for technological communication) as well as the cited examples, will be explored in more depth and detail. In terms of the examples that will be cited, the use of management information (or lack thereof) will be explored. The applications used will be described and be disseminated in terms of their applicability in the broader departmental sense. In this regard one has to consider the aspect of policy formulation and implementation. In the South African scenario, little if any implementation has occurred regarding the management of information. This, to the degree that numerous public broadcasters, has requested interviewees with responsible Ministers in this regard.

4.3.1 The South African view on communication

The South African Government through its Batho Pele principle committed itself to improving service delivery in the public service. It also committed it self to giving citizens full and accurate information about the public service (Draft White Paper on Transforming the Public Service, 1997:6).

The South African scenarios for the application of electronic democracy has advanced further, faster than most foreign countries. Due to its constitutional commitment, South Africa has accepted the responsibility to make as much as possible of the democratic process visible to as many as would want to know. The commitment to informational databases where *de facto* in the process. This implies that the government committed them to better management utilising all

available information. This, *ipso facto*, implied utilising the information age and the information technology available to present to all that would want to know the democratic facts of South Africa.

The State Information Technology Agency (SITA), responsible for maintaining the participating government department's information databases and systems, is not empowered or tasked to transform and interpret data. In terms of the act, the **State Information Technology Agency (SITA) Act 88, 1998** (Act 88 of 1998), provision is only made for the establishment of an agency to manage data, transactional information and infrastructure for and on behalf of participating departments. This limitation precludes the capability of transformation and interpretation of data into executive management information (*Supra* Chapter 3, par. 3.15).

This Act, the **State Information Technology Agency (SITA) Act 88, 1998** (Act 88 of 1998), paved the way for an already growing application of information available to the general public with regards to the actions and functioning of the South African Government. At this stage numerous (prosperous) provincial and local governments had web pages set up to enlighten the citizenry with regard to governmental functioning.

As stated previously, the State Information Technology Agency, together with the Department of Telecommunication, was given the task of not only bringing information to the citizenry in general but also of establishing a telecommunication infrastructure to support and maintain this (*Supra* Chapter 3, par. 3.15).

The most interesting aspect regarding this partnership was that the then Minister of Telecommunication, J. Naidoo, publicly stated that his decisions will be based on the financial implication of this action in that (*Supra* Chapter 3, par. 3.15):

A cost benefit analysis will be developed by my office and presented to the budgetary committee during the next budgetary cycle (Naidoo, J. 1998 [WWW document]).

In developing a cost benefit analysis, government indicates not only good governance but also prudence in terms of return on investment. Decisions to implement solution will be made on the financial impact as well as the proposed outcome thereof. Trade-offs between off-the-selve solutions (developed solutions that may be procured from vendors) versus bespoke development (system designed and developed on request of the user) as well as integrative and transversal systems development decisions could then be made from an informed cost impact basis.

At this time generic and governmental transversal systems commissioned by the Department of State Expenditure and the Department of Public Service and Administration, where designed and maintained under the auspices of the State Information Technology Agency. Prior to the State Information Technology Agency, Infoplan, the Central Computer Services (also known as Govnet or Openet) and a contracted bureau, NUMERIS (Numerical Electronic Information Service), doing batch processing, where responsible for the information technology developmental and maintenance needs of the participating government departments (Interviews with Director Information Technology, Department of Justice and Constitutional Development, 2001 and Director Enterprise Information Systems Architecture, Department of Defence, 2000).

The systems developed and maintained include the PERSAL (personnel and salaries), LOGIS (logistics information system) and FMS (financial management system) systems. These systems inherently suffer from being designed as transversal systems to accommodate as much as possible of every generic activity for all

departments and therefore lack the actual capability to comply with the unique and specific departmental needs. The added problems to these systems are that they do not focus on management information specific to the departments they serve nor do they allow real time statistical inferences. They do have a rather loose functional or transactional report structure (printouts) that need to be acquired from the central processing unit (the State Information technology Agency). The data capture for these systems are still done manually from source documents (official forms completed manually), which are unchanged from those prescribed years ago by Treasury, the Department of State Expenditure and the Department of Public Service and Administration (Interviews with Deputy Director General Corporate Services, Department of Justice and Constitutional Development, 2001 and Director Information Technology, Department of Justice and Constitutional Development, 2001.). The various Defence logistics systems, which allow for more flexibility, can, however, not be categorised herein (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000; Director Department of Defence Logistics Support Formation, Department of Defence, 2000 and Previously Director Commodities and Services, Department of Defence, 2000).

Excluded from the above statement is the Independent Electoral Commission, which commissioned the development of unique systems for application in their logistics, personnel and financial environments (*Supra* Chapter 3, par. 3.15). The Independent Electoral Commission does not apply any governmental transversal systems (Interviews with Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), Independent Electoral Commission, 2000; Assistant Manager Electoral Logistics (Director), Independent Electoral Commission, 2000; Director Procurement, IEC, 1999; Programme Director Klynveld, Peat,

Marwick and Goerdeler (KPMG) Electoral Consortium, 2000 and the Independent Electoral Commission World Wide Web).

4.3.2 Department of Defence (South African National Defence Force SANDF or SADF)

The Department of Defence has seen a transformation since 1994 in terms of the physical appearance and deployment. That implies that the role of a National Defence Force moved from an external defensive posture with an offensive capability, to a force that is (virtually) purely defensive in nature. Furthermore it now has as one of its primary funcionalities an internal supportive role to the South African Police Services in order to maintain internal security and peace (White Paper on Defence, 2000).

In terms of information management the SANDF or the then SADF had since the late 1960's had its own information management technology structure contained within the then Chief of Staff Management Services (CSMS) with a Directorate Electronic Data Processing (DEDP) responsible for this activity (Interview with Director Enterprise Information Systems Architecture, Department of Defence, 2000). This section was responsible for the development of functional software run from an IBM 360/145-Virtual Machine (VM) and later IBM 370/158-mainframe computer. Software development revolved around the generation of programs for the Payroll System (FMS – Financial Management System), Logistics (ILS – Integrated Logistics System and a medical system concerned with the integration of all medical health care facilities. Also developed was a personnel system (PERSOL – Personnel and Salaries; not to be confused with the PERSAL of other Government departments) envisaged as an extension of the FMS. The PERSOL system ultimately resulted in a personnel administration system for the administration of personnel leave and related functions (e.g. transfers, temporary postings and pension) in the Department of

Defence (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000; Director Human Resources, Department of Defence, 1999 and the previous Director Commodities and Services, Department of Defence, 2000).

During the development of the integrated logistics system (ILS), later the logistics information management system (LIMS), the personnel and salaries (PERSOL) system and the financial management system (FMS), no attention was given to specifically generating executive management information. All systems developed were to improve the line functionality of the various departments involved. Masses of information was collected but still had to be disseminated manually. This led to the start of the generation of information databases (Interview with Director Enterprise Information Systems Architecture, Department of Defence, 2000).

During 1978/1979 Infoplan, as a part of the then Armscor Group, was brought into existence in order to officially take over the computing function of the State Departments including the Department of Defence. The decision to have civilian organisations managing the information technology of government departments, was based on the premise that the Department of Defence and other government departments would not have access to the international markets for technology sorely required to maintain the government computer environment, due to the then embargo's and boycotts imposed on South Africa as a result of the then political dispensation (Interview with Director Enterprise Information Systems Architecture, Department of Defence, 2000).

Specifically for the Department of Defence account, Infoplan was the prime contractor in terms of software development and hardware deployment. By 1998 Infoplan had two distinct divisions, the one focussing on Defence and the other on Private enterprise. At this time Infoplan was also amalgamated and renamed to the State Information

Technology Agency (SITA) with separate divisions established to look at various governmental enterprises (interview with the Director Enterprise Information Systems Architecture, Department of Defence, 2000).

4.3.2.1 Data management in the Department of Defence

The Department of Defence amassed great volumes of transactional data. The amassing of data was primarily due to the drive to automate most of the manual functions. Although many pre-defined forms or printouts were available regarding the various important issues pertaining to the functional activities (for example inventory-related data, personnel data, financial or budgetary detail and medical histories), virtually none of these forms were available on-line (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000; Director Department of Defence Logistics Support Formation, Department of Defence, 2000 and Director Human Resources, Department of Defence, 1999). Thus data had to be requested days in advance and was delivered or collected days later. During more recent systems development, post 1996, more on-screen summaries of functional data were available for use by the staff (for example SLIS – South African Air Force Logistics Information System). Printouts and forms were easier to obtain but in some instances still had to run off-line (e.g. after the days transactions were completed) and had a waiting period of at least one day (Interview with Director Enterprise Information Systems Architecture, Department of Defence, 2000).

Since 1994, the drive to a process driven approach vis-à-vis the functional or silo approach was impacting on the way transactions were being executed. Yet the User Requirement Statements (URS) for the various systems were still focussed on improving the functional and transactional ability of the activity they had been developed for. This yet

again resulted in the development of functionally oriented systems, systems related to a component within the Department (for example logistics, financials, personnel) and not to the true cross cutting or transversal systems addressing the management process within the Department. These types of development could at this time still be attributed to the way the Department was and still is structured, to wit, along functional lines (for example operations, logistics, finances and personnel) (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000; Director Human Resources, Department of Defence, 1999 and Previously Director Commodities and Services, Department of Defence, 2000).

More recent developments (1997/1998) were a total restructuring (transformation) within the Department of Defence. The restructuring resulted in common functions (for example common logistics – procurement, clothing, and depot management or Operations – Joint Operations Centre (JOC) or Finances – de-militarised and civilianised) being grouped rather then replicated in the various Arms of Service (for example Air Force, Army and Navy). In turn this impacted on the systems and data management of the various services, as these could not necessarily be integrated. It is thus found that although a common function is performed at a site, the various Arms of Services' system are still being utilised, leading to duplication of data rather than interpretation of data. The utilisation of unique systems are essentially not a problem but the executive management of the data across the Arms of Service (transversal) now becomes important and crucial in order to attain the aim of the integration which was amongst others to minimise cost by optimising the allocated budget (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000; Director Department of Defence Logistics Support Formation, Department of Defence, 2000 and the previous Director Commodities and Services, Department of Defence, 2000).

Primarily to date print reports are still generated to obtain transactional statuses as well as specific transactional management information. The South African Air Force Logistics Information System (SLIS) and the South African Armies Logistics Management Information System (CALMIS), never realised the executive management information the users specified, as all independent project development was halted with the aim of integrating and transforming to a single logistics system. Either way these systems are still focussed on transaction information and data. The reports are in most instances not real time or synchronous as they run off-line and therefore do not always assist in the decision-making arena with either executive or transactional management information when needed. The existing new logistics systems (SLIS, CALMIS and NLIS) tend to give a more real-time on-screen capability. Much of this is, however, still based on the transactional need like operational capability (serviceability of weapon systems) or maintenance situations (situation reports on service situations) (Interviews with Director Enterprise Information Systems Architecture, Department of Defence, 2000 and Project Manager Electoral Logistics System, 2000).

4.3.3 Independent Electoral Commission (IEC)

The principle authority responsible for the management of national, provincial and local elections is the Independent Electoral Commission (Lodge, *et al*., 2000:1). All negotiating parties at the World Trade Centre in Kempton Park agreed to the establishment of the Independent Electoral Commission (IEC) on 7 September 1993. The inaugural meeting was held on 24 December 1993 with the aim to hold the first ever fully democratic elections over the period 24 to 29 July 1994. This was duly executed.

However, the Independent Electoral Commission was not established as an institution until 1996 when Section 181 and 190 of the

Constitution of the Republic of South Africa, 1996 (Act 108 of 1996). The **Electoral Act, 1998** (Act 73 of 1998), stated that the Independent Electoral Commission, will be a state institution charged with the strengthening of the constitutional democracy of South Africa (Lodge, *et al*., 2000:1).

The mission statement of the IEC states that it strives:

> *"To strengthen constitutional democracy through the delivery of free and fair elections in which every voter is able to record his or her informed choice"* (Independent Electoral Commission, 2000:i).

On both the former occasions, 1999 and 2000, the Independent Electoral Commission succeeded in executing this mandate.

Section 190 of the 1996 Constitution prescribes the functions of the Independent Electoral Commission as the following (Lodge, *et al*., 2000:2):

a. Manage the elections of national, provincial and municipal bodies in accordance with national legislation.

b. Ensure free and fair elections.

c. Declare the results of these elections within a period that is prescribed by national legislation and that is as short as reasonably possible.

In terms of these functions the Electoral Commission was set up by the **Electoral Commission Act, 1996**, (Act no 52 of 1996) to (Lodge, *et al*., 2000:2):

a. Manage elections.

b. Promote conditions conducive to free and fair elections.

c. Compile and maintain voters' rolls.

d. Compile and maintain a register of parties.

e. Establish and maintain party liaison committees.

f. Undertake and promote research.

g. Review and make recommendations on electoral legislation.

h. Promote voter education.

i. Declare results of elections.

j. Adjudicate electoral disputes.

The Independent Electoral Commission not only executed the 1994 elections (without a voter's roll) but also duly initiated and executed the 1995/6 municipal elections. During this election 807 voters rolls where used (Independent Electoral Commission, 2000:10). During the period 1995 to 1999 various institutional aspects regarding the Independent Electoral Commission was addressed and completed such as the Geographical Information System (June 1998), the delimitation of voting districts (November 1998) and the first national common voters roll (April 1999). The second national and provincial election was held on 2 June 1999 with the municipal election held on 5 December 2000 (Independent Electoral Commission, 2000:10 and interviews with Manager Voting Station Infrastructure and Electoral Logistics [Chief Director], Independent Electoral Commission, 2000; Assistant Manager Electoral Logistics (Director), IEC, 2000; Acting Chief Director Security, Independent Electoral Commission, 2000; Director Procurement, Independent Electoral Commission, 1999 and Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000).

4.3.3.1 Data management of the Independent Electoral Commission

The Independent Electoral Commission interprets data it has gathered. This data has to be captured and manipulated in order to produce election results. During previous elections (pre-1994) a very small percentage of the South African populace had the opportunity to vote. Managing this was neither complex nor complicated. From 1994 a voting populace of close on 20 million had to be maintained and managed. Pre-1994 the then Department of Home Affairs managed the election process. The management of voters could be done on there, then, existing systems, as they had the data regarding the voting populace of approximately 4 million voters. After 1994 this information was insufficient and the systems inadequate as an additional 16 million potential voters joined the ranks of the existing voting populace (Interviews with Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), Independent Electoral Commission, 1999; Director Procurement, Independent Electoral Commission, 1999 and Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000 and Independent Electoral Commission World Wide Web).

In terms of the Independent Electoral Commission mandate all citizens had to have the right to express their vote. The rural areas had to be so delimited as to ensure that potential voters did not need to travel vast distances (in excess of 4 kilometres) to their voting stations. This implied that a geographical map of population distribution of great detail had to be designed. Hence, the Geographic Information Service by which function the Independent Electoral Commission completed and automated a statistical delimitation of South Africa in 14650 voting districts. The delimitation achievement won the Independent Electoral Commission the National Productivity Institute's Platinum Award (Independent Electoral Commission, 2000:4). Given the data and the

mobility of the populace the Independent Electoral Commission had to collate and interpret the data virtually in real time. In order to interpret data, the Independent Electoral Commission established a Wide Area Network (WAN) to approximately 526 points, which focussed on upgrading of the telecommunications network of the local authorities. The establishment of a wide area network of this magnitude won the Independent Electoral Commission the Computerworld Smithsonian Award (Independent Electoral Commission, 2000:5). Also, voting stations had to be taken to the voters. This involved not only a logistical exercise of great magnitude, but also detailed information as to the number of voters to be catered for. Hence, the integrated logistical support system that obtained a Logistics Achiever Merit Award in 2000 (Independent Electoral Commission, 2000:6).

All these activities point to one aspect of the Independent Electoral Commission and that was that they succeeded in their primary objective of delivering free and fair elections. The success of delivering free and fair elections was obtained with the aid of information technology (Independent Electoral Commission, 2000:37). All aspects of the electoral process that could be computerised were computerised or connected (Independent Electoral Commission, 2000:38). All calculations from the voting populace to the quantities of voting booths, pens and ballot papers were based on computer manipulated information (Independent Electoral Commission, 2000:27). The question, however, remains whether the Independent Electoral Commissions management process improved through the use of these vast quantities of information? Although it might seem that the Independent Electoral Commission succeeded in mobilising its information resources into a excellent management tool, the fact of the matter is that they merely mobilised these resources in executing their primary objective and mission, to wit to deliver free and fair elections. Delimiting and connecting South Africa's voting district was a function

that had to be executed in order to attain the Independent Electoral Commission mission. The potent computing environment of the Independent Electoral Commission, which had established itself as a pacesetter in large Inter- and Intranet support, did exactly what it was designed for and in many instances exceeded expectations, but was not used for the executive management function *per se*. Management at all levels within the Independent Electoral Commission was greatly based on non-integrated spreadsheet driven reports (Interviews with Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), Independent Electoral Commission, 2000 and Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). Excluded from the afore-mentioned is the Integrated Logistics Support system, which was a real time management tool and supported the decision-making arena in the run up to and execution of the 1999 national election and again in the 2000 local election (Interviews with Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000 and Project Manager Electoral Logistics System, 2000). It supplied readiness information by translating the supply chain information (for example procurement, distribution and delivery statistics) into voting station readiness reports (Interviews with Manager Voting Station Infrastructure and Electoral Logistics [Chief Director], Independent Electoral Commission, 2000; Assistant Manager Electoral Logistics (Director), Independent Electoral Commission, 2000; Acting Chief Director Security, Independent Electoral Commission, 2000; Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000 and Project Manager Electoral Logistics System, 2000).

4.3.4 Department of Justice and Constitutional Development (DoJ)

South Africa's new **Constitution of the Republic of South Africa, 1996**, (Act 108 of 1996) demands transformation in various spheres of government in order to conform to the principles of the new democracy. According to section 16(6)(a) of schedule 6 of the Constitution it determines that:

> *"As soon as is practical after the new constitution took effect, all courts, including their structure, composition, functioning and jurisdiction, and all relevant legislation, must be rationalised with the view of establishing a judicial system suited to the requirement of the new Constitution"* (**Constitution of the Republic of South Africa, 1996** (Act 108 of 1996).

The process of rationalisation is taking effect but is yet to be completed. The courts are still suffering from lack of personnel and infrastructure. Legislation has been passed to optimise courts (for example Saturday courts) but judiciary is still spending too much time (up to 3 hours a day) on manual administrative functions (scheduling and completing forms and dockets) (Interview with Deputy Director General Corporate Services Department of Justice, 2001).

The Department of Justice and Constitutional Development was established in accordance with the **Constitution of the Republic of South Africa, 1996** (Act 108 of 1996), Chapter 8, as the restructured Department of Justice and Constitutional Development (Act 108, 1996(8)). The vision of the Department of Justice is to transform and rationalise the administration of justice into a legitimate system that gives effect to the basic constitutional goals as per the reconstruction and development plan for South Africa (Interview with the Deputy Director General Corporate Services, Department of Justice, 2001).

The Department of Justice has as its responsibility the administration of justice as a function of the national Government, which must ensure a uniform system of justice, guaranteeing equal protection for all. The Department of Justice is responsible for the administration of the courts and performs these functions in conjunction with the judges, magistrates and Attorney Generals. The performance of the justice function is applicable to both the criminal and civil justice scenario. Furthermore, the Department of Justice has as its responsibility the administration of the courts, providing legislation and providing administrative support to these establishments (Interview with Deputy Director General Corporate Services Department of Justice, 2001 and homepage Department of Justices' World Wide Web, 2001).

During February 1997, the Government announced its intention to embark on a strategy of optimising the justice system by allocating R 1.2 billion to 14 projects within the Justice cluster (the Justice cluster comprising of the Department of Justice and Constitutional Development, South African Police Services, the Department of Correctional Services and the Department of Social Development). The importance of the allocation is that the bulk of these funds were to be spent with the aim of improving the information management situation within the departments concerned (Department of Justice, Homepage, World Wide Web, 2001).

The Department is currently in a state of restructuring to comply with the changing needs. As information technology is playing an increasing demanding role and the existing systems do no not comply with this requirement, it necessitated an establishment of a new approach. This approach based on a multi million Rand investment in infrastructure and deployment of required networks will link the entire Justice environment into an Integrated Justice System. Funding for these projects includes foreign aid from the European Union and the Dutch Government (Ebrahim, 2001 and interview with Deputy Director

General Corporate Services, Department of Justice and Constitutional Development, 2001).

4.3.4.1 Data management in the Department of Justice

Data management in the Department of Justice was, as was the case in most government departments, done in-house with the assistance of the State Information Technology Agency. Major development work was done within the institutions but all transversal interfaces were contracted out. In this instances the State Information Technology Agency was responsible for co-ordinating such contracting. Prior to the State Information Technology Agency, the Central Computer Services (also known as Govnet or Openet) and an information technology bureau, NUMERIS (contracted for batch processing), was responsible for this development and support. In-house the maintenance to hardware and software was done (and still is at this time) by the Departments' own computer staff.

In accordance with current government practice whereby all generic and governmental transversal systems commissioned by the Department of State Expenditure and the Department of Public Service and Administration and designed under the auspices of the State Information Technology Agency, are to be maintained by the State Information Technology Agency, the practice of in-house development and maintenance would have ceased within the 2002 fiscal year and would then be handed over to the State Information Technology Agency. This compliance would also be applied to all unique systems developed for or on behalf of the Department of Justice (Ebrahim 2001:8 and interviews with Deputy Director General Corporate Services, Department of Justice and Constitutional Development, 2001; Director Information Technology, Department of Justice and Constitutional Development 2001 and Project Manager Digital Nervous System, Department of Justice and Constitutional Development, 2001).

At this time, no formal electronic executive information management system exists within the Department of Justice. Transactional management information is limited to that obtained from the financial systems, such as the government transversal financial management system (FMS) and the Department of Justice's Master's system, and manually updated spreadsheets. The transversal system, focussing on financials, has its own inherent problems such as being printout based and being to time consuming for decision-making (Ebrahim, 2001:10). The situation, regarding transactional information, is being remedied with the development and implementation of the courts process system.

In most instances the information obtained to (functionally /transactionally) manage the courts, to optimise the executive management *per se*, is obtained by means of manual methods. In rare instances, primarily at high court and head office scenarios, the application of databases or similar support systems are utilised. In other instances spreadsheets are utilised to maintain, for example, awaiting the number of fully tried cases (based on physically ascertaining the fact at record management) or the conviction rate (manually determined from the case files). Prosecutors spend a significant amount of their time manually collating information and statistics and other administrative tasks (Ebrahim, 2001:9 and interview with Director Information Technology, Department of Justice and Constitutional Development, 2001). Until April 2000 less than 10% of justice officials had access to computers. At this time little can be done to optimise case turnaround time, improve conviction rate or manage the loss of case files as no support structure is in place. This obviously reflects badly on the justice system (Ebrahim, 2001:7-9 and interviews with Deputy Director General Corporate Services, Department of Justice and Constitutional Development and Director Information Technology, Department of Justice and Constitutional Development, 2001).

However, as part of the proposed 1997 strategy, the Department of Justice, at this time (1999/2001), have embarked on piloting a revolutionary electronic system that will not only optimise the functions within the Department of Justice, but bringing the justice cluster closer together for a more effective and efficient legal system (Ryan, 2000:18). (The justice cluster refers to the Department of Justice and Constitutional Development, South African Police Services, Department of Correctional Services and Department of Social Development). On accepting the proposed Justice computerised system Proof of Concept (conceptual design of the electronic solution) outcome, a total rollout to all courts will commence with a timeline for completion of four to five years (Ebrahim, 2001:10 and interviews with Deputy Director General Corporate Services, Department of Justice and Constitutional Development and Director Information Technology, Department of Justice and Constitutional Development, 2001).

The Department of Justice project is based on four major endeavours, to wit the Courts Process Project (CPP), now renamed the Integrated Case Management System (ICMS), the Digital Nervous System (DNS), the Financial Administration System (FAS) and the Management Information Service (MIS) (Ryan, 2000:18; Ebrahim, 2001:7-9 and interview with Deputy Director General Corporate Services, Department of Justice and Constitutional Development). These projects, which collectively form the Department of Justice's contribution to the Integrated Justice System (IJS), cover the following aspects:

a. The court process project has as its core output to optimise court management, such as scheduling court staff, and addressing the optimised management and dealing more effectively with case files (dockets). Herein is implied improving the turn-around time of the total civil and criminal process from arrest to incarceration and to ensure not only timeous hearings but also correctness of procedure such as having the correct

accused, correct courts documents and eventually correct prisoner. This project integrates transactional information across the four departments of the Justice cluster. The South African Police Services are responsible for arrests and bookings, the Department of Justice for the courts and court procedures, the Department of Correctional Services for the correctional application when convicted and the Department of Social Development is responsible for looking after the inmate and his family and assisting him in adjusting to civil society after incarceration. At this time the project is in a pilot phase at the Durban and Johannesburg courts. On acceptance of the pilot program, phase two of the project will be to implement the court process project at 450 magistrates' courts. This project is considered to be the flagship project for the Department of Justice and will change the manner in which civil and criminal justice is delivered. It is envisaged that case turn-around times will be drastically reduced and that no dockets or case file will go missing as everything is computerised. It will also optimise the justice officials' time utilisation. Collation of court information will be easier and available for all users (Interview with Director Information Technology, Department of Justice and Constitutional Development, 2001).

b. The digital nervous system project is a three year phased project aimed at establishing Wide and Local Area Networks (WAN's and LAN's) and linking the 500 offices of the Department of Justice. It is envisaged that 70 separate networks will link approximately 10500 computers. This project is currently underway and runs ahead of the court process project. It is imperative that this project be successfully implemented as it forms the backbone of all the Department of Justice's technology developments (Interview with Project Manager

Digital Nervous System, Department of Justice and Constitutional Development, 2001).

c. The financial administration system project has as its aim the automation of the Department of Justice's unique financials. This project is not to replace the transversal financial management system. The project is at this time well advanced and has automated the State Attorneys offices (SAS) and the justice deposit account system (JDAS). This system is also aimed at improving gender equality. This is specifically evident in the maintenance arena. Also underway is the automation of the Guardian's Fund (Interview with Project Manager Financial Administration System, Department of Justice and Constitutional Development, 2001)

d. The management information services project is a three-phased project aimed at automating the record's management (also referred to as content management) which has as its aim the automation of existing case files. This will form the database from which statistical inferences may be made, or, the data could be applied in a transactional sense as well (All historical judgements are contained in these files and will be available to the justice system). The second phase, to run concurrently with phase 1 is the knowledge management sub-project. This has as its aim the capturing of all justice related folder information. This information, like departmental circulars, will be automated and be available for functional and transactional management use. The third and final phase is the integration of these databases with the courts transactional data wherein a repository of information will be available for manipulation or statistical inferences (Interviews with Deputy Director General Corporate Services, 2001 and Director Information Technology, Department of Justice and Constitutional Development, 2001).

4.4 Conclusion

This chapter addressed the current status of selected international examples and national departments within government with regard their application of information technology management during the period of the research for this thesis.

It is imperative to note that in the presented examples the underlying issue that was required for implementation of information technology as a management tool, either transactional or otherwise, was communication, both from the perspective of actual communication and of tele-communication. Also imperative for the successful implementation of information technology management, is a well-established computer network infrastructure. For the afore-going it may be stated that the establishment of a computer infrastructure without the benefit of an information and data capability, does not contribute to the executive information needs required for public policy making and implementation. Executive information requirements for the policy formulation and implementation needs to be derived from information manipulated from transactional data.

In terms of the international scenarios the selected countries to wit Jordan, Mexico, China and Californian municipalities, were used as examples in order to present the *status quo* of some of the existing development in the international arena. This was done with regards to the fact that information is gathered and utilised for transactional management rather than for executive management decisions and therefore for the formulation and eventual implementation of public policy. It also implies that information management technology requirements where based on a requirement to computerise order of magnitude problems rather than information management shortcomings. Translated, this implies that policy making and implementation, is not based on interpreted information but rather

information utilised for day-to-day transactions and the associated volumes of data, thus missing the strategic requirement for inferred data in order to obtain executive information required for policy formulation and implementation.

In terms of national scenarios, the selected examples to wit the Department of Defence, the Department of Justice and Constitutional Development and the Independent Electoral Commission were used in order to present the *status quo* of some of the existing development in the national arena. This, with regards to the fact that information is gathered and utilised for transactional management rather than for executive management decisions. It also implies that information management technology requirements where based on a requirement to computerise order of magnitude problems rather than information management shortcomings. Translated, this implies that policy making and implementation, is not based on interpreted information but rather information utilised for day-to-day transactions and the associated volumes, thus missing the strategic requirement required for policy formulation and implementation of the populace.

From this chapter it was gleaned that the base for and of information management and technology is to be found in communication. This applies to both the actual communication of information and the method by which it is done. In this case, reference to adequate, if not superior, tele-communication is a pre-requisite for effective and efficient information technology management.

Information management and technology (through very effective tele-communications networks) is an everyday event in private enterprise. It is therefore with grave concern that one has to note that the South African Government and its departments are, as yet, not on par with the international *status quo*. What is more disconcerting is that in some instances South African government departments were in possession

of forefront technology and equipment (mainframes) but somewhere after the move to Personnel Computers (PC's), servers, Local Area Networks (LAN's) and Wide Area Networks (WAN's), got left behind. Also, this resulted in the collapse of executive management information preparation and presentation as a method to manage departments beyond the functional domain.

In all instances the departments addressed in this chapter will claim to have an information management capability. This is not denied. All departments have this capability, primarily on a functional basis otherwise they will be worse off. What is missing is the capability with existing systems to manipulate or statistically enhance such data to formulate a decision-making and management scenario ("what ifs") on and of the department or in the broader sense the Government. In virtually all instances the departments addressed do to varying degrees apply available data for the monitoring of transactional or functional (line function) ability. Here serve as examples the transversal financial systems, the unique logistics systems and the personnel and salary systems of the addressed departments.

Attention was focussed on the vast amounts of transactional data captured and maintained by the various departments under discussion. However, there is no methodology to manipulate or effect statistical inferences from this data with the existing systems. An exception mentioned is the Independent Electoral Commission in that a specific management approach was followed beyond purely recording transactional information (voting statistics, financials and personnel). This, however, did not occur from within the deployed systems but had to be executed outside the implemented transactional systems. A future exception will be the Department of Justice with rollout of their management information services. This, however, is yet to become a reality with a target date of around 2004.

The contribution of this chapter to the overall problem statement is found in the fact that it explains the empirical findings from a national and international perspective, which forms the second aspect against which the theoretical research will be validated. Based on the information gleaned from this chapter, the research findings can now be tested against the driving forces and denominators.

CHAPTER 5

RESEARCH FINDINGS OF INFORMATION MANAGEMENT AND TECHNOLOGY IN RELATION TO THE DRIVING FORCES AND DENOMINATORS

5.1 Introduction

The preceding chapter dealt with the national and international trends in the arena of the information management and technology. The research was done against the backdrop of the problem as postulated earlier in the thesis (*Supra*. Chapter 1, par. 1.3.1). This chapter interprets the empirical findings and validates these against the empirical findings based on the research parameter and objectives of this thesis (*Supra*. Chapter 1, par. 1.3.2). Thereafter it will be possible to draw conclusions and make recommendations that will effectively address the problem as postulated. In as much, a proposed model to overcome any issues found will be postulated.

This chapter is structured around the applicability of the aspects as defined by the research done, deductions based on the aforementioned, the necessity of employing the missing theoretical points or drivers and forces, a conclusion regarding the comparison and a summary to the chapter.

5.2 Background to the research findings

With regard the presupposition of this thesis, it needs to be again stated that management comprises two aspects that, when in harmony, comprise the concept management. These two aspects are, firstly, the

transactional management capability relating to line, staff and functional orientation and required for day-to-day decision-making with regard the day-to-day tasks. Secondly, executive management information required for the future strategic planning and positioning of the department as well as potential policy formulation and eventual implementation for the department.

The focal objective of this thesis is to determine what the management solutions for the public sector should be, based on the application of information management and technology to be applied in the formulation and implementation of policy. The problem statement and objectives of this thesis, will therefore be the basis of departure (*Supra*. Chapter 1, par. 1.3.1 and 1.3.2).

Denominators (the transversal elements) that stem from this problem statement and which form an integral part of the problem will be addressed in the findings. They are:

a. The consideration that research was done to determine the type of application of information management and technology required for the formulation and implementation of policy in the public sector. Research has to be done prior to implementation and continued after implementation. It needs to be sufficient to facilitate the implementation thereof in the complex service oriented environment of the public service.

b. The determination of the element of economical viability is of fundamental importance as it is of no use that information technology is deployed for any purpose but cannot be sustained in terms of a financial ability. This could be in a self-maintained or outsourced capacity. The formulation and implementation of policy should also be based on the economic viability of such a decision.

c. The maturity or immaturity level of the users as well as the contractors implementing or developing the information management and technology systems for policy formulation and eventual implementation need to be investigated so as to determine successful implementation of both the information management and policy possibilities.

d. Confirmation need to be obtained that departments are in a situation to facilitate the total upgrade of information technology or have an infrastructure in place to facilitate implementation of information management and technology systems. Alternatively, that the existing information management and technology systems is of such standard as to support management needs and policy formulation and implementation needs.

e. Determination that communication of the new concepts for electronic based formulation of policy and implementation thereof for government and governance are done both horizontally and vertically in the public service as this is considered a necessity for successful acceptance and utilisation.

Also to be validated are the defined primary drivers and secondary forces, which form an essential part of the information management and technology concept (*Supra*. Chapter 1, par. 1.3.2). The primary drivers are:

a. Determination of the relevance of having availability of information and technology. Determination of the degree cognisance is taken of this driver and whether there is any actual improvement in availability and application of executive management information after implementation. The information availability is not only required for executive decision-making but also for the possible formulation of policy within a department.

b. To determine the influence cost reduction/cost avoidance have on the implementation of executive information management and technology required for the formulation and implementation of public sector policy and to determine the realistic expectations of this driver on the functioning of the public service after implementation.

c. To determine whether the effectiveness and efficiency of a department had improved with the utilisation of applied executive information management and technology required for the formulation and implementation of policy after implementation. Furthermore, whether this need is considered when the decision is made to apply the methodology of managing and designing policy through the application of information and technology.

d. To determine to what degree all participants in the applied information management and technology environment, required for the formulation and implementation of public policy, recognise the others' performance measures and measurements both prior to and after implementing information management and technology solutions. Also to determine whether new or modified performance parameters are required.

e. To determine to what extent management should be involved in the decision to implement and technology required for the formulation and implementation of public policy, and to what degree the management is effected by the decision. Also to determine how management of the department must be adapted for the information management and technology environment required for policy formulation and implementation, and what impacts should be considered or expected.

The secondary forces are:

a. To ascertain whether the human resources element plays any significant role in the decision to apply information management and technology for the establishment of electronic government and governance. The degree of cognisance that should be taken of this element during the phasing in of applied information management and technology required for strategic policy formulation and implementation, will also be ascertained.

b. To determine to what degree culture should be investigated or taken cognisance of when the decision to apply information management and technology required for strategic policy formulation and implementation has been taken.

c. To determine to what degree the application of applied information management and technology for formulation and implementation of public policy necessitates a new training curriculum at all levels and, what is the effect on the knowledge base of the existing public servants.

d. To ascertain what degree of control at all levels are gained or lost when implementing applied information management and technology required for the formulation and implementation of public policy.

e. To determine to what degree, if any, the departmental structures should adapt after the implementation of applied information management and technology required for the formulation and implementation of public policy. This will also imply that current procedures should be adapted to facilitate the new concept if it truly is unique.

5.3 Research findings

This section will deal with the analysis of the empirical research against the backdrop of the drivers, forces and denominators in order to determine to what degree success is, was or will be achieved. These findings will be supported by specific evidence from the cited examples. The evaluation will be explained by addressing firstly the drivers and forces and then the denominators. Due to the topic of this thesis and the aim thereof, it is only logical to explain the concept of management at the onset.

5.3.1 Drivers

The five drivers that will be considered are management, availability of information and technology, cost reduction/avoidance, effectiveness and efficiency and, performance measure and measurement.

5.3.1.1 Management

Management was considered the most important driver and the research had to determine to what degree management was affected by the implementation of information management and technology systems. Also, and probably more importantly, to what degree is management applied with the implementation and application of information management and technology systems. Herein lies the fundamental difference of transactional management and executive management information and the application thereof in the departmental environment in order to maximise efficiency and effectiveness in the public sector required for policy formulation and implementation (*Supra.* Chapter 2, par 2.3 and 2.4).

The Jordanian example is very specific in the fact that information technology was implemented to improve management capability but

does not reference the possibility of policy formulation to the benefit of the populace. This can be deduced from the following:

> *...that no large or complex public organisation, nor the administration and management of the social and economic programs of such organisations, is possible without information technology* (Supra. Chapter 4, par. 4.2.1).

Furthermore, that the implementation of information technology should adapt and should influence management and the way decisions are taken. The following supports this:

> *....that a supportive environment and skilled staff in a political stable climate are critical pre-requisites for the success of information technology application* (Supra. Chapter 4, par. 4.2.1).

From this example it also becomes clear that in the Jordanian case, management was aimed at transactional management and not focussed on executive management information or the potential input for policy formulation, implementation and monitoring. The following is in support of this:

> *Although mention is continuously made of improving organisational management most of these technology implementation reflect a focus on improved line function (doing the job better)* (Supra. Chapter 4, par. 4.2.1).

Ahmed, et al. (1998:121), quoting Wilson, also found that management was more involved in information technology for improved administration (Ahmed, et al., 1998:121 and Supra. Chapter 4, par. 4.2.1).

The Mexican example is not clear on the issue of management change or adaptation. It may be deduced that the implementation of information technology was focussed firstly on the improvement of data

management and secondly on transactional management with, again, no focus on the executive management capability available and, therefore, no focus on the input management information would or could have on policy formulation. The following supports this:

> ....*developing nature of the Mexican information technology, and the absence of hardware the Internet was a solution to be followed in order to improve government management capability* (Gutierrez, *et al.*, 1999:23 and *Supra*. Chapter 4, par 4.2.2).

In the Chinese example it is clear and conclusive that management had to adapt and improve on public service management but no reference to improving policy formulation nor the management of implemented policies exist. The following supports this:

> ...*was a shift in responsibility for business planning and economic performance from government to the top management of Chinese State Enterprises (CSE's)* (*Supra*. Chapter 4, Par 4.2.3).

This was referred to as the contract-responsibility system wherein managers were given the responsibility. Again the transactional and not the executive information management comes to the fore. The following supports this:

> ....*the managers had to meet their agreed on targets or performance objectives but in exchange got total autonomy to re-invest residual income* (Dologite, *et al.*, 1998:113 and *Supra*. Chapter 4, par. 4.2.3).

In the Californian example the need by management and for management is evident from their decision to implement information technology as a solution provider. It is not clear what management participation was or to what degree management change occurred. This is inductively concluded. The following substantiates this:

...explore the methodology deployed by a number of Californian municipalities to embrace the concept of on-line public service (*Supra*. Chapter 4, par. 4.2.4).

And further:

This might not necessarily be public management but certainly encompasses improved public service with the application of available data (therefore transactional activities) (*Supra*. Chapter 4, par 4.2.4).

From this example the transactional management capability, in order to improve on service delivery was first and foremost. The need for improved and executive information may have been considered an essential element for policy formulation or implementation. This may be concluded from the following:

The Californian approach of 'smart communities' actually required from their citizenry, to become informed in order to effectively participate in the public policy process (*Supra*. Chapter 4, par. 4.2.4).

Also:

...(in) a smart community any form of co-operation among counties, individuals, governing institutions.... the common aim that fundamental and not incremental changes should be effected. In this point of view management of the participating environment is addressed. (Caves, *et al*., 1999:6, and *Supra*. Chapter 4, par. 4.2.4).

From the interviews conducted with the SANDF staff it became clear that management was affected by the decision to implement information management and technology systems as a solution provider but that it did not enhance policy formulation *per se*. It was also clear from both, the Director Enterprise Information Systems Architecture (2000) and the previous Director Commodities and

Services (2000), that a resistance to change factor was present from the onset. The resistance to change problem, however, improved with time. According to both of them, the adaptation of management style and technique was essential in the management cadre of the Department of Defence, in order to optimise the data management capability. The Director Department of Defence Logistics Support Formation (2000) stated that at this time he is still not sure whether the total management cadre optimally applies the transactional management capability of the implemented solution. The potential capability of executive information according to the Director Department of Defence Logistics Support Formation (2000) also did not lead to improved policy formulation within the Defence environment.

The Director Human Resources (1999) stated that many senior (Department of Defence) management officials still do not use the computers (information technology) and data (transactional) to their benefit. The previous Director Commodities and Services (2000), stated categorically that no Department of Defence system was design or implemented to support executive management decisions hence no derived policies could be formulated from information gleaned from the existing databases. The interviewee was adamant that they supported only the transaction management level and even at this level it was not applied fully. The Director Human Resources (1999) stated that the management problem was exacerbated with transversal system like the PERSOL (personnel and salary) system. The previous Director Commodities and Services (2000), in his response, supported the point of view of the transversal systems. The Director Enterprise Information Systems Architecture (2000) stated that in the current Department of Defence environment, major potential exists for the application of the data management into transactional management capability. This avenue is currently being explored with the application of (software) tools and some bespoke developments. According to the interviewee

the total architecture design or re-design will pave the way for the successful implementation of this action and future application of information management which might lead to policy formulation for this department.

In response to the question of executive management capability the Director Enterprise Information Systems Architecture (2000) was emphatic that this is addressed in the new design. The interviewee acknowledged that management will need to adapt to this and together with their normal Department of Defence courses and training is taught to utilise this capability to its fullest extent in the strategic management and planning environment. Also that future executive decisions and policy formulation would be based on information extracted from the integrated environment of Defence data.

The previous Director Commodities and Services (2000) stated that from a strategic management perspective, the adaptation to applied information management and technology systems will, in all probability, be the most difficult as most of this is done in a manual mode. The Director Human Resources (1999) was of the opinion that, until such time as systems did not cater for the integrated support of strategic planning, they will not be used. *De facto* this implies that the formulation of internal policies will also not occur. The Director Department of Defence Logistics Support Formation (2000) stated that until information management and technology systems was refined to a situation of integrated supportive (executive) management tools at various levels, and data management for transactional management at others, management would have problems in applying an executive management capability. Again the *de facto* implication is given that no policy formulation based on available, albeit raw data, will be made.

In the Independent Electoral Commission example, the change in the management perspective was not so profound as management

accepted that they have to apply the information management and technology tool in order to execute free and fair elections (Interviews with Manager Voting Station Infrastructure and Electoral Logistics, 1999; Assistant Manager Electoral Logistics 2000 and Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). Herein the interviewees acknowledged the fact that policies for the election had to be formulated based on information gleaned from the databases of the Independent Electoral Commission. In the Independent Electoral Commission example the respondents had much the same to say about the executive capability of the systems deployed. The Manager Voting Station Infrastructure and Electoral Logistics, (1999), the Assistant Manager Electoral Logistics (2000) and the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000) were all of the opinion that data manipulation for executive decision-making occurred outside the implemented information management and technology systems. The three respondents all supported the notion that the systems implemented supported transactional level management and, in general, were excellent data warehousing tools. They all agreed that although applying tools such as Microsoft Access™ to manipulate or statistically infer data, the ideal would have been to perform (executive) data analysis by applying the implemented systems. With regard to the logistical system implemented to support the electoral process, the Project Manager Electoral Logistics System (2000) supports this notion. The system was excellent in terms of transactional needs and produced excellent reports on progress and inventory statuses as well as distribution progress. Executive management capability and the resultant policy formulation based on these results were, however, limited to inferring this information with various other databases and planning outside the system. The policies applicable to the Independent Electoral Commission's logistical environment were however not deduced from the available information technology base.

The Director Procurement (1999) from the procurement division stated that his executive information originated by maintaining manual methods. The interviewee concurs that the implemented financial system supported his division in the transactional management capacity to the ultimate extent. All respondents agreed that executive information in terms of strategic planning needs to be obtained from the systems deployed. All too agreed that in the case of the Independent Electoral Commission, executive management strategic planning had occurred and that information management and technology had been applied but did not assist them as an integrated solution in formulating voting policy. The formulation and eventual approval of electoral policies was done outside of the available information database on an individual expertise level (Manager Voting Station Infrastructure and Electoral Logistics, 1999).

From the perspective of the Department of Justice and the interviews with the Deputy Director General Corporate Services (2001), it became clear that management would have to adapt dramatically to the new approach of applied information management and technology. According to the interviewee, at the time of the launch of the Digital Nervous System project less than one third of the department had access to computers and the related information management and technology. Management is virtually completely based on manual methods with some applications of Microsoft Access™ and Excel™ spreadsheets. One of the biggest problems being experienced is that the deployed systems are not being utilised to the fullest extends. All existing systems are aimed at resolving transactional needs and these are limited to the transversal government systems such as PERSAL (personnel and salaries) and LOGIS (logistics information system). The Director Information Technology (2001) responded that information management and technology and the implementation of a system such as the integrated case process systems would have far reaching impact

on the existing management structures of the department and future policy formulation for the department. Both the Deputy Director General Corporate Services (2001) and the Director Information Technology (2001) were of the opinion that the management cadre of the Department of Justice would have to adapt dramatically to the changing environment.

In response to the question whether the new system cater for executive information and eventual formulation of policy for the department, the response from both the Deputy Director General Corporate Services (2001) and the Director Information Technology (2001) was an emphatic yes. So to was the response, not only of the Deputy Director General Corporate Services (2001) but also from the Director Information Technology (2001) regarding training. The Project Manager Digital Nervous System (2001) and the Project Manager Financial Administration System (2001) responded equally strongly that training at all levels within the department had to enjoy a priority in order to accept information technology as a management solution and eventual policy formulating body. The Deputy Director General Corporate Services (2001) was of the opinion that any solution implemented in the Department of Justice should be of such a nature to supply management with the required management information at all levels. This implies not only transactional management information but also executive management information. The interviewee was further of the opinion that this could not be done by one system (software solution), which could prove to be difficult but must be rendered seamlessly if provided by more than one system (software solution). This enlightened point of view places a different perspective on the statement of service provision and customer satisfaction as though was also given to the potential of policy formulation and implementation. In terms of executive management capability the Project Manager Digital Nervous System (2001) stated that for the management of the deployed infrastructure

statistical inferences were required to determine usage and downtime in order to determine systems dependability. The Project Manager Financial Administration System (2001) stated that statistical inferences were required with regard to cases, which is not currently available. These all point to the application of executive management information with the eventual aim to improve policy formulation within the department.

5.3.1.2 Availability of information and technology

Availability of information and technology was considered a driver due to the importance of data for management. The data integrity is also of great importance as decision based on corrupt data inferences will lead to bad decision-making and potential policy formulation. Furthermore the non-availability of data implies the incapacity to effectively manage an organisation or to execute policy formulation (*Supra.* Chapter 2, par. 2.3 and 2.4).

The literature research indicates that most management information systems focus on the private sector but that the public sector is the world's largest consumer of information technology. Government collects, collates and disseminates vast amounts of data (Claudle & Marchland, 1990 as quoted by Bajjaly, 1998:75). Given the research, it is clear that the public sector in general does have masses of data available.

In the case of the Jordanian example it is evident that initially (1977) no electronic data was available. However, as the computer infrastructure grew in its public sector information technology from having virtually no structure in 1970 to being the leader in the Middle East, the situation was reversed and accordingly Jordan amassed a great deal of data (*Supra*. Chapter 4, par. 4.2.1 and Ahmad, *et al*., 1998:119).

From the Mexican example the conclusion is that data is available but not all data is accessible due to a poor communication infrastructure. Data is also not accessible due to the Mexican political scenario, which still maintains an authoritarian view on information availability. This, in turn, would result in the inability to deduce policy from existing information. This deduction is based on the following:

> *The main constraint still remains the lack of (communications) infrastructures.* (*Supra.* Chapter 4, par. 4.2.2 and Gutierrez, *et al.*, 1999:23).

From the Chinese example it is gleaned that in some government enterprises such as hospitals and harbours, relatively large amounts of electronic data do exist. However, due to the lack of an integrative system, duplication is at the order of the day. Also, not all public services are addressed by the drive to computerise and no integrative approach is followed thereto. In the general sphere then the Chinese do not have much electronic information in the general public service other than for the military, harbours and hospitals (*Supra.* Chapter 4, par. 4.2.3 and Dologite, *et al.*, 1998:119-120). In turn this result in the situation whereby the masses of information cannot be used to improve policy formulation.

The Californian example is one of true Western development and boasts the availability of masses of information even available to the public. In their approach of the smart community information pertaining to all service to be delivered and all municipal type information must be available on-line but no reference to implemented and executable policies are made (*Supra.* Chapter 4, par. 4.2.4 and Caves, *et al.*, 1999:7).

The interviewees in general accepted the fact that in most instances (for example the Department of Defence and the Independent Electoral Commission) massive amounts of data was collected and collated

electronically (*Supra*. Chapter 4, par. 4.3.2 & par. 4.3.3, and interviews with Director Enterprise Information Systems Architecture, 2000 and Manager Voting Station Infrastructure and Electoral Logistics (Chief Director), 1999). In the case of the Department of Justice, their recent move to computerisation, it state's that they do not have masses of electronic information other than those available from the transversal systems (*Supra*. Chapter 4, par. 4.3.4 and interviews with Deputy Director General Corporate Services, 2001 and Director Information Technology, 2001).

The overall conclusion that may be made with regards this section is that, in general, the public service does have information available. However, as is the case with Department of Justice, the transversal information is dominant with regards to the electronic configuration but that the executive information pertaining to the specific department will be absent or severely lacking thus inhibiting potential policy formulation based on such data and information.

5.3.1.3 Cost reduction and avoidance in the implementation of information management and technology

It needs to be re-iterated that cost reduction and avoidance with the use of applied information technology in the application of policy formulation and implementation is essential. Executive information needs for the formulation of policy needs to be derived from usable data of the various departments (*Supra.* Chapter 2, par. 2.3 and 2.4).

In the Jordanian, Chinese and Californian examples it is not conclusive that cost reduction or avoidance was a consideration for implementing information technology. All these examples cite various other reasons but do not mention cost as a driver (*Supra*. Chapter 4, par. 4.2.1; par. 3.2.3 and par. 4.2.4).

From the Mexican example it may be concluded that cost was a driver in the consideration for implementing information technology as a solution provider for the information management but not necessarily in the policy formulation context. This conclusion is based on the argument of Gutierrez, *et al*., (1999:23) as also presented in *Supra*. Chapter 4, par. 4.2.3 who stated that:

> *Due to the developing nature of the Mexican information technology, and the absence of hardware, the Internet was a solution to be followed in order to improve government management capability. This route was followed primarily because of the low cost implication.*

From the interviews conducted with regard to the South African examples, all respondents cited cost as a major issue (driver) when the decision to implement information management and technology was made. The Director Enterprise Information Systems Architecture, (2000); the Director Human Resources, (1999) and the previously Director Commodities and Services (2000) stated categorically that major design (and implementation) issues in the existing unique and transversal systems where decided on in order to optimise on the ever diminishing Department of Defence budget. All, however, were of the opinion that the masses of data were not utilised to improve the departmental functionality with proved policies.

The respondents interviewed at the Independent Electoral Commission also had cost reduction as a major issue (driver). Implementing information management and technology (for example upgrading personnel computers, local and wide are networks) at the Independent Electoral Commission had one aim and that was to ensure free and fair elections within the given budgetary constraints with the aim of reducing operating cost in the long run. Resultant cost reduction policies were in the offing but implementation thereof would be determined in a matter of time (Interviews with Manager Voting Station

Infrastructure and Electoral Logistics, 1999 and Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000.).

At the Department of Justice, improved effectiveness and efficiency was cited as being the most important, but both the Deputy Director General Corporate Services (2001) and the Director Information Technology (2001) were emphatic about the fact that operating cost of the department had to be reduced. According to interviewees, cost avoidance was of greater importance than cost reduction as cost reduction is not so easily attained in an inflationary environment. Both interviewees were adamant that, on completion of the proposed electronic solution, all management and policy issues within the department would be resolved.

5.3.1.4 Departmental effectiveness and efficiency

It needs to be re-iterated that departmental effectiveness and efficiency with the use of applied information technology in the application of policy formulation and implementation is essential. Executive information needs for the formulation of policy needs improve the departmental effectiveness and efficiency in terms of the stated service delivery required by the populace (*Supra.* Chapter 2, par. 2.3 and 2.4).

Departmental effectiveness and efficiency was considered a driver and the research had to determine to what degree organisations accepted the effect of this driver on the environment prior to, during and after implementation of information management and technology.

The Jordanian example cites that the improvement of effectiveness and efficiency was important but does not refer to policy in any way. The following argument of Ahmed, *et al.*, (1998:120) as also presented in *Supra*. Chapter 4, par. 4.2.1 supports this:

> *... the implementation of information technology in the public sector, especially in developing countries, was to improve efficiency and effectiveness in order to influence (on) how government agencies conduct business.*

It cannot be conclusively stated from the Mexican example that the improvement of effectiveness and efficiency was a dominant issue nor that information for the formulation of policy was foremost. From the following excerpt it becomes evident that the Mexican Government still has an authoritarian hold over management and might well overlook the improvement of effectiveness and efficiency in lieu of control. The following argument of Gutierrez, *et al*., (1999:30-31) as also presented in *Supra*. Chapter 4, par. 4.2.2 supports this:

> *The Mexican political scenario still maintains an authoritarian outlook on information availability. This in turn results in the lack of public policy to mandate access to governmental networks.*

From the Chinese example it becomes clear that if central government had wanted to improve of effectiveness and efficiency of their administration, this did not occur due to the legacy of inefficiency in the Communist management methodology with no intention of improving governance through improved policies. Furthermore the Chinese concept of hired staff with life-long employment implies the non-retrenchment of unproductive workers and leads to losses in revenue (Dologite, *et al*., 1998:113-115 and *Supra*. Chapter 4, par. 4.2.3).

It can conclusively be stated from the Californian example that the improvement of effectiveness and efficiency was a serious consideration when the decision to implement information technology was taken. In this example the point of departure was of empowering the citizenry with regard to public policy and implementation. The following excerpt illustrates this:

The Californian approach of smart communities actually required from their citizenry, to become informed in order to effectively participate in the public policy process (Caves, et al., 1999:5 and Supra. Chapter 4, par. 4.2.4).

Respondents from the Department of Defence example had different opinions regarding the aim of improving effectiveness and efficiency. The Director Enterprise Information Systems Architecture (2000) was of the opinion that implemented systems had as their aim to amongst others improve effectiveness and efficiency. The previous Director Commodities and Services (2000), however, was of the opinion that the initial systems implemented (mostly transversal systems) had as their major aim to improve data management. The Director Department of Defence Logistics Support Formation (2000) and the Director Human Resources (1999) shared this point of view as well. The previous Director Commodities and Services (2000) further stated that only after approximately 1985 did the Department of Defence design for improved effectiveness and efficiency. The Director Department of Defence Logistics Support Formation (2000) and the Director Human Resources (1999) where further of the opinion that very few of the systems ever designed improved effectiveness and efficiency. The interviewees stated that virtually all systems designed were curtailed by lack of funds. This makes this driver rather inconclusive from the Department of Defence's point of view but given the remarks of the Director Enterprise Information Systems Architecture (2000) and the previous Director Commodities and Services (2000), it could be stated that effectiveness and efficiency was given due consideration albeit not executed in terms of design limitations. Not evident, however, was improving effectiveness through improved policy formulation.

From the Independent Electoral Commission example, it was conclusive that the total systems design was for improved effectiveness and efficiency. The Manager Voting Station Infrastructure and Electoral

Logistics (1999) was clear on the fact that not only the logistics systems but also the total integrative voting systems were designed towards optimisation and improved effectiveness and efficiency. According to the interviewee and the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000), the integrated local and wide area network concepts and the method in which the elections were executed was designed for optimal time response with accuracy of information as the driver. The Project Manager Electoral Logistics System (2000), responding to the same question and with reference to the logistics system, stated that other than cost reduction, improving the electoral logistical process through improved effectiveness and efficiency, was the total concept and idea. The Acting Chief Director Security (2000), who was responsible for the security of the Independent Electoral Commission, had the same opinion with regard to the security measures and systems implemented. None of the Independent Electoral Commission staff or contractors interviewed had any other opinion other than being in support of this driver.

In the Department of Justice example it can also be conclusively stated that effectiveness and efficiency is considered a driver. Improving the justice system by improving the effectiveness and efficiency of the systems in delivering justice to all are of prime importance according to the Deputy Director General Corporate Services (2001). According to the Director Information Technology (2001) all systems currently under design or pilot testing are designed with the concept of improving effectiveness and efficiency of not only the systems but also the justice process. The Project Manager Financial Administration System (2001) responded in similar fashion, when interviewed, regarding the Department of Justice's financial administration systems. The Project Manager Digital Nervous System (2001), responsible for infrastructure deployment, stated that her mandate was explicit in terms of improving effectiveness and efficiency in both systems and service delivery.

5.3.1.5 Performance measure and measurement parameters

Performance measure and measurement parameters as an element was considered a driver and the research had to determine to what degree organisations recognised performance, performance measurements and performance measures prior to, during and after implementation. Organisations will have to know what it was improving, what milestones had to be achieved during implementation and what had to be improved on after implementation (*Supra*. Chapter 1, par. 1.3.2 and Chapter 2, par. 2.3 and 2.4).

The Jordanian example is not conclusive that measurements or measures, to indicate improvement were applied, prior to and after the implementation of information technology. In the Jordanian example it is deduced that measures and measurement parameters were put in place. This is supported by the fact that leaders in the Arabic countries accepted the changing environment in this field. Also that:

> *Although mention is continuously made of improving organisational management most of these technology implementation reflect a focus on improved line function (doing the job better)* (Ahmed, *et al*., 1998:121 and *Supra*. Chapter 4, par. 4.2.1).

The Mexican example is inconclusive that performance measurement or measures were a consideration. At this time the Mexican Government still have a great deal of problems in purely addressing the communication issue (Gutierrez, *et al*., 1999:20 and *Supra*. Chapter 4, par. 4.2.2).

The Chinese example is conclusive that cognisance of performance measurements and measures had been taken. This is based on the fact that the Chinese government moved to a system of Chinese State Enterprises (CSE) within a contract-responsibility system. This does not however, imply that the concept of Chinese State Enterprises was

successful in its implementation (Dologite, *et al*., 1998:113 and *Supra*. Chapter 4, par. 4.2.3).

The Californian example is conclusive that the driver performance measurements and measures had been taken into account when the decision to implement information technology as a solution was made. This is clear from the following statement in *Supra*. Chapter 4, par. 4.2.4:

> *The Californian experience is captured in the improved service delivery dilemma…..The Californian solution was one of embracing the information technology age in order to establish smart communities. …..The Californian local governments were forced to respond to the requirement of the constituents as the citizens had become frustrated over the lack of service at the various levels of government.*

The recognition of improved information infrastructure and technology for the improved service delivery of amongst others, health, justice, economic growth and education was of importance to the Californian solution (Caves, *et al*., 1999:4 and *Supra*. Chapter 4, par. 4.2.4). This is only possible if structures to measure against are available or built.

From the interviews conducted in the Department of Defence environment it became evident that in most instances performance measures and measurements were available before during and after implementation. The Director Enterprise Information Systems Architecture (2000), the Director Department of Defence Logistics Support Formation (2000) and the previous Director Commodities and Services (2000), were emphatic when stating that it would have been impossible to determine the improvement of the implemented information management and technology systems had it not been for some form of established measurement against which to measure enhancement. These established measurements and measures existed

in an environment where existing productivity improvement programs were running. The Director Human Resources (1999) differed slightly (being involved with transversal systems) by stating that initially no baseline measurements were available. These were developed as the implemented systems progressed. An interesting proponent of this driver was the Acting Chief Director Security, Independent Electoral Commission, who before his retirement, was the Director Logistics Operation (supporting all South African Air Force logistical operational activities), who stated that the concept of logistics for operation was based on knowing the performance parameters.

From the Independent Electoral Commission example it is gleaned that very specific performance measurement tools where designed prior to the implementation of the information technology drive. This had as a specific aim to measure performance enhancements during and after implementation with a specific focus on election results and electoral maintenance after the cyclic events. The Manager Voting Station Infrastructure and Electoral Logistics (2000) and the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000), during their interviews and discussions, were categorical in stating that the design for systems alone is not implementable but the measurement against standards and norms is. The Assistant Manager Electoral Logistics (2000) stated that, should systems within the Independent Electoral Commission have been developed against unknown criteria, the Independent Electoral Commission would not have known whether they are improving the electoral process. The Project Manager Electoral Logistics System (2000) stated that a department does not implement a system without reason, this reason being improvement of some action. In order to know and understand the requirement, the organisation has to measure this action. Again, the Acting Chief Director Security (2000) had an interesting comment to make in that in his environment there was

nothing to measure so anything that was done related to improvement. As a last statement in this regard it needs be stated that the Director Procurement (1999) reflects on the Independent Electoral Commission's performance enhancement vis-à-vis previous organisation the interviewee served at, as being at the forefront. It could therefore be concluded that the Independent Electoral Commission accepted performance measurements and measures as a driver.

In the Department of Justice example measurement against set criteria was at the order of the day. The Deputy Director General Corporate Services (2001) stated that the e-Justice programme was initiated against the backdrop of negative (justice) statistics and weak tools, which indicated that the Department of Justice had to follow the course of information management and technology systems implementation. This was the only solution to the justice systems critical backlog and poor conviction and other performance records. These poor results were the physical results in the court process as obtained from statistical inferences and administrational reporting (Ebrahim, 2001:6-9). The Director Information Technology (2001) stated that the Courts Process Project is measured against set parameters and the national rollout will also be measured against such parameters. In terms of the Digital Nervous Systems the Project, Manager Digital Nervous System (2001) was of the opinion that a classical case of stated measurement improvement during and after implementation was experienced. With regards to the financial systems being implemented, measurement to the non-tangible level of gender acceptance is measured (Interview with the Project Manager Financial Administration Systems, 2001). It could therefore be concluded that the Department of Justice accepted performance measurements and measures as a driver.

5.3.2 Forces (departmental elements)

The forces are those elements the department has control over. In the context of this thesis they are human resources, culture, training and skills development, control and departmental design (*Supra.* Chapter 2, par. 2.3 and 2.4).

5.3.2.1 Human resources

The human resources element as a component is important from the perspective of change management and the influence the implementation of a new form of management or even a transactional tool impacts on the human environment (*Supra.* Chapter 2, par. 2.3 and 2.4).

The Jordanian example is conclusive in that human resources were considered when the decision to implement information technology was made. The following argument of Ahmed, *et al*. (1998:118) as presented in *Supra*. Chapter 4, par. 4.2.1 supports this:

> *They are further of the opinion that a supportive environment and skilled staff in a political stable climate are critical pre-requisites for the success of information technology application.*

Neither from the Mexican nor from the Chinese example can it be conclusive deduced that the element of human resources was considered when the decision to implement information technology was made (*Supra*. Chapter 4, par. 4.2.2 and par. 4.2.3).

The Californian example highlights the human component from the perspective of the user:

> *The Californian approach of smart communities actually required from their citizenry, to become informed in order to effectively participate in the public policy process* (*Supra*. Chapter 4, par. 4.2.4).

Considering the Californian example the conclusion is drawn that the organisations did consider the human component of the resources element. The conclusion drawn, must be stated against the backdrop of the research being unclear as to the actual human resource element within the department (Caves, *et al*., 1999:5 and *Supra*. Chapter 4, par. 4.2.4).

During interviews conducted with regard to the Department of Defence example, the Director Enterprise Information Systems Architecture (2000), the Director Human Resources (1999) and the previously Director Commodities and Services (2000) stated that no consultation before implementation was done with the human resources element involved, at user level. A marketing drive during and after implementation was, however, undertaken. The three respondents did also state that the decision to implement any information management and technology solution was undertaken with consultation and detail briefing at senior management level. In this regard the change management was difficult to execute (Director Human Resources, 1999).

From interviews conducted at the Independent Electoral Commission it was apparent that this department embarked on a total change management program prior to implementation of information management and technology. Interaction with all levels at the Independent Electoral Commission was established and progress reports communicated monthly (Interviews with the Manager Voting Station Infrastructure and Electoral Logistics, 2000 and the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). Forums for improvement and computer literacy training were established prior to system implementation and maintained after implementation (Interviews with the Assistant Manager Electoral Logistics, 2000 and the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). New

systems where not implemented until the users were acquainted with the funcionalities (Interview with the Project Manager Electoral Logistics System, 2000).

The interviews and discussions conducted at the Department of Justice indicate that sensitising the staff (human resources) is one of the greater priorities at this time. Communication to all offices and staff informing them of the changes is undertaken prior to implementation and rollout (Interviews with the Deputy Director General Corporate Services, 2001 and the Director Information Technology, 2001). Training and feedback forums are in place and suggestions duly noted (Interviews with the Director Information Technology, 2001 and the Project Manager Financial Administration Systems, 2001). Where practically possible these may be incorporated as long as it supports the overall information management architecture (Interview with the Deputy Director General Corporate Services, 2001).

5.3.2.2 Departmental culture

Culture form the backbone of any department imperative that this be considered when implementing any form of transformation. The culture of a department is established through the functioning of its staff over many years. Should a paradigm shift in terms of management operating concepts or otherwise be implemented, this implies changing the existing culture to something new. In the case of the international examples consideration of this element could not be conclusively established (*Supra*. Chapter 2, par. 2.3 and 2.4 and Chapter 4, par. 4.2).

In the case of the Department of Defence example the previously Director Commodities and Services (2000) stated that no cognisance was given to departmental culture. It was assumed that the staff would adapt to the changing scenario. The Director Human Resources (1999) stated that no system implementation ever bothered about cultural

compatibility. New systems were designed and implemented without consideration as to the impact on the existing culture. Hence the resistance to change especially with regard to the transversal systems. The Director Enterprise Information Systems Architecture (2000) was of the opinion that departmental culture *vis-à-vis* the potential contractor's departmental culture was considered. This facet is also important within the contracting organisation human resources cultural acceptance with credible contractors and *vice versa*. The Director Department of Defence Logistics Support Formation (2000) stated that in his experience the design of systems, especially the transversal systems, never considered the impact on the departmental culture other than top management statements that it will improve productivity. Also, in most instances, culture was not a consideration when the decision to implement information technology was made, but rather a management decision. It may, therefore, be concluded that in the Department of Defence departmental culture was not a consideration when the decision to implement information management and technology was taken.

In the Independent Electoral Commission scenario the Manager Voting Station Infrastructure and Electoral Logistics (2000) affirmed that the departmental culture was of prime importance when the Independent Electoral Commission initiated the implementation of information management and technology. In all instances consideration was given to the impact at all user levels prior to implementation as well as establishing culture change programs to accommodate the transition. The Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000) was of the opinion that the Independent Electoral Commission went to great lengths to ensure that the cultural shock of the implemented (information management and technology) systems was minimised. The interviewee was especially praiseworthy of the designed and implemented plans to smooth the

cultural transition. The Director Procurement (1999) and the Assistant Manager Electoral Logistics, (2000) affirmed the comments of the Manager Voting Station Infrastructure and Electoral Logistics and added that in most instances a marketing drive prior to implementation of these systems was launched. During implementation, teams went out to assist users in the application of such systems, again to minimise the culture shock and assist in the culture transition. It may therefore be concluded that the Independent Electoral Commission did consider the impact of information management and technology on departmental culture.

The Deputy Director General Corporate Services (2001) of the Department of Justice, affirmed that the implementation of any (new) system is, and will be, accompanied by a drive to minimise the culture shock that was apparent when the Department of Justice implemented the transversal systems. These were not accompanied by culture change plans. The Director Information Technology (2001), the Project Manager Financial Administration Systems (2001) and the Project Manager Digital Nervous System (2001) supported this point of view by elucidating on the efforts their projects had made to sensitise the existing work environment. The Project Manager Digital Nervous System stated that as progresses with regard to implementation of other projects are made, the task is vastly easier. Major marketing and pre-implementation drives are undertaken to determine user susceptibility to the changing environment. These are supported by sensitising efforts to obtain user acceptance and management buy-in for the proposed and implemented systems (Interview with the Deputy Director General Corporate Services, 2001). It may therefore, be concluded that the Department of Justice does take the impact of information management and technology on departmental culture into consideration.

5.3.2.3 Training and skills development of personnel

Training and skills development at all levels of the department is imperative to transform a public department to a functional and manageable service oriented entity. Due to the changing environment and needs of the public domain, the need to change and adapt to the fast track of the information age implies that all levels of management and functional application are required to be adapt at the use and application of information management and technology. In the case of the international examples consideration of this element could not be conclusively established (*Supra* .Chapter 2, par. 2.3 -2.4 and Chapter 4, par. 4.2).

In the case of the Department of Defence, the Director Enterprise Information Systems Architecture (2000) stated that the Department of Defence did embark on a major drive to educate and empower the users of the systems. This was imperative if the deployed systems were to be used to their design capacity. The previously Director Commodities and Services (2000) stated that during the design of the previous (information management and technology) systems little training was initiated. Only during and after implementation was training initiated. This obviously contributed to a situation were the users were slow in applying the capabilities of the systems due to lack of knowledge of the systems. The Director Department of Defence Logistics Support Formation (2000) stated that transversal systems had continued training as the systems were updated and as new staff joined the service. According to him it must be assumed that training always formed a fundamental base when implementing information management and technology as a solution. The Director Human Resources (1999) stated emphatically that where knowledge transfer was identified prior to implementation of (technology) systems, such training was initiated with the co-operation of the developers. The interviewee supported the comments of the Director Department of

Defence Logistics Support Formation (2000) in terms of continuous training. It may therefore be deduced that the Department of Defence did apply training as a skills provider before, during and after implementation.

From the Independent Electoral Commission perspective, the Manager Voting Station Infrastructure and Electoral Logistics (2000) stated that in all instances were systems where implemented, the Independent Electoral Commission did not only sensitise the staff prior to implementation, but actually enhanced their skills by implementing a computer literacy training plan before training the staff on the system. The Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000) stated that from the Independent Electoral Commission's inception, to the first national election in 1999, senior management of the Independent Electoral Commission, had it as an imperative, to train all applicable staff, inclusive of management, in the use of the (information management and technology) systems that would be required to run the election. The Project Manager Electoral Logistics System (2000) stated that as an implementation guideline for the logistics system, training and skills transfer at all user levels (inclusive of management) were essential. The Assistant Manager Electoral Logistics (2000) stated that in his mind, the Independent Electoral Commission was an example of a public service organisation, which had the right approach with regard to the training and skills transfer approach to implemented information systems. The Director Procurement (1999) stated that although their procurement system was very manual oriented, they to embarked on a training and skills transfer course with very positive results with regard to their functional tasks. It may therefore be deduced that the Independent Electoral Commission did apply training as a skills provider before, during and after implementation.

From the Department of Justice interviews it was apparent that the training component did not enjoy attention when implementing transversal systems. In these cases training only occurred after implementation. This resulted in resistance to change being experienced (Interview with the Deputy Director General Corporate Services, 2001). The newly designed systems and proposed systems are however being designed with the training needs in mind. Training design is done with both the functional or transactional need in mind as well as the management needs based on these activities (Interviews with the Director Information technology, 2001 and the Project Manager Digital Nervous System, 2001). In the case of the integrated case management system (ICMS), specific data retrieval and management reports are standard in the design of the system to accommodate the improvement of the justice system to the people at grass roots level (Interview with the Deputy Director General Corporate Services, 2001). As part of the existing project budgets a substantial portion is used to facilitate the need for training (Interviews with the Project Manager Financial Administration Systems, 2001 and the Project Digital Nervous System, 2001). Both interviewees and the Director Information Technology (2001) did, however, state that training and the rollout of systems have to be carefully dovetailed (managed) so as not to train now and have to retrain prior to implementation, especially when timelines slip. It may therefore be deduced that the Department of Justice did apply training as a skills provider before, during and after implementation, qualified to new systems only.

5.3.2.4 Control

The importance of the element control in the implementation of information management and technology in a public service environment is not simplistic as it interfaces with aspects such as culture, training and organisational design. However, in most instances users at all levels are of the opinion that control is lost when

implementing information management and technology as a solutions provider. At management level management should consider the fact that they actually have better control over their functional arena than before. This perception is, however, not always appreciated (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the international examples quoted it could not be clearly and conclusively deduced that control was a consideration. Possible exclusions are the Chinese and Californian examples. Nothing explicit is stated but rather implied hence no supportive quotes (*Supra*. Chapter 4, par. 4.2).

During the Department of Defence staff interviews it became apparent that control was of importance when consideration was given to the implementation of information management and technology. The Director Enterprise Information Systems Architecture (2000) stated that the implementation of information management and technology was considered of prime importance due to the fact that management control would be improved. The previous Director Commodities and Services (2000) stated that control of the (transactional) information was of prime importance at the time of implementing the unique systems. The interviewee acknowledged the fact that executive information was considered to be the same. At this time the previous Director Commodities and Services (2000) also acknowledged the fact that there is a vast difference between the need for the various management information requirements. It can therefore be stated that the Department of Defence example had as their aim to improve management control when the decision to implement information management and technology was taken.

The Manager Voting Station Infrastructure and Electoral Logistics (2000) from the Independent Electoral Commission stated that for their Department, it was imperative that control in general, and management

control specifically, had to be improved with the implementation of an information management and technology solution. This was then attained in the main electoral fields of operations as well as the support functions. With regard to the financial systems implemented they improved the financial control and the Independent Electoral Commission obtained a virtual clean bill of health during their annual audit. With regard to the support and operational logistics systems, both contributed to the success of the national and local election and made it possible to procure, store, distribute and roll back all the electoral equipment so identified (Interview with the Manager Voting Station Infrastructure and Electoral Logistics, 2000). The Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000) stated that the control aspect was paramount at the outset of the electoral process, but had to be augmented with the information management and technology implemented. This the interviewee said was attained as for the first time election readiness was monitored and controlled with regard to the logistics of the effort. The Assistant Manager Electoral Logistics (2000) confirmed this point of view. The interviewee stated that the total control allowed by the implemented systems enabled the Independent Electoral Commission to publicly, and in real-time, submit, not only results within 24 hours of the election, but also to compile a voters role within the short span of time of three weeks. The Project Manager Electoral Logistics System (2000), from the point of view of the logistics required for the elections, stated that the control over the process of item identification, procurement and distribution, was focal when the decision to implement the (logistics) system was taken. The Director Procurement (1999), from the procurement side, stated that the systems procured were thoroughly screened for conformance to control aspects. It can therefore be stated that the Independent Electoral Commission had as their aim to improve management control when the decision to implement information management and technology was taken.

In the case of the Department of Justice, the Deputy Director General Corporate Services (2001) stated that control over the case management of the court process is fundamental and non-negotiable with regard to the implementation of the technology solution. The aim of the system is to minimise court administration time, improve case turnaround time, minimise case (docket) losses, improve judicial application time and in general improve productivity. This control is only possible if control over the process is attainable and manageable (Deputy Director General Corporate Services, 2001). The Director Information Technology (2001), from the courts process project side, stated that the outcome of the pilot study was to ensure that the main objectives regarding the control objectives were met. The Project Manager Digital Nervous System (2001), stated that this project was responsible for the placing of infrastructure at all courts and, through this activity, enhance the control by the Department of Justice over the justice system. The Project Manager Financial Administration Systems (2001), responsible for the unique financial systems, stated that, apart form the various funds administered by the courts, the control and audibility of these funds are fundamental in the design of these systems. It can therefore, be conclusively stated that the Department of Justice had as their aim to improve control in general and management control specifically when the decision to implement information management and technology, was taken.

5.3.2.5 Departmental design

The need for organisational change within a department mainly after implementation of an information management and technology solution is a factor not always given due consideration. Due to the changing nature of the departmental functionality, an organisation should consider re-aligning itself with the changing environment. The re-alignment is required mainly due to the fact that various elements, not previously present, now start to manifest themselves within the

department. In this regard aspects such as computer helpdesks and management information kiosks might be required to assist the users and management in the application of the tools implemented. Due consideration must be given to the fact that one not merely computerises the mistakes of the past but improves on the existing scenario. This might lead to required changes in the departmental design. In the case of the international examples no clear consideration to departmental change, can be detected. In all instances the improvement in management capability is the only inference that may be made (*Supra*. Chapter 2, par. 2.3-2.4 and Chapter 4, par. 4.2).

According to the Director Enterprise Information Systems Architecture (2000), the Department of Defence did go through departmental change and adaptation after implementation of the information management and technology solution. The most noted of that was the integration of sections such as the stores and technical components regarding procurement and systems management. The Director Department of Defence Logistics Support Formation (2000) stated that within the broader Department of Defence environment, similar changes were initiated and implemented to accommodate departmental change requirements that resulted after management information systems were deployed. This was not linked to the transformation process that the Department of Defence went through during the late 90's (Interview with Director Department of Defence Logistics Support Formation, 2000). The previous Director Commodities and Services (2000) supported the Director Department of Defence Logistics Support Formation (2000) with regard to the departmental change as the interviewee had initiated the same within his directorate. The Director Human Resources (1999) stated that departmental change in his environment was not so profound as they dealt mainly with the transversal systems. It may therefore be stated that in the Department of Defence, departmental adaptation was not only considered a

requirement with the decision to implement information management and technology solutions, but actually implemented.

In the Independent Electoral Commission scenario, the organisation had the opportunity to start as a new entity in support of their information and management needs. Departmental adaptation was therefore not required after the implemented systems were operational (Interview with Manager Voting Station Infrastructure and Electoral Logistics, 2000). According to the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000), departmental adaptation was a build-in factor in the initial design of the Independent Electoral Commission, in order to retain flexibility, as was evident when the Independent Electoral Commission had to downsize after the 2000 local election. The downsizing, however, was not a result of the implemented information management and technology systems (interview with Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). According to the Director Procurement, departmental adaptation was considered and implemented in the corporate service environment as a result of management needs and not systems implementation. It may therefore be stated that in the Independent Electoral Commission, departmental adaptation was a consideration during the design of the organisation but was not required when the information management and technology systems were implemented, as a result of good planning prior to operationalising the organisation.

The Department of Justice stated that with the implementation of information management and technology systems departmental adaptation and change was imminent (Interview with the Deputy Director General Corporate Services, 2001). The interviewee stated that the Department of Justice approved a departmental change to facilitate the need for a more process driven organisation, which included an information and systems business unit (Information and

Systems Management or ISM). The Department of Justice Board also approved re-structuring the department into manageable business units (for example Masters Offices, State Attorneys, Courts, Support Services and other functional justice entities). The Director Information Technology (2001), echoed the sentiment of the Deputy Director General Corporate Services (2001), with reference to the fact that the Department of Justice's information technology division (responsible for day-to-day information technology support) was to be integrated with the State information Technology Agency. Information technology services would then be procured from the State information Technology Agency on a contract basis. The Project Manager Financial Administration Systems (2001) and the Project Manager Digital Nervous System (2001), stated that their projects would not effect any other departmental change or adaptation not already contained within the information and systems management division. Their concern is the need for procedural changes that must be affected. It may therefore be stated that in the Department of Justice, departmental adaptation was not only considered a requirement with the decision to implement information management and technology solutions, but was also implemented.

5.3.3 Denominators

The denominators or transversal elements are research prior to implementation, economic viability of the implementation decision, maturity levels of the organisation, available information technology and communication.

5.3.3.1 Research

Research is critical in the user requirement design for the implementation of information management and technology systems. As these systems are usually costly, a wrong decision can amount to

major budgetary losses. The need for specific solutions must also be critically balanced against availability, applicability, sustainability and life cycle costs (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the Jordanian example, the following statement highlights the factor that due consideration was given to the research element as reflected in *Supra.* Chapter 4, par 4.2.1 and by Ahmed, *et al.* (1998:118):

> *This was enabled primarily through the use of their (Jordanian) Royal Scientific Society, which is an active proponent of Information Technology. This society not only conducts research with regard to (management) requirements but also develops software for various applications in support of these requirements.*

Also applicable is the following statement as reflected by Ahmad, *et al.*, (1998:119) and *Supra.* Chapter 4, par. 4.2.1:

> *...the (Jordanian) Royal Scientific Society has conducted and concluded numerous studies and developments for various Jordanian public sectors inclusive of the Ministries of Justice, Foreign Affairs and the Department of Income Tax.*

From both the Mexican and Chinese examples it is not clear whether due consideration was given to the element of research at the time the decision to implement information management and technology was made (*Supra.* Chapter 4, par. 4.2.2 and par. 4.2.3).

Considering the Californian example, it is not clear whether they considered research. In the article it becomes apparent that research would have been undertaken in order for the Californians to attain their seventh place in world ranking economies. Also and as reflected in *Supra.* Chapter 4, par. 4.2.4:

The Californian solution was one of embracing the information technology age in order to establish smart communities.

The Californian local government where forced to respond to the requirement of the constituents as the citizens had become frustrated over the lack of service (Caves, *et al*., 1999:4 and *Supra*. Chapter 4, par. 4.2.4). It is therefore concluded that the Californians had undertaken research prior to implementing information management and technology.

The Department of Defence did not initially conduct research regarding the then primarily transversal systems. It was only after the implementation of unique systems (for example the logistics information systems) that consideration was given to research in terms of best practise (Director Enterprise Information Systems Architecture, 2000 and the previous Director Commodities and Services, 2000). This is found in the fact that the logistics system implemented in the South African Air Force was later procured by the Royal Air Force for their application. This, according to the previous Director Commodities and Services (2000), proves that the South African development was of the best standard in the world. The Director Enterprise Information Systems Architecture (2000) stated that information management and technology was at the forefront of (information management and) technology. The Director Department of Defence Logistics Support Formation (2000), affirmed that developed Department of Defence systems, required for (transactional) management, were of the best in the world and could be compared favourable with anything in existence. The Director Human Resources was more concerned about the transversal systems as these did not comply with individual departmental requirements and from his experience did not meet international or local management capacity or capabilities nor did they seem to have been well researched. During further discussion with both the previous Director Commodities and Services (2000) and the

Director Human Resources (2000), it was apparent that the absence of executive information management was their main concern and that this requirement was not researched at all. It may, however, be concluded that the Department of Defence did consider the denominator or transversal activity of research an important aspect in the design of information management and technology implementation albeit not for the use in executive information management.

From the Independent Electoral Commission example, and interviews with the staff, it became apparent that thorough research was at the order of the day prior to the inception of the Independent Electoral Commission with regard to the implementation of information management and technology (Interview with Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). This is with specific reference to the fact that the implementation of information management (and technology) systems was decided upon prior to the launch of the new Independent Electoral Commission in 1996. The Project Manager Electoral Logistics System (2000) stated that research into the most applicable logistics solution was prevalent when the decision to implement a control mechanism was decided on. The Assistant Manager Electoral Logistics (2000) stated that research into the best and optimal solution was a consideration when the decision to approve systems for the Independent Electoral Commission was made. The Director Procurement (Electoral Commission, 1999) stated that in all procurement criteria the request was for optimising management and this then indicates that research into the best solutions for the Independent Electoral Commission was paramount. However, in none of the cases the express need for executive management information was considered. It may therefore be concluded that research was indeed an element that was given consideration by the Independent Electoral Commission at the time when the decision to implement information management and

technology as a solution provider was made but again without due cognisance of the executive information needs.

From the interviews conducted at the Department of Justice, research into the best solution for information management and technology was not only evident as a denominator in terms of the fact that all divisions and the department as a whole (Interview with the Deputy Director General Corporate Services, 2001). It was clear from the approach followed that any solution with regard to information management and technology had to comply with departmental requirements and had to comply with a life cycle expectation and (executive) management needs (Interview with the Deputy Director General Corporate Services, 2001). The Project Manager Financial Administration Systems (2001) stated that with regard to the systems implemented for the Masters courts, only the best practise was considered. In terms of the courts case management scenario the Director Information Technology (2001) stated that although the current consortium had the mandate to develop the pilot system, the department is continuously considering alternatives that might prove to provide better options. The Project Manager Digital Nervous System (2001) stated that with regard to infrastructure development standardisation on Microsoft Office 2000™ was decided on, however, any improvement in technology might lead to reconsideration of the original decision. It may therefore be concluded that the Department of Justice did consider doing extensive research prior to the implementation of the information management and technology concept. They also had an executive management focus regarding this need.

5.3.3.2 Economic viability

Information management and technology must under all circumstances only be considered if they are economically implementable and sustainable. This might for the purpose of this thesis imply that due

consideration might be given to outsourcing technology solutions as they are primarily not part of the core function and secondarily it may not be financially feasible to maintain such a service within the organisation. It also implies that systems should not be implemented if they cannot be maintained as this will lead to fruitless expenditure (*Supra.* Chapter 2, par. 2.3 and 2.4).

With regard to the international examples none but the Jordanian example cited economical reasons as a decision to implement information management and technology. This is derived from the following statement as reflected in Ahmed, *et al*. (1998:121) and *Supra*. Chapter 4, par. 4.2.1:

> *Referring to the Asian-Pacific rim countries, Ahmed found that computer technology was dependent on economic development.*

The Mexican example does refer to cost as an influence in the implementation of technology but does not refer to economical viability (*Supra*. Chapter 4, par. 4.2.2). It cannot be concluded that the international examples had economical viability as a primary consideration.

With regard to the Department of Defence, the Director Enterprise Information Systems Architecture (2000) stated that in all instances budgetary constraints forced the consideration of economically viability. In this regard the maintenance of implemented systems was always subject to the life cycle cost of such projects and the effect they would have on future budgets. According to the previously Director Commodities and Services (2000), no system (excluding the transversal systems) was considered unless a full life cycle costing had been done. This facilitated the accommodation of that such a system within the budgetary constraints of the department. According to the Director Enterprise Information Systems Architecture (2000) and the previously Director Commodities and Services (2000), some systems

were deliberately under developed due to the constraints of firstly developing them and secondly maintaining them. The Director Department of Defence Logistics Support Formation (2000) stated that in his experience all systems were subject to economical issues. No development could occur if no life cycle cost was presented. The Director Human Resources (1999) stated that in his mind it would be departmental suicide to design, develop and implement without due consideration to economical factors, especially life cycle costs. It can therefore be concluded that from the Department of Defence's perspective, economical viability was given due consideration albeit from a budgetary constraint perspective.

From the Independent Electoral Commission example, the Manager Voting Station Infrastructure and Electoral Logistics (2000) and the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000), stated that again, due to budgetary constraints, due consideration was given to economical viability. A further aspect according to these interviewees was the fact that the Independent Electoral Commission would have to sustain itself through a period of inactivity. According to them the Parliament wanted free and fair elections and motivation for funds for systems was difficult. The Assistant Manager Electoral Logistics (2000) stated that in all circumstances due consideration was given to the economical viability of possible systems. This according to the Project Manager Electoral Logistics System (2000) was especially true of the life cycle and applicability of the system after implementation and down sizing of the Independent Electoral Commission after the elections. The Director Procurement (1999) confirmed this sentiment as the investment and maintenance cost would have to be borne by a departmental budget severely cut between elections. It could therefore be concluded that due consideration was given to the transversal element economical viability, albeit due to budgetary constraints.

With regard to the Department of Justice, the Deputy Director General Corporate Services (2001) stated that consideration was given to economical viability. The interviewee also stated that if it were not for donor funding the departmental or budget vote would not have been sufficient for the transformation to an e-Justice environment. According to the Director Information Technology, much of the decisions, although politically initiated in 1997, were based on the availability of funds and *de facto* on the availability of funds for the maintenance thereof. This, according to the interviewee, applied to the broader integrated justice systems (IJS) as well. The Project Manager Digital Nervous System (2001) stated that from the perspective of the economical viability, infrastructure development, remains a consideration. Instance of no deployment has been registered, as scenarios were activities of support infrastructures inhibit these activities. Lack of communication infrastructure also acts as a hindrance on these sites and will therefore only be considered at a later stage. It may therefore be stated that the Department of Justice did consider the transversal element of economical viability as an important element prior to implementation of information management and technology.

5.3.3.3 Departmental maturity levels

Maturity level of a department (the level at which a department accepts growth potential) is indicative of the culture and departmental positioning in the information technology environment to accept change for improvement. The best systems can fail if buy-in from all levels is not attained. Furthermore, proposed and implemented systems must be perceived as an aid and not a danger to the organisation. It is imperative that all levels of the organisation must share this perception. Training and communication may influence maturity levels (*Supra.* Chapter 2, par. 2.3 and 2.4).

In the international examples it is not clear, or conclusive, that departmental maturity was a consideration when the decision to implement information management and technology was taken (*Supra*. Chapter 4, par. 4.2).

In the Department of Defence example and during the interview and discussions with the Director Enterprise Information Systems Architecture (2000), it was stated that initially maturity levels were not considered. It was, according to the interviewee, rather a case of departmental need. This, the interviewee stated, was especially true with regard to the transversal systems. The interviewee did acknowledge the fact that with the development of later systems and in the current scenario, departmental needs still enjoys prominence but that maturity levels are considered. The interviewee also stated that means of informing and training of staff influence the departmental needs. The previous Director Commodities and Services (2000) also stated that departmental needs rather than maturity levels were a consideration when the decision to implement information (management and) technology was undertaken. The interviewee also reaffirmed the statement that maturity was only considered at a later stage and that this was enhanced by training and communication. The Director Human Resources (1999) stated that only transactional need were considered and all other human resources aspects forgotten. The Director Department of Defence Logistics Support Formation (2000), was of the opinion that both needs and maturity were considered and that the communication of the intent to implement systems was beneficial not only to the growth in the maturity level of management but also to the transactional acceptance of implemented systems. It may therefore be stated that the Department of Defence did (although not initially) consider maturity of the organisation as a factor when the decision to implement information technology was made.

From the Independent Electoral Commission perspective maturity of the organisation was not an issue as the organisation was initiated with the concept of advanced information (management and) technology implementation. These systems were required to ensure a free and fair election (interviews with the Manager Voting Station Infrastructure and Electoral Logistics, 1999 and the Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). The Director Procurement stated that although some sections within the Independent Electoral Commission (for example stores) did not have a system to capture and manage their assets and consumables, they were sensitised to the future changing scenario from the onset. This, according to the interviewee, improved the maturity growth and assisted in the change management, which is associated with such an activity. The Project Manager Electoral Logistics System (2000) also stated that during the implementation of the logistics management systems due consideration was given to the maturity within the logistics environment. Prior to implementation, this was perceived to be a level acceptable for the implementation of the system. It may therefore be concluded that maturity, as an element, was given due consideration by the Independent Electoral Commission at the time when the decision to implement an information management and technology solution was made.

From the Department of Justice perspective, the Deputy Director General Corporate Services (2001) stated that the required maturity level in the department was not yet achieved but that departmental need required the implementation of an information management and technology solution. In order to overcome the shortcomings in maturity at all levels the interviewee stated that communication and training initiatives had been launched. This had improved the maturity level with regard to the total system perspective within the organisation and assured a buy-in from all levels. The Director Information Technology

(2001) reaffirmed that the communication of the aim of the court's project improved the acceptance of the departmental perception with regard to its role within the justice cluster. The Project Manager Digital Nervous System (2001) stated that the perception was that of relatively high maturity levels with regard to acceptance for proposed implementation of systems. The Project Manager Financial Administration Systems (2001) stated that in the financial administration environment, the perception was of relative high maturity levels with regard to technology and system implementation. It may therefore be stated that although the Department of Justice may not have had an adequate maturity profile at the onset of the implementation of the information management and technology drive, this situation has improved. It may also be stated that maturity was given due consideration, but that departmental needs were of a higher priority.

5.3.3.4 Information technology

Information technology in this perspective implies the infrastructure availability to support an information management environment. Implied herein are the aspects of interconnectivity (local and wide area networks) and the existing status of the computer hardware. This is an imperative as old and out-dated hardware such as 286/486 computers will not be able to accommodate more recently released software (for example Microsoft Windows NT™ or 2000™), nor will they be able to accommodate networking, which is required for database facilitation (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the Jordanian example it is clear that the existing information technology is state of the art. It is stated that they are the leaders in the Middle East as is stated by and in Ahmad, *et al*. (1998:119) and *Supra*. Chapter 4, par. 4.2.1:

> *Jordan grew in its public sector information technology from virtually no structure in 1970 to the leader in the Middle East.*

From the Mexican example it is also clear that thought did go into the establishment of state of the art technology infrastructure as is reflected on by and in Gutierrez, *et al.* (1999:23) and *Supra*. Chapter 4, par 4.2.2:

> *The growth in the application of computers as a solution provider and information source in Mexico is considered to be the second highest in the Latin Americas. In this regard only Brazil surpasses it. The main constraint, however, is the lack of communications infrastructures.*

The Chinese example is not very clear on the level of information management technology although it is stated that more and more hardware was procured by the Chinese State Enterprises in order to execute their functional (also known as the transactional) tasks. According to the research networks are insufficient or completely absent which leads to duplication of data and lack of data interchange. The following excerpt as reported on in *Supra*. Chapter 4, par. 4.2.3, supports this:

> *... no or very limited network capability exists for the interchange of data and more overly for management purposes.*

Furthermore massive duplication of data is evident due to the lack of an integrative system of data management and networking. It is also stated that managers spent more time on obtaining more hardware for functional or task driven actions than on managing the actual activity or Chinese State Enterprises, allocated to them. It is also clear that a lack of government investment and lack of efficient use curtails management optimisation of the Chinese State Enterprises (Dologite, *et al.*, 1998:119-121 and *Supra*. Chapter 4, par. 4.2.3).

The Californian example is relative clear in the fact that they opted for state of art technology in order to improve service delivery. This was

reflected on and supported by Caves, *et al*. (1999:4) and *Supra*. Chapter 4, par. 4.2.4:

> *The Californian solution was one of embracing the information technology age in order to establish smart communities.*

The Californian local governments opted for integrated network solutions so as to improve on efficiency and effectiveness. As stated in *Supra*. Chapter 4, par. 4.2.4 and supported by Caves, *et al*. (1999:3), the following holds true:

> *... strong proponents of an integrated system whereby data is exchanged in-order to optimise management.*

From the international examples it may therefore be stated that state of the art information technology and communication was considered an important factor in order to improve overall public service delivery.

The Department of Defence interviewees were all adamant that state of art technology was the key to success. The Director Enterprise Information Systems Architecture (2000) stated that, had the Department of Defence not kept abreast with information technology, management in the Department of Defence would have been virtually impossible. According to the interviewee, networks and communication technology are essential to support large and complex organisations. The interviewee also stated that the need for real-time information requires the application of modern front-end technology. The previous Director Commodities and Services (2000), was of the opinion that no defence force can operate without computers. This interviewee also elucidated on this point by stating that integrated systems in support of management are essential. The interviewee further stated that there was a need to remain at the forefront of technology in order to maintain an optimised organisation. The Director Human Resources (1999) stated that without the support of the technology base in the

Department of Defence, it would have been virtually impossible to manage the personnel of the department. The Director Department of Defence Logistics Support Formation (2000) stated that (technology) infrastructure deployment enabled the Department of Defence to not only implement integrated systems but also to optimise management. The interviewee also stated that the Department of Defence still has a need for maintaining the existing information technology and that best practise strategies should be followed in order to remain at the forefront of technology. It may therefore be stated that existing information technology in the Department of Defence is not only capable of supplying management information but also of supporting the department in transactional or functional tasks.

In the Independent Electoral commission example, the Manager Voting Station Infrastructure and Electoral Logistics (1999) response to the question on information technology, stated that the Independent Electoral Commission did not have any doubt regarding the rollout of state of the art technology to support the election process. According to the interviewee, the existing technology infrastructure was procured and implemented with the concept of a life cycle approach. The interviewee stated that due to the fast changing technology, the idea was to replace the existing infrastructure after the 2004 general election. In this way the Independent Electoral Commission will remain abreast of technology developments. The Programme Director Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium (2000) supported this point of view and stated that systems currently deployed in the Independent Electoral Commission are monitored and updated as part of the licensing agreements with the suppliers. The Project Manager Electoral Logistics System (2000) sited a specific example, in that the logistics system was upgraded after the national election to accommodate needs identified for the local election. The Director Procurement (1999) stated that information technology

deployment was key in the success of the transversal systems of procurement and financials in the Independent Electoral Commission. Deployed information technology supported the decentralised requirement statements of provincial offices and centralised head office procurement activities. The interviewee supported the notion of the life cycle approach for the phasing out of existing equipment and phasing in new equipment. It may therefore be stated that the Independent Electoral Commission maintains a policy of excellent information technology and communication infrastructure in order to support its electoral activities.

During interviews with the Department of Justice, the Deputy Director Corporate Services (2001) emphatically stated that the proposed integrated justice system would not be able to function optimally if there is no state of the art infrastructure. In support of this, the Project Manager Digital Nervous System (2001) stated that the aim of Digital Nervous System (DNS) is to supply the Department of Justice with an integrated technology support to enable the department to communicate internally. Cross-departmental communication through networks will also be facilitated. This will link the Department of Justice with other departments such as the South African Police Services and Department of Correctional Services. According to the interviewee, the rollout of equipment to the approximately 500 justice offices is currently underway and approximately 10500 computers will be deployed by the end of the 2001/2002 financial year. The Project Manager Digital Nervous System (2001) stated that the Department of Justice will be linked by means of local and wide area networks in order to facilitate, and realise, the true justice for all concept. The Director Information Technology (2001) stated that the aim of the department is to have an established state of the art computer infrastructure to support a state of the art justice system. The Project Manager Financial Administration Systems (2001) stated that the existing non-integrated systems

deployed in the Department of Justice require phasing out. The interviewee stated that the identified need for improving on the justice delivery, by implementing advanced information technology solution, was excellent. The interviewee was, however, concerned about the demographics of the country, specifically the rural communities, which not always supports such advance technology. It may therefore be conclusively stated that the Department of Justice applies the concept of advanced information technology and systems for the execution of their core function to wit bringing justice to all.

5.3.3.5 Communication

Communication is an important element when the decision to implement information management and technology is made in an organisation. In order to obtain not only user acceptance but also participation in the design of such systems, intent and objectives must be clearly communicated to all levels within the department (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the international examples it can not be conclusively deduced that communication formed an integral part of their implementation strategy. The only reference to communication is in the Californian example, which concludes with the statement as reflected on in Kennard 1998, quoted by Caves, *et al.* (1999:11) and *Supra*. Chapter 4, par. 4.2.4, that the information age is:

> *"... profoundly changing the way we communicate...*

The previous Director Commodities and Services (2000) stated that initially the Department of Defence did not clearly communicate their intent to all levels in the organisation. The interviewee stated that it was only after the implementation of the initial transversal systems that senior management decided and authorised the communication of intent and objectives. The interviewee also cites the generality of these

types of systems as a problem in the communication and participation aspect. The previous Director Commodities and Services (2000) also stated that with the development of later systems, specific project offices were initiated which had as one of their tasks, the communication of intent and objectives. They also had to obtain inputs from the broader user groups during the design phases of such systems. Management information and process improvement was targeted. The Director Enterprise Information Systems Architecture (2000) stated that currently, clearly marketed intent and participation is of high importance in the design of all systems. The communication of objectives is done at as many forums as possible and staff is allowed to forward suggestions for the improvement of systems. The Director Department of Defence Logistics Support Formation (2000) stated that communication, especially to the user level, was initiated after it was realised that the change management aspect and resistance to change aspect were not considered with the implementation of the initial systems. This point of view was re-affirmed by the Director Human Resources (1999). The interviewee added that communication through marketing now forms an integral part of the system design and implementation strategy. It may therefore be stated that although the Department of Defence did not initially follow a communication strategy, the existing policy is one of communication to and at all levels of the organisation.

The Manager Voting Station Infrastructure and Electoral Logistics (2000) from the Independent Electoral Commission stated that it was policy from the onset of the decision to implement an information management and technology solution to keep all levels informed of the intent and objectives of the Independent Electoral Commission. Participation was limited as the core function of the Independent Electoral Commission greatly dictated the type of technology and systems to be implemented (Interview with the Programme Director

Klynveld, Peat, Marwick and Goerdeler (KPMG) Electoral Consortium, 2000). The Assistant Manager Electoral Logistics (2000) stated that communication was entrenched in the total change management program of the Independent Electoral Commission and it was this policy that made the acceptance of systems at all levels possible. According to him specific marketing drives especially aimed at the provincial and local levels made the application of the virtual satellite (V-Sat) feasible. The Project Manager Electoral Logistics System (2000) stated that in terms of the deployed logistics systems at warehouse level, prior marketing and training empowered the Independent Electoral Commission staff to facilitate the total election process. The Manager Voting Station Infrastructure and Electoral Logistics (2000) re-affirmed this by stating that all systems deployed were accepted as being beneficial to not only the transactional level but also to the management level. The Director Procurement (1999) was of the opinion that the somewhat aggressive marketing of the information management and technology solutions assisted the Independent Electoral Commission in, not only being operational in less than eight months, but also facilitating the election process to the degree that real-time information of results were available. It may therefore be stated that the Independent Electoral Commission did employ a principle of communication to and aimed at all levels to facilitate the implementation of the information management and technology solution.

According to the Deputy Director General Corporate Services (2001), the Department of Justice embarked on an informative display of the intent to computerise and to implement information management and technology as a solutions provider from the outset of the program. According to the interviewee the aim was to sensitise the staff of the Department of Justice and the public as whole of the intent of the department to make justice available to all citizens. Not only did they

make use of news articles but they also started with the publication of a newsletter explaining the objectives of the implementation drive. The Director Information Technology (2001) stated that for the purposes of the pilot project and the rollout of the digital nervous system, specific communication drives were initiated and implemented. This was not only to sensitise the general departmental users to the action but also to prepare them for the changing environment. The Project Manager Digital Nervous System (2001) stated that at this time there is an ongoing program to keep the Department of Justice's staff informed as to the progress of the implementation program and the objectives to be achieved. The Project Manager Financial Administration Systems (2001) stated that, within the environment of the State Attorneys, they have a program to sensitise and educate the staff and users of the system with regard to the new systems that will benefit all. The Deputy Director General (2001) also stated that the main aim of the communication was for management to buy in on the implementation and take ownership of the application. It may therefore be concluded that the Department of Justice, not only embarked on an information and communication drive, but are actively propagating the new justice systems at all levels.

5.4 Conclusion

In terms of the research for this thesis, it is clear that the identification of drivers, forces and denominators do play an active role in the decision to implement information management and technology in a department. It is also clear from the research for this thesis that in situations were the drivers, forces or denominators did not enjoy attention or prominence the implementation and application of the information management and technology was less successful.

It is also clear at this time that organisations primarily focus on transactional improvement in the management scenario. This situation is primarily due to the constant drive to improve transactional effectiveness. It is also clear from the empirical research that management is under the impression that executive management information resides as function in the management information available. This impression is primarily due to the fact that they (management) believe that data manipulation and data management equates to executive management information. Existing implemented systems are by no means inadequate with regard to information management and the amassed data are available for statistical inferences and therefore strategic decision-making. The application thereof is, however, absent.

The contribution of this Chapter to the overall research statement is found in the fact that it sets the basis against which the research findings are validated. This Chapter basically sets the stage against which the defined problem statement was tested.

Given the aforementioned, it is only logical to proceed to the analysis of the findings, which then forms the basis for the next chapter. This is required in order to validate the empirical findings against the theoretical and literature study and to determine whether the theoretical study supports the empirical findings.

CHAPTER 6

THE RESEARCH FINDINGS AND MODEL FOR IMPLEMENTATION

6.1 Introduction

The preceding chapter dealt with the findings of the research as conducted. The research was done against the backdrop of the hypothesis as postulated earlier in the thesis (*Supra*. Chapter 1, par. 1.3.1).

This chapter not only interprets the findings but also validates the literature and theory against the findings based on the research parameters (*Supra*. Chapter 1, par. 1.3.1). This interpretation implies that this chapter in effect brings together the three aspects of problem definition, theory and research (*Supra*. Chapters 1,2,3,4 and 5).

The importance of this chapter is found in the aspect to validate and contrast the findings in order to draw conclusions and make recommendations. This will effectively address the problem as stated. In as much as it should it be deemed a requirement, a solution in the form of a model to overcome the issues found, will be presented.

This chapter is structured around the applicability of the aspects as defined by theory, the applicability of the findings from the questions, deductions based on the aforementioned, the necessity of employing the missing theoretical points or drivers and forces, and a conclusion.

6.2 Research synthesis

The synthesis of the research, in the field of information management and technology (*Supra*. Chapters 2,3,4 and 5), is based on the concepts of data, data manipulation and statistical inferences. In the United States of America, politicians apply information management and technology to keep abreast of the political needs of the citizenry. Examples cited are that of the Mondale campaign and, more recently, the Bush/Gore Presidential election. In these cases the politicians applied the vast amounts of data contained in specially designed and developed databases to determine outcomes or to apply customised approaches during the election campaign.

What is evident from the literature is that pure transactional management was and is not enough. Data have to be inferred or statistically manipulated in order to be able to plan strategically. In the American presidential elections this was a necessity not only in order maintain a lead but also to understand the needs of the citizenry at various levels and in various geographic areas. From this the element (or driver) management thus enjoyed prominence. No differentiation is made at this time between transactional and executive management information. From the research done (*Supra*. Chapter 4 and 5), it also becomes apparent that when institutions implements and apply information management and technology it is to improve efficiency and effectiveness of organisations of such institutions, thus supporting this element as a driver. The literature research also refers to cost reduction as a requirement thus, supporting this driver. Other aspects covered in the theoretical research are:

a. Improved productivity, which relates to the performance measurement driver.

b. Improved access to information, which relates to the driver availability.

c. A more transparent governance which may be related to the force, training and skills development.

d. Improved contact with the citizenry, which may be related to the force, culture.

e. Improved workflow that will lead to departmental optimisation which may be related to the force, departmental adaptation.

f. Improved system design and standardisation, due to the improved work flow analysis, of the relevant tier/organisation, which may be related to the force control.

g. Improved contact with the citizenry, which may be related to the force, human resources, primarily due to the fact that in the political scenario this will be the voting populace. In the public sector the citizenry will be the workforce.

What now needs to be established from the literature research is whether it also supports the denominators identified in terms of the maturity levels (*Supra*. Chapters 2,3,4 and 5). Required for the implementation of information management and technology, references to instances where maturity and maturity levels are considered as an essential element, reflects on the numerous statements referring to the empowerment of the citizenry (*Supra*. Chapters 2,3,4 and 5). Also supporting this are the references to making information available to the citizenry and having more transparent governance (*Supra*. Chapter 4, par. 4.3). Reflecting on the information technology *per se* Chapter 4 and 5, reflects on the need to have a sufficiently supportive base of technology available in order to comply with the demands of the information era. Emphasis is also placed on the fact that technology without a communication infrastructure implies a useless technology

base. Referring to the communication denominator and not communications *per se* the horizontal and vertical communication of intent and objectives are not that clear in the literature research. In this regard reference to participation is made which may be translated into communication have been undertaken. Chapter 4 has several references to the need for research prior to the implementation of information management and technology with specific reference to the type of solutions to be applied and the type of systems to be deployed. Finally, throughout the literature in *Supra*. Chapter 4 there is an underlying message that the economic viability and cost must be seen as determinants of solutions in the technology environment, hereby warning against over-capitalisation or impossibility to sustain or support expensive infrastructures over time. It may therefore, be concluded that the literature research supports the concept of having the identified drivers, forces and denominators. It may also be concluded that the applicability thereof holds true for the literature research.

An item that needs further elucidation is the management information aspect. Chapter 2 (*Supra.*, par 2.3-2.4 and Chapter 4, par 5.3.2.2) has reference to a concept called service management, which refers to the manipulation of data in order to obtain something else than transactional management information. In the rest of the literature research statements implying the need for more than transactional management information are made. In the references to the United States of America's presidential elections it is also implied that (statistical and other) inferences on existing and designed databases, were made by the presidential candidates support teams in order to lead the race for presidency. With regard to the rest of the theory, reference is only made to transactional type management information and the improvement thereof. It may therefore, be concluded that although implied, executive management information is identified as a

need, barring some exceptions, it remains relatively absent from the practical scenario.

6.3 Research applicability

The objective of this thesis is to determine what the information management solutions for policy making and implementation in the public sector should be based on in terms of available and applicable information technology.

The most important aspects ascertained was that the successful implementation and acceptance of information management and technology can only be obtained when the following two aspects are addressed:

a. The driving forces.

b. The transversal elements (denominators) that influence the postulated problem statement.

6.3.1 Drivers of the departmental management information and technology

The five drivers that will be considered are management, availability of information and technology, cost reduction/avoidance, effectiveness and efficiency, and performance measures and measurement.

6.3.1.1 Management

Management was considered the most important driver and the research determined the degree to which management was affected by the implementation of information management and technology systems. From the research the need for management information is clearly stated (*Supra.* Chapter 2, par. 2.3 and 2.4). However, no distinction is made between the aspect of transactional and executive

information needs. What is stated is the need to execute the transactional level tasks more effectively (and efficiently) and for management to have tools by which to manage this.

The research results all indicate an aspect whereby the management results were focussed on general management information. Herein lies the fundamental difference of transactional management and executive management information and the application thereof in the departmental environment in order to maximise efficiency and effectiveness. The findings virtually all reflected the point of view that transactional information needs to be stored and managed in order to improve effectiveness and efficiency. In terms of the South African public sector reflections on a tool to manipulate or execute statistical inferences is yet to be identified.

6.3.1.2 Availability of information and technology

Availability of information and technology was considered a driver due to the importance that information has for management (*Supra*. Chapter 5, par. 5.3.1.2). Furthermore the non-availability of data implies the incapacity to effectively and efficiently manage a department. The availability of data, however, proves to be the least of the problems. Making the data available tends to be more of an issue. The availability of data in most instances is due to lack of communication infrastructure or even, to some degree, lack of information technology infrastructure. Having this lack of infrastructure, in turn, results in the lack of having a consolidated database (or data-warehouse) of information at the disposal of the department in question for the application of management. The absence of a central or consolidated database of information inhibits the departmental capability to apply statistical inferences or data manipulation for executive information management and decision-making. The absence of the central database does not, however, inhibit the transactional management requirement or need.

The reason for this is that even if remote and non-linked information technology is available, those offices can still continue with their transactional capabilities. The presence of a central database fundamentally proves the concept that the public service in essence does have information available to manipulate. The problems associated with this, however, reside in the ambit of infrastructures and inference tools.

6.3.1.3 Cost reduction and avoidance in the implementation of information management and technology

Cost reduction or avoidance was considered a driver because the decision to implement information technology has a great budgetary impact on any public service department. Within the South African context this is especially true, as certain departments have experienced severe cutbacks on their capital expenses. The point, however, is that after implementation the department must be in a situation to render a more effective and efficient service at a reduced cost or at least at a cost that is equal to the pre-implementation cost. In the normative research this aspect was conclusively proven (*Supra.* Chapter 2, par. 2.3 and 2.4).

In the case of the empirical research, however, the aspect of high investment cost with a high return on investment must be a consideration. The theoretical and empirical research also shows that long-term savings from having a information technology system, would indirectly reduce the budget of the department involved. The empirical research does, however, indicate that due to new cost and expenditure elements such as maintenance and data-lines, consideration must be given to a cost trade-off with regard to the net gain in budgetary terms. The indirect savings obtained from the increased productivity and improved effectiveness of the department would even have a greater impact on the overall functioning of such a department. The indirect

savings obtained, according to the aim of the empirically researched departments, would prevent astronomical budget hikes. Cost reduction/avoidance is therefore an important aspect that needs to given due consideration when the decision to implement information technology is made.

6.3.1.4 Departmental effectiveness and efficiency

Improving departmental effectiveness and efficiency should be a major aspect when the decision to implement an information management and technology solution is made. Making this decision with regard to information management and technology implies that the need for management information at all levels should be known. In turn this implies that both the need for transactional improvement and executive management needs should be defined and addressed (*Supra.* Chapter 2, par. 2.3 and 2.4).

The research indicated that this was an important consideration. The research determined that most organisations accepted the effect of this driver to the environment prior to, during and after implementation of information management and technology solutions.

The empirical research also in most instances conclusively pointed to this aspect being a driver. The public service as a whole has for decades been notoriously bad at service delivery. In order to improve on this effectiveness and efficiency has to be improved. Due to the cumbersomeness of the beaurocracy and the regulating policies and procedures the amount of paperwork has increased through the years. The beaurocracy resulted in decreased effectiveness and efficiency. The research points out that effectiveness and efficiency must be increased after implementation of an information management and technology solution. When effectiveness and efficiency, is not attained, or attainable, the solution or the target group is incorrect. In the research it was found that the implementation of the information

management and technology was aimed at improving service delivery and therefore improving effectiveness and efficiency. The research, however, did determine that the executive information needs were not addressed.

6.3.1.5 Performance measures and measurement parameters

The driver performance measures and measurement stems from the aspect of improvement, which must, however, be measurable against some norm or standard. The standard must be known to the department in order to determine the success of the implemented solution. Furthermore, the public service as a whole and a department in particular cannot invest major sums of capital without knowing what the return is going to be and what it is the return should be on (*Supra.* Chapter 2, par. 2.3 and 2.4). The reason for this is that the decision to implement information management and technology should be aimed at improving service delivery.

From the research the importance of performance measures and measurements was clearly stated. Performance measures and measurements was, from the aspect that an organisation, must be understood to have its own requirements prior to the decision to implement information management and technology is taken. Improving departmental performance reflects on the benefit attainable through implementing a technology solution.

From the research, the departments did not initially know what they were improving. Departmental performance occurred only after they became knowledgeable with regard to information management and technology implementation. The departments did, however, plan on what milestones had to be achieved during implementation and got more skilled in this project management capability as more systems were implemented. However, on the point of knowing what had to be improved, the empirically researched departments did not in all

instances know what had to be improved. Identifying the parameters occurred only after the initial implementation of solutions and these parameters improved as more solutions were implemented. The lack of identified measurement parameters implies that not only should consideration be given to what solutions should be considered but also to the aspect of the achievement that must be a direct result of the implemented solutions, in other words what area of the business must be improved in terms of effectiveness and efficiency.

6.3.2 Departmental forces

The departmental forces are those elements the department has control over. In the context of this thesis they are human resources, culture, training and skill development, control and departmental design.

6.3.2.1 Human resources

Human resources as a force is that component that if not addressed correctly will lead to the rejection of any implemented solution. The rejection will be primarily due to the effect the changing environment has on the work force.

From the research it became evident that any proposed solution in terms of information management and technology must be thoroughly communicated throughout the department (*Supra.* Chapter 2, par. 2.3 and 2.4). Furthermore the research points out that where this was not done, major resistance to change was experienced. In the situations where attention was given to change management, major successes were registered in terms of implemented solutions. The successes then gives validity to the application of this element as a force and due consideration should be given to it before and during implementation of a information management and technology solution.

6.3.2.2 Departmental culture

Culture from an implementation perspective, is as important as taking cognisance of change management. Culture is a departmental inborn trend that needs to be addressed through communication and training.

From the research no distinction was made between the departmental culture and the human resource culture. However, the aspect of due consideration to culture as a force to be considered was addressed. Also evident from the research was that the element of culture was not always given due consideration. In such cases this also led to rejection of the implemented solutions. As departments grew and organisations developed, change management was affected more easily when identified as a need in the changing environment of the deployment of information management and technology solutions. Where public service departments took cognisance of this element prior to implementation the culture shock was much smaller and the migration to a technological environment was smoother.

6.3.2.3 Training and skills development of personnel

The element of training and skills development at all levels of the organisation is imperative to transform a public organisation to a functional and manageable entity. Due to the changing environment and needs of the public domain, the need to change and adapt to the fast track of the information age implies that all levels of management and functional application are required to be adept at the use and application of information management and technology. From the normative research it was ascertained that training and skills development was indeed a factor to be considered.

In the international examples the application of training and skills development was indeterminable. In terms of the empirical research the application of training and skills transfer, although not initially in some

instances, was considered an important element. In these instances where this element was addressed prior to implementation it even assisted the culture change and change management of the projects. In all the empirical examples training, either initially or later, played an important role. Also of note, are the continuous training programs identified that are meant to keep the staff (at transactional and management levels) up to date with regard to new developments in the field of the information management and technology deployed.

6.3.2.4 Control

Control is a crucial consideration when the decision to implement information management and technology is made. The lack of due consideration for the element of control resides in the perception that the implementation of electronic solutions does not necessarily improve managerial control but rather diminishes managerial control over the transactional functioning. In effect the implementation of information management and technology should actually improve control (*Supra.* Chapter 2, par. 2.3 and 2.4). Once this improvement concept is accepted, the implementation process is accepted and the culture changes to acceptance and the change management process is assisted. From the normative study it was clear that improved control must be a consideration for the successful implementation of an information management and technology solution.

From the empirical perspective the international examples were not clear regarding the element of control. However, it was clear that control and the improvement thereof were not only a consideration but were actually applied in the national examples cited. Specific emphasis was put on the improvement of (transactional) management control. It may therefore be stated that control, and the improvement thereof, in so far as the national perspective goes, is considered to be an

important success element for the implementation of information management and technology.

6.3.2.5 Departmental change

Departmental change is essential in the event of the implementation of major information management and technology solutions. Again this element closely interfaces with the afore-mentioned elements, in that it impacts on change management, culture, and training and skills transfer.

From the research, departmental change or adaptation was not specifically advocated, however, it was implied. In the literature the effect or impact of the implementation of technology solutions either directly resulted in or forced a change in the organisation after implementation. Also from the research, the international examples did not reflect on any departmental change. Again, it was implied in some of the examples in terms of improvement of service delivery. However, from the national examples it was evident that departmental change and adaptation was a criterion for consideration. It may therefore be stated that in terms of the South African public service scenario, departmental change was indeed a factor of consideration at the time the decision to implement information management and technological solutions was made.

6.3.3 Denominators

The denominators or transversal elements are: Research prior to implementation, economic viability of the implementation decision, maturity levels of the organisation, available information technology and communication.

6.3.3.1 Solution design research

Research as a denominator is critical in the user requirement design for the implementation of information management and technology solutions. As these solutions are usually costly, a wrong decision can amount to major fund or budgetary losses. The need for specific solutions must also be critically balanced against availability, applicability, sustainability and life cycle costs (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the research it was evident that research into solutions must be detailed for a specific scenario or problem definition. The proposed solution(s) must not only comply with the required outcomes of the organisation but also be measurable, sustainable and attainable. It was also partially evident from the international examples that research was a factor for consideration. In terms of the national examples of the public service, research was considered a major transversal element when the decision to implement information management and technological solutions was made. The element of research also remains high on the list during the entire life cycle of the implemented solution in order to remain at the forefront of technology. It may therefore be stated that as a denominator or transversal element, research into possible solutions is an important function that needs to be performed prior to and during the life cycle of the implemented solution.

6.3.3.2 Economic viability

The denominator economic viability interfaces closely with research. Both impact on the eventual cost and expenditures to be incurred. Information management and technology must under all circumstances only be considered if it is economically implementable and sustainable. Due consideration might be given to outsourcing technological solution as it is firstly, not part of the core function and secondly, not financially

feasible to maintain such services within the organisation. It also implies that systems should not be implemented if they cannot be maintained as this will lead to fruitless expenditure (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the research, the economic viability of information technology solutions was addressed in the sense that poorer countries and even counties/provinces might not be in a financial position to implement required solutions. On this issue outsourcing functions within the departments might then be given due consideration. The international examples were, however, not all clear on this issue. From the national examples cited the application of the transversal element of economic viability was given due consideration and was factored into all decisions of development and implementation over the total life cycle of the proposed and implemented solutions. It may therefore be stated that as a denominator economic viability has a role and function when the decision to implement information management and technology is made.

6.3.3.3 Maturity levels

Maturity levels as a denominator interface with the driving forces in as much as they affect management, effectiveness and efficiency as well as departmental adaptability, culture and training. The maturity level of an organisation is indicative of the culture and departmental positioning in the information technology environment to accept change for improvement. The best systems can fail if buy-in from all levels is not attained. Furthermore, proposed and implemented systems must be perceived as an aid and not a danger to the organisation. It is imperative that all levels of the department must share this perception. Training and communication may influence maturity levels.

No specific reference is made in the literature study to the need for or the effect of maturity levels on the decision to implement information

technology as a solutions provider. Only inferences are made to the perceived benefit of such a solution to a department. From a practical point of view, the international examples has no references to this denominator and the assumption must be made that they either considered it as a sub-set of one of the driving forces or alternatively gave it no due consideration.

From the national examples cited, two aspects, to wit the maturity within the department in question and within the service provider, were considered important. The research concluded that, without a mature environment (an environment which accepts change for the benefit of improved effectiveness and efficiency) and mature service provider's implementation of a technology solution is not attainable. Maturity, according to the research, is attainable through training, communication and change management. It may therefore be stated that the denominator (or transversal) element of maturity needs to be considered when the decision to implement information technology in the public sector, is made.

6.3.3.4 Information technology

The denominator information technology in this perspective implies the infrastructure availability to support an information management environment. Implied herein are the aspects of interconnectivity (local and wide area networks) and the existing status of the computer hardware. This is an imperative as old and out-dated hardware such as 286/486 computers will not be able to accommodate newer released software. Nor will they be able to accommodate networking, which is required for database facilitation.

From the literature study, it is clear that a solid foundation of advanced information technology and infrastructure is required in support of proposed or implemented information management. From the research in general and with regard to the international examples, it is clear that

advanced technology is required to enhance service delivery (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the national examples cited, it is also clear that advanced information technology is the only solution in order to enhance service delivery. Furthermore the requirement for connectivity requires such forefront technology. According to the research it is also easier to remain at the forefront once such infrastructure is put in place. Maintenance and other cost factors are then greatly reduced. It may therefore be stated that in terms of a transversal element, information technology status should be given due consideration when the decision to implement information management and technology is made.

6.3.3.5 Communication

The denominator communication is an important element when the decision to implement information management and technology is made (*Supra*. Chapter 5, par. 5.3.4.5). The literature research does reflect on this element from the perspective of marketing intent and communication capability (technical). References are made not only with regard to management participation and buy-in, thus implying communication (marketing intent) but also to the need to bring the message to the greater citizenry and obtain greater participation from them. The study further highlights the need to be able to reach every citizen by means off some communication mechanism, thus focussing on the technical aspect of communication. Global connectivity is also addressed.

The research on the international examples, however, has little if any reference to communication from the perspective of marketing intent. Some reference was given with regard to citizen participation, which implies communication. This does not reflect on communicating intent prior to implementation (*Supra.* Chapter 2, par. 2.3 and 2.4).

From the national examples cited, the study found that, in the older transversal systems, little communication occurred. However, with the later systems and information management and technology solutions, communicating intent and obtaining participation was of the utmost importance. It may therefore be stated that communication, as a denominator, has a fundamental role to play in the design, implementation and maintenance of proposed and implemented information management and technology solutions.

6.4 Proposed information management and technology model

To address the problem of implementing executive information management, it will be required to implement a strategy to specifically address the issue of information requirements. In order to facilitate an easier transformation when the decision to implement information management and technology is taken, the composition of the management information requirement must consist of:

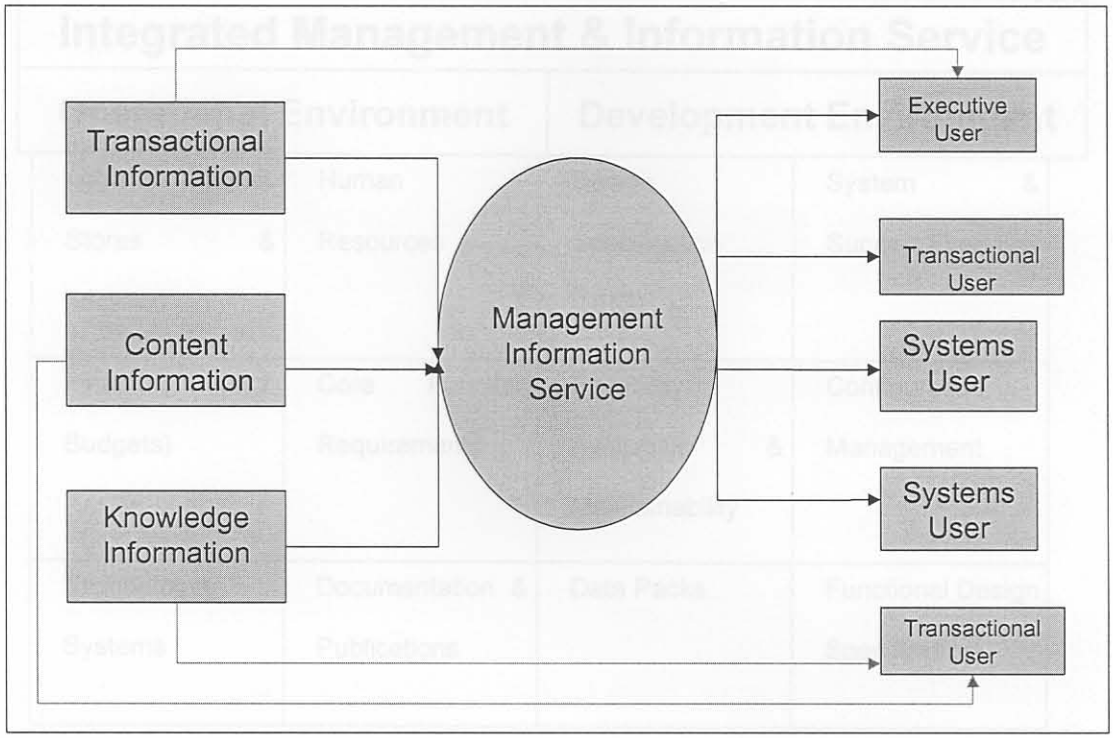
a. Functional or transactional information, which by definition consists of all transactional activities such as data captured with regards to functional or day-to-day tasks.

b. Content information, which is relevant to the organisation such as files and records (for example case file for the Department of Justice, voting figures for the Independent Electoral Commission and mission available systems for the Department of Defence).

c. Knowledge management information, which per definition consists of that information, which refers to circulars or to information, contained within proposals and policies, developed within a department, or the individuals own ambit of expertise.

These components must be integrated into a database or date-warehouse (institutions consolidating databases for data retrieval purposes) from which statistical inferences or other forms of data manipulation may be made in order to obtain executive management information. Normal transactional or data management information may at the same time be obtained from the relevant serving input components. Important in this methodology is that any user at his/her applicable level may obtain information concerning the management level pertaining to that user from that data-warehouse. This implies that the data-warehouse must be dynamic enough to allow search and queries in order to satisfy the decision-making process applicable for that level. This also implies that it must be preferably a system, designed from the onset to accommodate such inferences or queries. Data is obtained from transactions, content and knowledge management. This data is then captured in a central repository, which will have the capability to do statistical inferences as per user requirement, in order to obtain executive management information. The information from the repository will be available to transactional users, systems users and management. The application of this information might be in its original format for transactional use, pre-defined requirements (system management) or executive management information (statistical inferred information for strategic decision-making). In instances of content and knowledge management, transactional users will access their data required for day-to-day activities direct from the source. In a seamless environment, using middle-ware (additional software to manipulate the data from designed systems), access to the reworked management information will be possible (Blignaut, 1992:20-42). This concept is depicted in figure 6.1.

Figure 6.1: Information Management Integration



Source: Adapted from Blignaut, 1992:42.

In order to have the management information available a system must be designed to facilitate the availability and accuracy of such required information. It is also an imperative that such information needs be integrated into a single service delivery. To facilitate this integration to public service management requirements, it is proposed that the following approach be followed (Blignaut 1992:20-24):

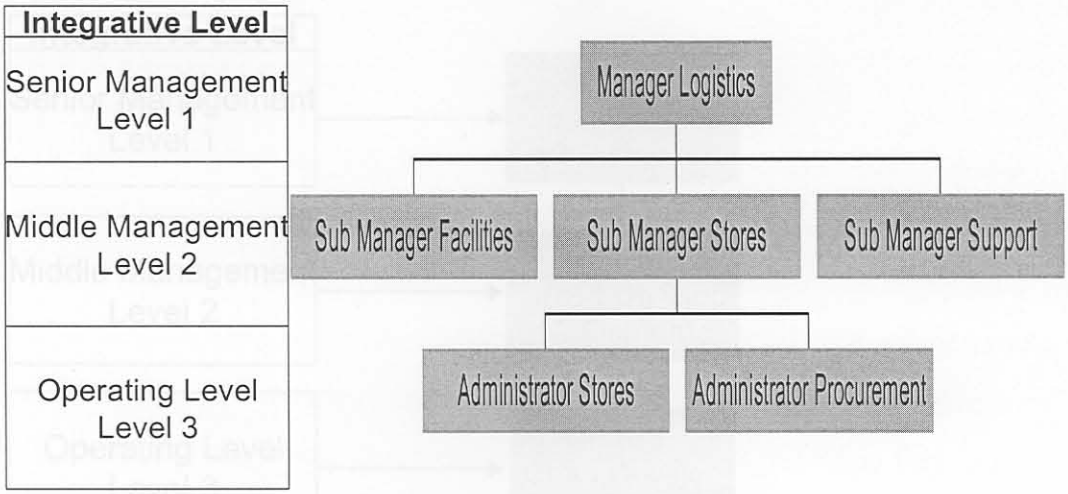
Figure 6.2: Integrated Management Approach

Integrated Management & Information Service			
Operational Environment		**Development Environment**	
Logistics (incl. Stores & Facilities)	Human Resources	Design Specification (URS)	System & Support Expertise
Finances (incl. Budgets)	Core Function Requirements	Reliability, Availability & Maintainability	Configuration Management
Technology Systems	Documentation & Publications	Data Packs	Functional Design Specification

Source: Adapted from Blignaut, 1992:24.

In order to have applied information management and technology in the public sector it is proposed that the process be defined as having two primary components. These components are the operational and development environments. Each component consists of six elements, which refer specifically to their environments. These twelve elements must be integratively addressed in order to produce a information management solution. A further aspect is that in order for the model to be successfully implemented, the model must be implementable and applicable to all levels of a department. When implemented at all levels and utilised integratively, decisions based on accurate information are possible. This will also facilitate policy making (Blignaut 1992:24-67).

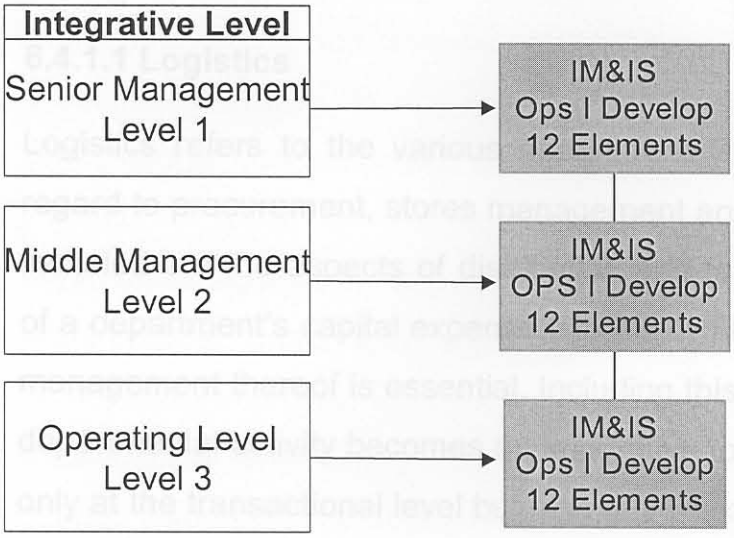
Figure 6.3: Management Levels



Source: Adapted from Blignaut, 1992:37.

This also implies that the same model must be applicable to the various management levels within the department. Thus the same twelve elements will be equally applicable to the transactional levels where functional or task execution occurs and to the executive management level where strategic decision-making and eventually policy formulation, has to occur. The decision-making, in turn implies that whenever a requirement is initiated, at whatever level, the integrative process is the same and all components and elements are applicable. In turn this will result in not only having participation from all levels of the department but that the actual implementation after policy formulation will be easier as the public servants whom where participants in the process, have the knowledge to communicate policy to the broader populace. It also holds true that as they are closer to the populace and the can identify more readily with needs of the populace, inputs in executable policies will be of greater value (Blignaut 1992:45-71).

Figure 6.4: Management Structure Match



Source: Adapted from Blignaut, 1992:42.

The various components and elements of the model (*Supra.* Figure 6.2), could be explained as follows.

6.4.1 Operational Environment

The operational environment is that which pertains to the normal work activities of a department, which would want to implement information management and technology. Executive information management and technology is based on attention being given to the various drivers, forces and denominators required for the successful implementation thereof (Blignaut 1992:24-35).

Once the required implementation of the drivers, forces and denominators has occurred, attention may be focussed on the most important element of this component to wit the core business of the department. This may be any level of the existing three-sphere approach or, more pertinently, focussed on a department such as the Independent Electoral Commission, Department of Defence,

Department of Justice or any other government department (Blignaut 1992:35-41).

6.4.1.1 Logistics

Logistics refers to the various departments or spheres function with regard to procurement, stores management and technical support. Also included are the aspects of distribution and facility management. Most of a department's capital expense is allocated to these aspects and the management thereof is essential. Including this function in terms of any departmental activity becomes an imperative to manage this aspect not only at the transactional level but also at the executive level. In terms of the transactional level, aspect such as State Treasury and the Auditor General are major role players, and at the executive level it becomes necessary to manage the strategic direction of a department in terms of decision-making and policy formulation and implementation. These policies and decisions must be based on reliable information management and technology (Blignaut 1992:24-72).

6.4.1.2 Human Resources

No department can succeed in attaining its mission or vision if there is no commitment from the human resources employed by such a department. Human resources being included as an element under the component 'operational environment' are the functionaries, who either execute the transactional management or the transactional level (task level). It also includes the staff that is charged with the responsibility to lead the department strategically. The human resources element was also very prominent as a driving force as decisions are taken at all levels of the department by staff. In turn they must be equipped to not only capture information but also to interpret information needs. This activity of interpretation may also lead to improved policy formulation and management (Blignaut 1992:24-71).

6.4.1.3 Finances

Finances, in terms of the economic applicability, featured prominently in the driving forces and denominators. This element as a function in the model is imperative, as any department (at any tier level) is dependent on its budget vote (allocated funds as per Parliament decision or White Paper). In terms of finances this activity involves the managed expenditure against the approved budget as well as the attaining of the departmental goals and objectives within the allocated funds. All strategically approved or envisaged aims and objectives as well as the transactional functioning must be contained within the approved budget. Managing the approved budget also calls for policies to govern this activity. In this relationship, departments may have consolidated and integrated information available for the Department of State Expenditure to improve executive decision-making and policy formulation (Blignaut 1992:24-72).

6.4.1.4 Core Functioning

In order to understand the executive information management and technology requirements of the department, one aspect continuously stressed throughout the research of this thesis in the application of the driving forces and denominators, is in terms of the core function of the business. This is also applicable to the transactional management needs, which must not be neglected. Executive management information for departments with regards to the core function is crucial. Policy formulation and implementation affects the department as whole and must thus be based on accurate information obtained from established databases (Blignaut 1992:24-72).

The core function reflects on the particular functionality that a department was initiated to perform. Such examples are the Department of Defence (responsible for the defence of the Republic of South Africa), Department of Justice (responsible for the courts and

related Justice activities), the Independent Electoral Commission (responsibility of running of free and fair elections), the Department of Public Service and Administration (responsible for public service) or the Department of Water Affairs and Forestry (responsible for supplying water and forestry services).

6.4.1.5 Technology Systems

This element reflects on the ability of a department in terms of its capability vested in the technology available to perform the service of management and information services. This reflects directly on the infrastructure as required and as mentioned in the driving forces and denominators with specific reference to the available technology and the sustainability thereof to manage the transactional and executive needs of the organisation or department (Blignaut 1992:35-72).

6.4.1.6 Documentation and Publication

Without documentation and publication or prescripts no organisation can function. This element was indirectly reflected on in the denominators but still forms an essential part in terms of departmental or departmental needs. Should this not be present, no control over the required systems or design is possible. Also to be noted is that if no cognisance be given to this aspect, the management of any implemented system will be difficult, as the basis from which such a systems was developed would not be understood (Blignaut 1992:35-72).

This function or element reflects on the control mechanism and facilitates the maintenance of the product, policies, service or system implemented. Moreover, the maintenance of this element reflects directly on the departmental capability of formulating and implementing policies. Having accurate documentation and publication capabilities, ensures having control over the department. It need also be stated that

this element need not be a manual system of large volumes of books and documents, but may be contained within an electronic documentation database (Blignaut 1992:35-72).

6.4.2 Development Environment

The development environment refers to the design and development of the required solution in terms of the information management and technology solution required by the department or organisation. The development process may or may not, as complete or as individual entities, be executed within the organisation or department. Herein implied is that the use of outsourced/sourced-in capabilities are acceptable. Within the development environment the aspects of the engineering principles are noted with regard to the establishment of the required solution. Within this component are contained the aspects of design, development and documentation of the required solution in accordance with the user specification. Design is important as the data capture for management at all levels is to be explicitly catered for during this component's activity so as to ensure data integrity (Blignaut 1992:72-124).

6.4.2.1 Design Specification

Implied in the design specification are the requirements to satisfy the needs in terms of the management needs of a department. These include the transactional requirements that may be derived from the transversal systems or the executive needs required for steering the organisation or department on a futuristic course. Design specification also implies the reworked user requirement specification on which the organisational and departmental needs are based. These in turn are deduced from the management requirements above and beyond transactional requirements. This implies a specific participation and the first level of integration between the user group and the development

group. The outcome will be a detailed requirement with regard to that what is expected as an outcome from the process of implementing the action of information management and technology (Blignaut 1992:72-124).

6.4.2.2 System Support Expertise

System support expertise is the expertise required for the design of the system. This implies the expertise available to not only design a system but also to make the required inferences available without the aid of middle-ware or supportive software in order to do statistical inferences on existing data for executive management information. The middle-ware expertise allows the design of systems around available hardware and software irrespective of brand name and also allows new developments not known at the time of requirement statement (Blignaut 1992:72-124). It is a knowledge field, which allows innovation to suit user requirements. In the absence hereof the implication is a purely transactional system.

6.4.2.3 Reliability, Availability and Maintainability (RAM)

The purpose of identifying the third element of the development environment is twofold. Firstly they represent the representation of the soft issues. The soft issues are the reliability of available information or quality of information (accuracy or information vis-à-vis corrupt information), the availability *per se* for example quality and the representation of the sustainability of the information available (data integrity). Secondly, this element represents the impact of hard issues to wit hardware and its reliability in terms of mean time between failure and availability in terms of system uptime and maintainability in terms of cost to repair and mean time to repair. This is directly linked to the identified driving forces and denominators with regard to the successful

implementation of an information management and technology system (Blignaut 1992:72-124).

6.4.2.4 Configuration Management

Configuration management is the method by which control will be achieved during development. The element of configuration management focuses on the maintenance of record keeping during the development phase and addresses version and content control of the developed product or system (Blignaut 1992:72-124). Based on the initial system design and possible subsequent changes, a detail record keeping is essential for future enhancements or maintenance to the system.

6.4.2.5 Functional Design Specification

Functional design specification (FDS) is the essence of the design of the proposed solution. This specification forms the basis from which the coding is initiated and eventually results in the proposed solution. The functional design specification is based on the user requirement specification (or design specification) as stipulated by the user. The functional design specification allows the computer programmer (or developer) to eventually translate the user designs specification into code (or the required design) and in turn results in a program (or product) (Blignaut 1992:72-124).

6.4.2.6 Data Packs

Data packs are the culmination of the development environment and represent the collection and collation of all relevant documentation pertaining to the developed solution (Blignaut 1992:72-124). This data pack must be transferred to the systems manager in the organisation or department that requested the system or solution, as all future changes and maintenance must be referenced and logged against this data

pack. The data pack should contain the source code of the solution, and will also contain all relevant maintenance aspects required to affect changes to, or maintain the solution.

6.4.3 Integration Process

The integration process for either information management or technology requirements is initiated by the requirement from the operational environment. Any or all of the operational elements may have a request or need for an information management and technological solution. Any or all of the operational elements are phased through to the development environment by means of a business case, which broadly addresses the need. From this a design specification is drawn-up with the aid of system support specialists. On acceptance of the design specification by the future user, the functional design specification is completed for the programmers (developers) to develop an acceptable solution. Parallel to this the progress of the developing solution is documented for configuration purposes. As the system is developed, testing will occur to ensure compliance to the required reliability, availability and maintainability. After user acceptance and system implementation, a compilation of all documentation, codes and diagrams will be collated. These documents comprise the data pack (Blignaut 1992:100-124). The data pack will be submitted to the systems (or project) manager in the operational environment from which the implemented systems will now be managed. The user department executes maintenance of the implemented solution. Enhancements will however follow the same route as if a new design is required.

Application or use of the solution is within the ambit of the various elements of the operational environment. Should it be a transversal system, all identified users will benefit. If a particular user requested the

solution, the application will be within the ambit of that user department or organisation (Blignaut 1992:72-124).

The integration of the development elements addresses, holistically, the total need of either an organisation or that of a department in terms of both the transactional and the executive information management need. Both aspects may be approached through the same route.

The management of the integration process should be done through the establishment of an office which, must collect, collate, manipulate and infer data to the requirement of the department. This office should also be responsible for the security of both data and information and within the ambit of the public sector domain, the making available of this information to the broader public. This method will result in greater participation in the governance and government in South Africa.

6.5 Conclusions

This chapter dealt with the analysis of the findings, the design of a model to address the problems experienced in the public sector information and technology scenario and a discussion of the added value of this study to the field of public management and administration.

This thesis had as its aim the validation of certain requirements for the successful implementation of information management and technology in the public sector. With regard to the previous, it may be stated that at least the following driving forces and denominators are to be present when the decision to implement information management and technology is made and therefore address the postulated problem. From the basis of the outcomes required by the decision the following drivers were addressed:

a. To assure that management, both in terms of transactional and executive needs of the organisation, is clearly defined in terms

of a frame of reference. Also to assure that management participation is obtained from the onset of such a program.

b. To assure that data is available for the statistical inferences required for executive information and to assure that transactional data is available for the functional day-to-day activities.

c. To assure that cost reduction/avoidance is addressed as an objective to be attained.

d. To assure that the improvement of effectiveness and efficiency is addressed as an objective and managed accordingly.

e. To assure that performance measurements and measures are realistic and that improvement is measured against known baselines.

With regard to the considerations required from the departmental environment, which act as forces on the decision-making scenario, the following essential requirements were addressed:

a. To ensure that the human resources element is adequately addressed, especially in the arenas of communication and change management.

b. To ensure that the cultural aspect of the organisation is considered and that cultural change program be initiated to protect against culture shock.

c. To ensure that sufficient training and skills development is offered to all levels of the organisation before, during and after program implementation.

d. To ensure that the concept of improved management and transactional control is understood.

e. To ensure that departmental change is investigated and implemented prior to or at the latest during the implementation of the program implementation. This holds true for the required policy and procedural changes that might be required as well.

With regard to the considerations required from the transversal environment (denominators), the following essential requirements were addressed:

a. To have and maintain compliant maturity levels within the organisation (both at management and transactional levels) and within the service provider environment.

b. To have and maintain a modern and supportive information technology base from which to implement an information management and technology solution.

c. To have and maintain a communication plan in order to inform the organisation with regards to the changing scenario.

d. To have and maintain a continuous research strategy with regards to the information management and technology prior to during and after implementation.

e. To have and maintain an economical balance with regard to the implementation decision.

The value of this chapter is found in the analytical dissemination of the available facts as obtained from the empirical and literature research. Further value is obtained by the design of a solution in the form of a model in order to address the problems or lack of information available at the time the decision to implement information management and technology is made in a particular department or organisation within the public sector. The analysis of this chapter and the findings and proposed model from this chapter logically lead to the proposed

implementation of such a solution in the public sector with specific reference to departments wishing to implement information management and technology therein.

CHAPTER 7

INFORMATION MANAGEMENT AND TECHNOLOGY IN THE PUBLIC POLICY MAKING AND IMPLEMENTATION IN SOUTH AFRICA: CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The structure of the value assessment was done in accordance with the thesis layout. An in-depth evaluation of arguments was presented in order to clarify the reasoning and value added by the thesis and approaches followed in the thesis. In conclusion proposed further fields of study was postulated and evaluated.

Initiating this study and thesis was a perceived lack of information management and technology in the public sector for policy formulation and implementation. This perceived lack as mentioned, in turn, contributes to the lack of service delivery improvement by government and the various departments functioning within the public sector. In all instances this perceived lack is not due to the lack of data but rather the application thereof. This in turn focussed the attention on the application of the technology required, to not only house the information but to retrieve information.

From the foregoing chapter (*Supra*, Chapter 6), it becomes imperative that the thesis be evaluated in terms of a value assessment of the findings. This value assessment of the thesis was done against the backdrop of the magnitude of data and information available in the Republic of South Africa's public sector and specifically the government

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departments, in technology repositories for the purpose of transactional management. These masses of data do, however, not cater for executive management information thus inhibiting informed decision-making and policy formulation and implementation based on inferred data.

7.2 Reason for and background to the thesis

The statements made by various governmental officials during the recent past, all focus on the issue of service delivery. Yet, if consideration is given to whether service delivery has indeed improved, one has to state that this not the case. Service delivery is a product of the competency of the public servant applying information within his or her domain. However, to support the public services information management requirement, there is a requirement for technology and interconnectivity. Shortcomings exist in the field of infrastructure and communication networks. In terms of the South African context these although addressed by the Government Communication and Infrastructure System and the international application and identification of infrastructure development, the South African scenario still requires development before improved electronic governance and government is attainable. In the run-up to this, however, improved managerial capability must be established.

Information, be it transactional (information required to execute the functional tasks), content (information contained in documents, policies and procedures) or knowledge (information reflecting on internal scripts, records and processes), used in isolation or independently, does not lead to good decision-making, potential policy formulation or improved service delivery no matter how good the database or system being employed, functions. Used independently or in isolation only the functional or line application will be affected. For improved and

informed decision-making, data from all three sources need to be manipulated or statistically inferred within their own or a common database, as per the management requirement, of the various levels of a department and within the unique requirements of the various spheres of government. Data manipulated or statistically inferred this way and applied for specific decision-making now becomes executive information management at a level or within a sphere. In order to execute statistical inferences and data manipulation, technology is required.

The integration and manipulation of transactional, content and knowledge information result in executive management information. Executive management information and applied technology is a cognitive decision and requires an implementation plan and execution thereof. The lack of improved service delivery in the South African public sector is found, amongst other, in the lack of executive management information and applied technology. In turn, this results in shortcomings in the field of policy formulation, hence the research.

7.3 Expected outcomes of the thesis

An outcome expected from the research done for this thesis, was the determination of the lack of information management, and specifically executive information management which results in turn in a lack of appropriate policy formulation and implementation. Added to this outcome was the requirement for an integrated infrastructure (connectivity) for the communication of information.

Based on the theoretical analysis and the interviews conducted, it was expected that the following requirements for the implementation of information management through technology, would have emerged from the empirical analysis (*Supra*. Chapter 1, par. 1.3.2):

a. That although data is available little if any is applied in the role of enhancing decision-making executive management through the application of statistical inferences, data manipulations.

b. That although initially the development of a technology infrastructure might be expensive, the long-term benefit is improved effectiveness and efficiency together with improved productivity.

c. That due consideration was given prior to going the route of information technology with the aim of improving effectiveness and efficiency.

d. That performance measure/measurement was realised purely from the perspective of transactional/functional activities.

e. That information management was purely localised to the transactional level.

f. That improved control over information and management has not been realised due to the absence of correct management tools and application as well as communication.

g. That insufficient attention was generally given to the existing work force or the transversal impact on the organisation.

h. That the departmental culture was not taken cognisance of prior to implementation.

i. That departmental design was not process analysed or restructured.

j. That little if any, training programmes or skills upliftment programs to facilitate a change in the management approach was implemented.

Another expected outcome of the thesis was to postulate a solution for improved information management in the South African public sector. Designing for management purposes is no new concept but designing for an improved management capability within a new solution, should render new results. Improving the public sectors' management capability, inclusive of policy formulation, however, is dependent on the availability of data, infrastructure and connectivity.

7.4 Approach followed to achieve the outcomes

This thesis approached the need for improved public service information management and technology from the perspective of improved governance and government in order to achieve improved service delivery. The point of departure for this thesis was the definition and description of key concepts. The definitions and description are supported by current international and national examples with regards to the infrastructure and connectivity requirements as well as the management application of existing systems. Research parameters derived from the existing situation were measured against empirical research. The research parameters were based on fifteen elements subdivided into drivers, forces and denominators (*Supra*. Chapter 1, par. 1.3.2).

The drivers are:

a. Availability. Having availability of both the information and the technology, the degree cognisance is taken of this driver and that there is actual improvement in availability and application of executive management information after implementation.

b. Cost Reduction/avoidance. The influence cost reduction/cost avoidance have on the implementation of information management and technology for the establishment of electronic

government and governance and the realistic expectations of this driver on the functioning of the public service after implementation.

c. Effectiveness and Efficiency. That effectiveness and efficiency of an organisation have an influence on the concept of applied information management and technology for the establishment of electronic government and governance after implementation. Furthermore that this need must be considered when the decision to apply the methodology of managing with information and technology, is made.

d. Performance Measure and Measurement. That all participants in the applied information management and technology environment, for the establishment of electronic government and governance, recognise the others' performance measures and measurements both prior to and after implementing information management and technology solutions. Also, that new or modified performance parameters will be required.

e. Management. That management should be involved when the decision to implement information management and technology for the establishment of electronic government and governance, is made. Also, how must management of the organisation be adapted for the information management and technology environment for the establishment of electronic government and governance and the impacts that should be considered or expected.

The forces can be stated as:

a. Human Resources. That role of the human resources element, plays be considered when the decision to apply information management and technology for the establishment of electronic

government and governance, is made. The degree of cognisance that is to be taken of this element during the phasing in of applied information management and technology for the establishment of electronic government and governance, is also be ascertained.

b. Culture. That the cultural impact on the organisation, when the decision to apply information management and technology for the establishment of electronic government and governance has been made, be considered.

c. Training. That the application of applied information management and technology for the establishment of electronic government and governance necessitates a new training curriculum at all levels and, has an effect on the knowledge base of the existing public servants.

d. Control. That control at all levels is gained when implementing applied information management and technology for the establishment of electronic government and governance.

e. Departmental Adaptation. That organisations should adapt after the implementation of applied information management and technology for the establishment of electronic government and governance. This will also imply that current procedures should be adapted to facilitate the new concept if it truly is unique.

The denominators (or transversal elements) are the following:

a. Research. That research in to the application of applied information management and technology for the establishment of electronic government and governance prior to implementation should be done.

b. Economical Viability. That the decision to implement information management and technology be based on an economical viability study.

c. Maturity Levels. That due consideration be given to maturity levels prior to the application of information management and technology for the establishment of electronic government and governance that a growth in maturity has occurred.

d. Information Technology. That the extent of our current information technology, can accommodate a concept so reliant on accurate data and real time information to management in order to make the implementation thereof a success.

e. Communication. That the extent of the application of information management and technology for the establishment of electronic government and governance was communicated horizontally and vertically in the public service for the successful acceptance and utilisation.

A theoretical framework of the existing information management and technology scenario in South Africa, which had set the background to the thesis, was established by utilising the theoretical research. In this, the theoretical requirement of information management and technology for the improvement of service delivery in the public service, with specific reference to the South African scenario, was established (*Supra*. Chapter 3).

Applying international and national trends, the current status of the information management and technology environment in the public service was explored. This was to establish the as-is scenario (*Supra*. Chapter 4).

The empirical research validated the drivers, forces and denominators as elements that needed to be addressed when the decision to

implement information management and technology was taken. Empirical studies and interviews were used to execute the validation process (*Supra*. Chapter 5).

The validation process was followed by an analysis of the theoretical and empirical research. The analysis was executed by achieving a synthesis of the theoretical framework and the empirical research done for the thesis. Resultant from the synthesis, a model was proposed for the improvement of information management and technology, for improved service delivery, in the public sector (*Supra*. Chapter 6).

7.5 Validation and deductions

The terms of reference (*Supra*. Chapter 1) were to be validated by the literature and empirical research. Thus the stated primary drivers, secondary forces and denominators, which form an essential part of the information management and technology concept, were to be proved or disproved. The primary drivers as well as the general research findings deducted from the qualitative research analysis and pertaining to these drivers were:

a. That management was purely localised to the transactional level and virtually all systems designed ignored its role in the process. That virtually in all situations additional tools had to be used to manipulate data or do statistical inferences as these aspects were not incorporated into the system design.

b. In the case of the availability of information, it was found that although data is available little if any was applied in the role of enhancing decision-making executive management through the application of statistical inferences, data manipulations. On the other hand functional management that is, managing the functional or line/task environment was to a great extent catered

for. Both are, however, required to optimise and improve effectiveness and efficiency in the public service as a whole.

c. With regard to cost (reduction and avoidance), it was found that although initially the development of a technology infrastructure might be expensive, and was a consideration, the long-term benefit would be improved effectiveness and efficiency together with improved productivity. Consideration of long term cost reductions was not always an issue. Improved productivity could do more to improve cost savings in the long run and thus reduce operating cost. Also, that with a solid high technology infrastructure, maintenance and upkeep over time is more cost effective, as upgrades due to technology enhancements become cheaper. It became apparent that implementation cost should be spread across the life cycle of the project, thereby reducing the once-off cost.

d. With regard to effectiveness and efficiency, it was proven that due consideration was given prior to going the route of information technology to the aim of improving effectiveness and efficiency. It was also apparent that in many instances this was the primary driving force for implementing some form of information technology. What lacks in this approach was that the required due consideration to management information at executive level was not given. It was also proven that the actual implementation plan for achieving effectiveness and efficiency was not executed. This due to the fact that partial accomplishment was attained through improved efficiency by optimisation of transactional/functional tasks (line function) and little attention being given to true executive management information.

e. With regard to performance measure/measurement, this element was realised purely from the perspective of transactional/functional activities. Again, little if any, attention was given to the optimisation of the managerial function in the sense of statistical inferences and data manipulation for the improvement of the department or organisation as an integrated whole. This would have resulted in greater effectiveness and efficiency, which would have induced improved productivity with the resultant decrease in operating costs.

With regard to the forces the following was found:

a. With regard to human resources, that attention was generally given to the existing work force or the transversal impact on the organisation. However, that the impact of the information technology implementation was not always understood. That the human resources at various levels, especially at executive management level, are usually ill-equipped to handle the migration to an information management and technology environment. This was in most instances applicable to the implementation of transactional/functional systems as well.

b. With regard to departmental culture, that departmental culture was to a large degree not taken into consideration prior to implementation and that little or no action to prevent culture shock was taken.

c. With regard to training and skills development, those training or skills upliftment programs to facilitate a change in the management approach were implemented. This was only applicable to the transactional level and does not pertain to the executive management levels.

d. With regard to control, that improved control over information and management with specific reference to executive management has not been realised at the executive management level due to the absence of correct management interpretation tools. However, at the transactional management level these controls were improved.

e. With regard to departmental design, that departmental design was seldom addressed prior to implementation but rather at later implementation stages.

With regard the denominators, the following was found:

a. With regard to research, that considering the cost component of information technology, the theoretical and practical examples reflected that research was done to determine the type of application of information management and technology for the establishment of electronic government and governance. This occurred prior to implementation and continued after implementation. It was sufficient to facilitate implementation in a complex service oriented environment.

b. With regard to economically viability, that the determination of this element was of fundamental importance as it would be of no use that information technology would be deployed for any purpose that cannot be sustained in terms of a financial ability. This could be in a self-maintained or outsourced capacity.

c. With regard to maturity levels, that the maturity or immaturity level of the users as well as the contractors implementing or developing the information technology need to be investigated in order to determine successful implementation possibilities.

d. With regard to information technology, that confirmation needs to be obtained that organisations are in a situation to facilitate a

total upgrade or have an infrastructure in place to facilitate implementation of information technology management.

e. With regard to communication, that communication of the new concepts for electronic government and governance was addressed both horizontally and vertically in the public service, as this was considered a necessity for successful acceptance and utilisation.

In order to attain this integrated solution, two issues were identified. They are firstly the requirements to successfully implement an integrated information management solution in the public service and secondly the lack of executive management information for strategic decision-making within the organisation.

In order to address the first issue, it is therefore recommended that when the decision to implement an information management and technology solution is taken in any public service department, attention must be given to the drivers, forces and denominators identified and researched. These driving-forces and denominators are the primary aspects that, if applied, will ensure the successful implementation of an information technology solution.

In order to address the second issue, management must identify needs and requirements related to their level of management preferably prior to the implementation decision in order to have these accommodated within the design of the information management and technology solution.

7.6 Value assessment of information management and technology

The thesis addressed the aspect of information management, which is at a low in the public sector at this time, and the aspect of the required technology in order to sustain both the transactional and executive needs of an organisation or department in the public sector. Both are interdependent, as the one cannot exist without the other. A proposed solution (model) to address the delta that exists between existing needs and the solution thereto was postulated.

7.6.1 Requirements for information management

The thesis firstly did a value assessment of the existing public service management information. It extrapolated normal management concepts, required to maintain transactional management needs and requirements, beyond the accepted norms into the realm of the executive management needs to management for strategic decision-making and policy formulating purposes. Secondly, the study did a value assessment into the realm of the requirements not only for management needs, but also for the technology required in sustaining and maintaining such needs over time. The aspects of improved management, effectiveness and efficiency, cost reduction, availability and measurement, are indicators, which must be adhered to, in order to implement the information management and technology decision. The forces and denominators identified, reflected on the departmental needs for both improved management capability and technology decision-making for policy formulation and implementation.

The thesis highlighted the aspects of factors influencing management and the decision to implement information management and technology for policy formulation and implementation. These factors were explained and tested against the research parameters, which ultimately

led to a model being proposed. The model is generic in nature in that it is applicable to all spheres of management in the public sector, its departments, and related organisations. In terms of the differentiation between transactional and executive information management needs, the public sector specifically lacks the resources to execute statistical inferences and obtain executive information. From the thesis the outcome of the value assessment was that the requirement for information management, especially at executive level, was a requirement. In terms of the technology required, the need to identify not only the computerisation of existing manual systems but to implement a system whereby executive decision-making as well as transactional activities are possible thought the application of existing and available data and the manipulation thereof, was identified. The thesis contributes to the field of the public administration in terms of its contribution of, not only, the model but also in the approach to management within the public sector. This, by definition incorporates the need for accurate data and accurate data inferences for management purposes at all levels as well as the added capability to formulate policies based on this information.

7.6.2 Information management and technology requirements

The value assessment of the thesis indicates that the decision to implement information management and technology as a solution to a departments management needs, are based on the application of the drivers, forces and denominators as stated (*Supra*. Chapter 1, par. 1.2.3). Information management, in turn, should be based on the requirement for data from the transactional, content and knowledge management environments. Integrating these environments and manipulating the data, results in executive information as required at various levels of the organisation. The manipulation or statistical inferences of data results in improved management capability and,

hence, improved service delivery through improved policy formulation and implementation.

In terms of the value assessment a further requirement for the improvement of service delivery, was the implementation of infrastructure in order to communicate the (executive) management information. Connectivity results in all levels of the organisation (department) having access to either transactional or executive management information.

7.6.3 Model

The postulated model furthers the value assessment in that it proposes a solution in terms of what should be considered by a public service department or organisation, to successfully implement an information management and technological solution. This model, applied generically, will enhance departmental or departmental capability to successfully identify the need for, and implementation of, an information management and technology solution for the successful management at both the transactional and executive level of a department. This executive management information will also assist the department in policy formulation and implementation.

The model applied, in conjunction with the drivers, forces and denominators, during the design phase of the proposed solution for information management and technology, will ensure the successful implementation of such a solution. The twelve elements of the model will lead the department to address its requirements in a multifunctional yet integrative manner when the requirement and need for policy formulation and implementation arises.

7.7 Recommendations

In terms of the value assessment, the following recommendations are made:

a. Address the drivers, forces and denominators identified and researched. The drivers, forces and denominators are the primary components that, if applied, will ensure the successful implementation of an information management and technology solution.

b. Management must identify needs and requirements related to their level of management with specific reference to policy formulation and implementation and, preferably, prior to the implementation decision in order to have these needs accommodated within the design of the information management and technology solution.

c. Departmental management at all levels should at this time implement the proposed model addressing and integrating the twelve elements, in order to resolve the management requirement for information for purposes such as decision-making and policy formulation and implementation.

d. Determine and define the requirements for the implementation of an integrated information management solution in the department and determine and formulate the executive management information required for strategic decision-making and policy formulation and implementation within the department.

e. Formulate and implement policies in order to obtain the successful potential from the model and existing as well as new information.

Addressing the drivers, forces and denominators, will ensure that attention is given to the requirement for the successful implementation of information management and technology. By addressing the model it will ensure that an integrative management solution is implemented. In order to implement executive information management and technology an integrative approach to the elements and model need to be followed.

7.8 Conclusion

This thesis had set out to prove that information management and technology implemented in the public service does not comply with the requirements of the day. It further had set out to prove that if a model for implementation was followed, this implementation, and selected solution such as a designed policy, might be successfully implemented. This research evaluated the research objectives, to wit the fifteen elements that need to be considered to successfully implement information management and technology in an organisation or public service department. These were tested against the research objectives with regards to the successful implementation of information management and technology in the public service.

Considering the thesis as to its contribution to the overall problem statement, the research duly noted the absence of the requirements for the successful implementation of information management and technology for policy formulation and implementation in the public sector. This thesis then proposed a model for the implementation of information management and technology, to be applied in the formulation of policy. The thesis also substantiated and determined the relevance of the driving forces underlying the basic requirements for the successful implementation of an all-level management solution in terms of information management and technology for policy formulation and implementation in the public sector. In the final analysis, the thesis

then made recommendations with regards to resolving some of the information management and technology problems being experienced by public sector departments in the decision-making and policy formulation and implementation arena.

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Appendix A

Questionnaire

This questionnaire has to determine the validity of the following driving forces and denominators. Underlying the various questions is the aspect of policy formulation and implementation:

A.1 DRIVING FORCES AND DENOMINATORS

A.1.1 Drivers (Primary objectives)

- To ascertain the relevance of having AVAILABILITY of both the information and the technology as a primary driver and to determine to what degree cognisance should be taken of this driver and whether there is any actual improvement in availability and APPLICATION of management information after implementation
- To ascertain the influence COST REDUCTION/COST AVOIDANCE have on the implementation of information management and technology and to determine the realistic expectations of this driver on the functioning of the Public Service after implementation.
- To ascertain whether EFFECTIVENESS and EFFICIENCY of an organisation have any influence on the concept of applied information management and technology after implementation and whether this need

be considered when the decision to apply the methodology of managing with information and technology, is made.

- To determine to what degree all participants in the applied information management and technology environment recognise the others' PERFORMANCE MEASURES and MEASUREMENTS both prior to and after implementing the concept. Also whether new or modified performance parameters are required.
- To determine to what extent MANAGEMENT should be involved in the decision to implement information management and technology, and to what degree the management is effected by the decision. Also, how must management of the organisation be adapted for the information management and technology environment and what impacts should be considered or expected?

A.1.2 *Forces (Secondary objectives)*

- To ascertain whether the HUMAN RESOURCES element plays any significant role in the decision to apply information management and technology. The degree of cognisance that should be taken of this element during the phasing in of applied information management and technology will also be ascertained.
- To determine to what degree CULTURE should be investigated or taken cognisance of when the decision to apply information management and technology has been taken.

- To determine to what degree the application of applied information management and technology necessitates a new TRAINING curriculum at all levels and, what is the effect on the KNOWLEDGE base of the existing public servants.
- To ascertain what degree of CONTROL at all levels are gained or lost when implementing applied information management and technology.
- To determine to what degree, if any, the ORGANISATIONS should ADAPT after the implementation of applied information management and technology. This will also imply that current procedures should be adapted to facilitate the new concept if it truly is unique.

A.1.3 *Denominators*

- To determine the type of and depth in RESEARCH to the application of applied information management and technology prior to implementation and whether this was enough to facilitate the implementation thereof in a complex service oriented environment.
- To determine whether it is actually an ECONOMICALLY VIABLE solution for public/private enterprise to contract in on the implementation of applied information management and technology.
- To determine what the MATURITY LEVELS were prior to the application of information management and technology being implemented and whether a growth in maturity had occurred.

- To determine to what extent our current INFORMATION TECHNOLOGY can accommodate a concept so reliant on accurate data and real time information to management in order to make the implementation thereof a success.
- To determine to what extent the application of information management and technology was COMMUNICATED horizontally and vertically in the Public Service as this is considered a necessity for successful acceptance and utilisation.

A.2 BACKGROUND

1. What is your perception of applied information technology in your department? [*This question is to determine the interviewee's background regarding applied information management and technology.*]

2. Is current policy deduced from the application of information management or, if not, is such action in the offing? *[This question is to determine whether applied information management is utilised in policy formulation.]*

3. What is the current situation in your department regarding the application of information management to improve the effectiveness and efficiency of the organisation? [*This question is to determine the interviewee's background regarding the effect of applied information management and technology on the organisation.*]

4. Would you say that the same type of information would continuously be required or would an adaptive approach be more applicable? [*This question has to determine whether management by exception is a principle or whether standard reports will suffice. This is indicative of a dynamic or stagnant organisation and displays the understanding of the dynamics of management information which could also be cyclic.*]

5. What do you understand from the concept integrative management principles and what does organisational processes determine in this concept? [*This question must determine the understanding of intra and*

inter departmental influencing factors as well as the impact on the particular department.]

6. Is current organisational management policy deduced from the application of information management or, if not, is such action in the offing? *[This question is to determine whether applied information management is utilised in policy formulation.]*

A.3 APPLIED INFORMATION MANAGEMENT AND TECHNOLOGY

1. Are you of the opinion that information management through technology improves effectiveness and efficiency? [*This question must* inter alia *determine the understanding of the impact of management with applied information management within the departmental environment.*]

2. Is current policy required for the improvement of effectiveness and efficiency deduced from the application of information management or, if not, is such action in the offing? *[This question is to determine whether applied information management is utilised in policy formulation.]*

3. Are you of the opinion that sufficient management information is available and if so is this applied to the benefit of the organisation? [*This question must determine whether sufficient information or data is available and if so whether this is in a format that enables the manager or user to execute his/her task optimally.*]

4. Are you of the opinion that sufficient and correct information will lead to cost reduction/avoidance within the organisation if applied correctly? [*This*

question must determine if information management through technology will inter alia *lead to cost reduction/avoidance and thus extend the capability of the departmental budget.*]

5. Is current cost reduction policy deduced from the available information or, if not, is such action in the offing? *[This question is to determine whether applied information management is utilised in policy formulation.]*

6. How is existing organisational and personal performance measured given that management through information (data) determines that specific requirements are met? [*This question has to deal with the capability of departments to meet their inter and intra departmental performance agreements.*

7. What is your perspective of applied management in your department with the aid of information technology? [*This questioning leads the respondent to compare the existing scenario with the possible future scenario and solicit a comment regarding the route taken by the specific respondents environment in either not opting for the application of information* ***management*** *with available technology or for applying available information management with available technology.*]

8. Will future policies for the improvement of your department be deduced from the application of information management or, if not, is such action in the offing? *[This question is to determine whether applied information management is utilised in policy formulation.]*

A.4 ORGANISATIONAL CULTURE AND STRUCTURE

1. What is your opinion of the acceptance by the staff of the concept of management with information technology and how has this impacted on the organisational culture? [*This question has to determine whether the staff has bought in on the concept of management by applying information as per technology base and to what degree this has changed or influenced the organisational culture.*]

2. Did the department, to facilitate the transformation to information management, initiate any kind of training or any other form of skills development programs? [*This question has to determine whether the departments have empowered the staff to apply information from a technology base.*]

3. Was there specific policy implemented or formulated for implementation to facilitate this activity? *[This question is to determine the availability of public sector support in the implementation of the information management activity.]*

4. What are your opinion of the organisational impact and/or changes of the application of information technology and performance measurement? [*This question has to determine the effect of the new (if any) process on the organisation as this impact on the culture of said organisation.*]

5. In your opinion, is their control over information and the resultant management effect? [*This question has to determine whether the*

organisational entity is managing the information and that this is leading to the point of improved management capability.]

A.5 TRANSVERSAL SUPPORT STRUCTURES

1. Are you of the opinion that the Public Service is mature enough for the change to manage with applied information technology? [*This question is in support of the requirement, if any, for training or skills based empowerment and covers the aspect of right time and place for a move to an alternative method of and for management.*]

2. In your opinion is their a sufficiently supportive **information technology** base (or infrastructure) from which management information may be obtained, in order to make the transition to applied information management through technology? [*This question are posed in order to validate the answers obtained from the first section with specific reference to the availability of information.*]

3. In your opinion is inter- and intra- organisational **communication** which management communicates information internally and externally well enough established in the public service? [*This question is posed in order to validate the answers obtained from the section on organisation structure and culture (preceding section).*]

4. Was benchmarking or other form of research done to determine the requirement for management by information technology? [*This question is posed to determine the research to the applicability of management*

information in the existing environment and will either support or refutes the statements obtained from the questioning in section one.]

5. What is your opinion on the **economical viability** of the existing and futuristic management capability of the public service? [*This question is posed in order to validate the preceding question and to determine if sufficient consideration and trade-offs with regard financial implications was done during the implementation phase.*]

A.6 CONCLUSION

1. In your opinion are the relevant support functions such as standards and norms in place for information management with technology ALTERNATIVELY was sufficient consideration given to imbed such functions in the existing organisation? [*All discussion and questions will be to validate preceding argumentation. Deviations from previously stated answer will be further explored.*]

2. In your opinion does or can the process of information management through technology enhance the capability of the department/organisation ALTERNATIVELY is there an improvement in the functioning of the department with or without this capability? [*All discussion and questions will be to validate preceding argumentation. Deviations from previously stated answer will be further explored.*]

3. In your opinion, is there enough implemented policy guidelines to execute the process of information management through the use and application of technology ALTERNATIVELY is such policy now been identified or in the process of formulation and implementation? *[This question is to validate the all responses on actual or perceived or non-existing policies required for improving the integrative approach to information management.]*

4. In conclusion do you have any other comments/remarks or statements that will assist me in this research?