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

| Input: Transactional or Functional Data | → | Process: Data Manipulation | → | Output: Management Information |
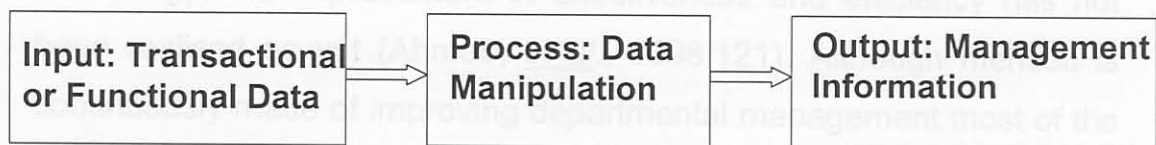
Source: Englander, 2000:10

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

113

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.