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Information Management, IT and Government Transformation:

Innovative Approaches in the new South Africa

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Abstract

Governments worldwide are faced with the challenge of transformation and the need to modernise administrative practices and management systems. South Africa presents an archetypal example, given its need to transform a state apparatus that was not only racist but arguably dysfunctional as well. This paper considers problems with existing government processes in South Africa, and presents a generally-applicable framework for analysis of existing government information systems prior to transformation. It argues that a central theme of government transformation is development of a culture of information management to ensure that information systems fit the task for which they are procured. Two innovative solutions are described that address obstacles to this transformation: the Swanborough Information Grid that helps senior public managers control user requirements specification, and the Request for Solution approach to public information technology (IT) procurement. The paper concludes by analysing the pressing need for such innovations given the broader context of structural responsibilities for government IT in South Africa and the recommendations of the recent Presidential Review Commission.

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A. Background to Government Transformation in South Africa

A1. The Transformation Agenda of the State

For the new democratic government of the Republic of South Africa, the first stage of transformation required a careful re-writing of statute to remove the legal framework that had entrenched racial discrimination. This culminated in the Constitution of 1996 (RSA, 1996), which by current yardsticks provides the most far-reaching guarantees of fundamental human rights in the world.

In addition, the injection of new thinking into the upper echelons of government, the admission of the country into the community of nations, and its exposure to the competitive environment fostered by the World Trade Organisation, have all driven a second agenda of modernisation. These modernising changes are now in full flood, with every Minister eager to table policy instruments intended to redress past wrongs and simultaneously enable the country to compete on the global stage.

The policy formulation process for post-apartheid South Africa is more than a decade old, having been started during the closing years of exile. The outcome of this intellectual ferment is a vast body of Reports, Commission findings, Green and White Papers, new laws, and the wholesale scrapping of outmoded regulations. A framework for the transformation of the social and economic arenas has been put in place through lengthy negotiations and consultations involving the major players of State, capital and labour, as well as other formations of civil society. Attaining agreement on constitutional matters has often been lengthy, but the process of dialogue has been hailed as unique among those nations within which great chasms of ideology exist. The implementation of these policies is another matter, with the acid test being the degree to which budgets reflect policy intent. Ultimately the putative beneficiaries should perceive that the services they receive have changed for the better.

In providing goods and services to their electorate, governments make use of state revenues, their direct employees, physical infrastructure, various associated processes and their associated information systems. In seeking to bring about improved and more equitable service delivery, the transformation agenda has thus far mainly concentrated on three broad areas: finance, access and governance.

In the realm of finance, two overarching policies are being implemented. The first is the structural adjustment programme known as the Growth, Employment and Redistribution strategy (GEAR). GEAR commits government to the restructuring (often via privatisation) of state assets. It sets targets for both economic growth and deficit reduction, and it seeks to bring about job creation by creating a low-inflation, well-managed economy. The second is more mundane, being a set of policies requiring government departments to effect budgeting in three-year rather than annual cycles. An additional reform is the adoption of accrual as opposed to traditional cash flow accounting.

The word 'access' encompasses both redress and redistribution. Associated policy measures cover a wide swathe of mechanisms ranging from control of natural resources through to access to facilities. There are new laws relating to water usage, mineral resources, welfare, the airwaves, housing, schooling and so on. Numerous government commissions have been established to supervise an orderly process of restitution according to the Constitution. Unsurprisingly, the least progress has been made in respect of land claims arising from the dispossession of generations of those on the wrong side of the colour line.

Finally, new forms of governance now apply to labour relations, workplace conditions, employment equity, schooling, higher education, the security and intelligence services, etc. Certain of these measures apply both to the private sector and public service. For example, an employment equity bill has recently been approved, and new public service regulations are being implemented to introduce limited-term contractual relationships between state and employees, subject to performance management criteria. Both Malaysia (employment equity) and New Zealand (value for money) beckon as role models.

A2. Current Government Processes and Information Systems

The above three broad transformation areas establish a new operational framework, but say very little about the actual processes of government decision-making and service delivery. These processes are regulated by the body of prescriptions termed the Staff Code, as well as by numerous Acts that *inter alia* determine procurement, expenditure and accountability procedures. Like many procedure-based machine bureaucracies, the South African public service has been slow to deliver and slow to change. Its *raison d'être* is to maintain, not transform.

Now, as a radical departure from practice, Government intends to set aside the Staff Code in favour of a set of guidelines. The stated intention of this move is to free managers of excessive control and require them to manage their organisations according to a budget cap. The consequence is that they will have to manage a new and complex environment where performance indicators reign supreme. Under these circumstances excellent information management will become an imperative. This change is in line with international thinking. Witness this quote from the seminal US book *Reinventing Government*:

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    "Because  they  don't  measure  results,  bureaucratic
    governments  rarely  achieve  them  ….   With  so  little
    information  about  results,  bureaucratic  governments
    reward  their  employees  based  on  other  things:  their
    longevity,  the  size  of  budget  and  staff  they  manage,
    their  level  of  authority.   So their  employees assiduously
    protect  their  jobs  and  build  their  empires,  pursuing
    larger  budgets,  larger  staffs,  and  more  authority"
    (Osborne and Gaebler, 1992:139)
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A change is therefore sought from the past emphasis on regulation and control in a relatively stable environment, when Government 'worked' by satisfying mass demands.

If one is to measure results and judge government delivery by those results, then performance measures must be in place to allow for the monitoring and communication

of strategy. This in itself points to an area where information systems must play an important role.

In April 1998 the much delayed and finally re-constituted Presidential Review Commission on the Public Service (RSA, 1998a) submitted its findings more than a year over schedule. The eagerly-awaited Commission, chaired by a prominent sociologist, was critical of most public service procedures and processes, and particularly scathing in its criticism of government information management, information systems and technology (IMIST). But, whilst critical, it did not go far enough to satisfy the most senior political figures, who had expected more on the substance of change. Nonetheless, the Commission Report is the only advice currently available and it will be critiqued in more detail later in this paper.

Perceived failure of IMIST is not unique to the South African public service. Management dissatisfaction with IMIST is widespread in the private sector as well (*Financial Mail*, 1998). Worse still, there is mounting evidence that the productivity gains promised by the information revolution are elusive (Amidon, 1997). An explanation for this may lie in the fact that most information system projects 'fail' (Heeks and Bhatnagar, 1999). More than 80% are not delivered on time, or within budget, or are not fully implemented. The lament of project sponsors is: "I didn't ask for that!". Top management complains that in-house IT divisions do not deliver, while IT managers do not feel supported by their apparently techno-phobic bosses. A gulf of misunderstanding and mismatches exists.

In seeking how to rectify these problems we shall consider the problem in four domains, namely the scope of existing information systems, user satisfaction, determination of user needs, and information system procurement.

B. Analysing Information System Adequacy and User Satisfaction in Government

The tool known as the Cranfield Grid (Ward and Griffiths, 1996) is useful in analysing the current deployment of government information systems. The Grid (diagram 1) is derived from the McFarlan Grid and is a quadrant diagram having the categories of 'support', 'operational', 'strategic' and 'high-potential'. It is expected that an organisation will require information systems in all four quadrants if it is to prosper. The information systems in these four zones must support all the business processes of the organisation as well as propel it into the future.

Diagram 1: <u>The Cranfield Grid</u>

Strategic	High-Potential
Operational	Support
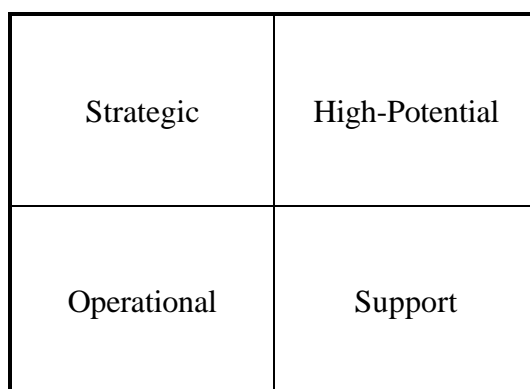
How does government fare? A quick survey indicates that the South African government is reasonably well provided with 'support' systems. Two centralised systems manage the staff payroll and cash-flow accounting. They are unwieldy but keep the wheels of state turning. Public servants are generally paid their legitimate salaries on time, and the books of account are closed on a monthly basis, albeit not in a period according with international benchmarks. The accounting system is more than two decades old, and to extract strategic information from it, various add-on spreadsheet applications have been devised. It is extremely unfriendly to users. The payroll system is younger and has many more features, but has not been fully implemented. Few civil servants know how to use it, with the consequence that it too

has been written off by most users. We are reminded that user perceptions can kill the implementation of an otherwise solid application.

In the 'operational' zone are many systems such as motor vehicle registration, population registration, pensions, school examination records and processing, and health administration, to name but some. These systems 'work', using a range of operating systems and hardware platforms. However, there are regional disparities and problems of a lack of interoperability. While each department of state has something in the way of an electronic information system performing vital operational tasks, the scale of deployment is weak.

A more detailed study of information systems in the Gauteng Provincial Government, the industrial heart of the country, showed that of 200 high-level administrative processes, barely thirty were supported by sound information systems, most of which were not computer-based.

In the 'strategic' and 'high-potential' zones the state cupboard is almost bare. The absence of 'strategic' information systems is most worrying, since it is these systems which senior management requires for better-informed decision making. Referring back to the Gauteng study, in the strategic and high-potential zones there were but two minor systems each. Further research has indicated that this situation is repeated at central government level.

Little attention to the high-potential zone is hardly surprising, since this is a high-risk area and governments tend to be reluctant to experiment. However, if one includes the Internet and intranet systems in the high-potential area, one finds an almost total absence of projects designed to explore these media as a means to enhance service delivery. The Cranfield analysis suggests that the State is poorly equipped with information systems of the requisite type.[3]

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[3] In a perverse way, however, the limited deployment of computer-based systems may actually present an advantage, since it means that some departments have a very limited Y2K problem.

A more detailed approach investigates the adequacy of existing information systems from the viewpoint of users. This was done in the case of the Gauteng Provincial Government using a commercially available tool known as the Information Management Index. This index is based on a questionnaire with 86 items covering the various attributes of information such as accessibility, relevance, and reliability. The items are ranked on a Likert scale and the data is then analysed by custom software. An index is then built up. This index is useful in benchmarking the adequacy of information at a given point in time, as well as allowing comparisons within an organisation across its various levels or business units. The scores obtained within the Provincial Government were all uniformly low, below those found in service organisations in the private sector. This indicated that public servants were not complacent regarding the information systems at their disposal: they knew these were unsatisfactory. Those least satisfied with the quality of the information systems were senior business managers and those responsible for delivering information systems and technology.

What this establishes is the existence of a serious gap between information systems needs in government and current provision of information systems. Accordingly we next turn our attention to the determination of information system needs and the procurement of information systems.

C. Innovative Approaches to Information Systems in Government

C1. Information System Specification

The classic approach to information system design begins with a user requirement specification (URS). This sounds very democratic and in line with participatory management styles, but it is fundamentally problematic. It may be obvious to state but a URS obtained by asking parties 'what they need' is susceptible to user bias on at least two counts. First, those who are asked to reply constitute a sample, which may or may not be representative. Second, those who are asked may not necessarily know what they will need. This problem is well known to researchers: how to ensure that the research instrument asks the correct question in the correct way. Unless an unambiguous approach is taken in eliciting user requirements, one may end up with a system that is out of alignment with business goals and that is unlikely to provide useful management information.

For example, in designing a health information system, the information needs of medical practitioners are quite different from those of health administrators. Providing quality, affordable health care means quite different things to these parties, and yet both must be involved in an unambiguous information specification process.

The worst case arises where naïve management allows vendors, consultants or internal organisational technicians to do the specification unchecked. If the system is driven too strongly by what the latest technology can do, it may look good but may end up being another costly failure. This implies that senior management must be empowered in determining what information is necessary to run their organisations. Senior management should not be expected to become technicians but must be able to indicate accurately the information requirements an intended system must deliver.

An example of the type of tool that senior managers might find useful in developing such specifications is the Swanborough Information Grid (SIG), described below.[4]

Getting a Clear Perspective on User Needs

Traditional approaches to analysing information requirements have often been typified by a dearth of reality 'balanced' by a plethora of vague qualifying statements. So a desired attribute of an information system might be "to provide a secure welfare payments system". This is how the motivation for budget will be presented at the top of the organisation. The eventual users of such systems are some way down the organisational hierarchy. Even if their viewpoint on the desired functionality of the system is sought, their inputs may be diminished by a lack of knowledge (you don't know what you don't know!) and an inability to convey this to those responsible for the system specification. This combination of unawareness and vagueness innocently depreciates the integrity and coherence of the results.

One is dealing here particularly with a communication problem. Avoiding past pitfalls and ensuring the wholeness and accuracy of all future information specifications may thus be advanced through the adoption and application of a 'common information language'. The authors have employed such a language as the first stage of working with line and IT managers in developing an information system strategy for their organisation. What transpires is a process of management development that is empowering but simultaneously potentially threatening to those who until this juncture have controlled IT deployment by virtue of their coded knowledge and jargon. Suddenly the playing ground is no longer as tilted as before. Senior management now has the language with which to interrogate. The common information language provides definitions of the time domains of information, the physical attributes of information, the quality attributes, and so on.

Having provided a common language, the next step in linking information and strategy is to explicate the links between the time attributes of information and the main

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[4] Developed by the co-author in his role as Director of Absolute Consulting Group.

elements of any organisation. For this purpose a schema known as the Swanborough Information Grid has proven to be particularly useful (Swanborough 1998). The SIG (diagram 2) has as its vertical axis the four types of information related to time: synoptic, review, operational and descriptive. Its horizontal axis covers the four business factors of manpower (people), money, machinery (infrastructure and technologies), and materials[5]. Viewed as a whole, this schema accounts for all of the information that any organisation requires. It is argued that it is a prerequisite that an organisation has adequate information in all sixteen cells if it is to succeed.

Diagram 2: The Swanborough Information Grid

Swanborough Information Grid	**Manpower**	**Money**	**Machinery**	**Materials**	
Synoptic (long-term future)	s1	s2	s3	s4	
Review (past events)	r1	r2	r3	r4	W h e
Operative (short-term future)	o1	o2	o3	o4	r e
Descriptive (no time content)	d1	d2	d3	d4	
When	*Who*	*Why*	*How*	*What*	

Viewing the business process and its attendant information flows in terms of these sixteen cells enables a 100% appraisal of information availability. As a result, the SIG is used to ensure complete information conformance to requirements. Taking any of the SIG cells at random, its position in the grid (both horizontally and vertically)

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[5] The materials factor includes inbound and outbound logistics.

provides a straightforward prompt for key information detail. It enables one to overcome the situation where "I don't know what I don't know".

For example, cell **s1** would induce the determination of adequate Synoptic-Manpower information, such as future overall staffing requirements and requisite skills bases. Cell **d4** would determine the adequacy of Descriptive-Materials information, such as asset classifications and descriptions. The specifications provided for any of the cells can also prompt the need for associated specifications in other cells. For example, in order to provide a maintenance schedule for government equipment driven from cell **o3** there might need to be information about the available staff defined in cell **d3**. In this case, the ongoing success of the maintenance plan would then be indicated in cell **r3** and the long-term throughput expected of the equipment would be in cell **s3**.

A SIG may represent information at individual, departmental, divisional, regional, or national levels, or at all levels, and it may contain many different indicators. To provide maximum versatility and usefulness, there are literally hundreds of ways of addressing each of the cells to determine various issues such as information quality, ownership, format and so on. For use in government, particular issues and representations can be emphasised.

In the example of a public sector service-oriented department illustrated by diagram 3, the information system has been subjected to scrutiny against SIG completeness. A tick indicates areas of information that are adequate and a cross indicates areas that are inadequate. The result is the profile most often found in service organisations and known as the 'backward L'. It denotes an almost complete absence of long-term information for planning decisions, and very limited information in general about anything other than materials. We argue that there is a need to address all the areas indicated by a cross and to prioritise these for immediate action. Probably a first focus should be the Money column!

Diagram 3: <u>Simple government application of the SIG</u>

	Manpower	**Money**	**Machinery**	**Materials**
Synoptic	X	X	X	X
Review	X	X	X	√
Operative	X	X	X	√
Descriptive	√	√	√	√

The ideas presented here are not complex. Nor do they have anything to do with information technology *per se*. They stand central to empowering managers to manage their information needs. This is what is meant by information management. These tools enable careful scoping of the features of a desired information system without getting bogged down in technical jargon. Conversely, when presented with 'the ideal' information system by vendors or technicians, these tools give a manager some chance of understanding what the information system can and cannot do. For example, if the specification concentrates only on the operational domain, managers see that strategic synoptic information will be unavailable without further costly and time-consuming enhancements.

So we now have the means to specify what it is we require. However, in government one is rarely able to procure the product which best fits one's needs, an issue to which we will now proceed.

C2. The Need for Procurement Reform

When one considers procurement, the spending of taxpayers' money is subject to a plethora of controls. These are intended to ensure legitimate spending but they frequently result in wrong spending. This is especially so for a fast-moving field such as information technology. As matters stand, from the time of need identification, through budget planning, approval, technical specification, the tender process, and commencement of implementation, from two to three years may elapse before a new system is installed. Given Moore's Law (that the density of chip components doubles roughly every 18 months) and the measurement of the Internet in 'dog years' (where one 'Internet year' is the equivalent of seven years in the 'real world'), the risk of obsolescence is built into the procurement system. Joe and Joanne Public can easily end up paying for junk

Pity the bureaucrat who must effect procurement under the scrutiny of the Treasury, Tender Board, Auditor-General, State Law Advisers, Public Service Commission, and various Portfolio Committees. The underlying danger is that what was correctly specified will be obsolete by the time it is installed. And this assumes that a sound specification was forthcoming to begin with.

Attempts to improve the situation at national level in South Africa have thus far been futile. The government IT Executive Steering Committee, which should have been populated by the most senior business managers of state, rapidly succumbed to being attended by lower-ranking IT managers. Business managers, under pressure to address more urgent issues, left decisions on deployment to their IT managers. In the meantime, systems remain inadequate and IT staff are migrating out of government in search of better opportunities. If ever there were an argument for outsourcing, the above tale would appear to provide ample justification. But outsourcing will not happen overnight and it is in any case subject to another set of perils. So how does one improve the procurement process?

A possible answer is the wider adoption of the 'Request for Solution' (RFS) procurement methodology which was pioneered by staff of the Gauteng Corporate Informatics Department. It was subsequently examined and endorsed by the Presidential Review Commission. In essence, RFS sources best-of-breed information systems and technologies through a rapid, low-risk and transparent process.

RFS begins with the premise that the organisation should not attempt to write a full technical specification for the information systems (IS)/IT it requires. To write a detailed specification would assume that IT managers were all-knowing. Instead, the organisation must understand its information needs, and request suppliers to offer possible solutions. Both business managers and IT managers are involved in this information-led needs identification. The SIG process is used to analyse these needs with precision. By eliminating the construction of a detailed technical specification, in the order of six to twelve months of time may be saved.

The next step is to go to open briefing session, and then to invite all bidders to offer a solution in open forum. Only after that stage is a shortlist of competent tenders compiled. The process then respects commercial confidentiality and moves to consideration of fully detailed bids, including examination of reference sites. The bids themselves are subject to the SIG analysis, thus allowing for a consistency check. In this way, the Gauteng Provincial Government was able to set up and award its IT goods and services tender in a record five months, with a saving in terms of time and testing of more than US$1.5m. Previous tenders took anything up to two years to develop and award.

The RFS approach can only work if business managers possess their own radar to detect when either their own technicians or external vendors are offering 'fools gold'. By so doing, greater user satisfaction is achievable, with better understanding among managers, technical staff, vendors, and the public.

D. The Broader Context of Information Systems Reform in South Africa

D1. Who is in Charge of IT?

Singapore has its National Computer Board, the United Kingdom the CCTA, and South Africa now has its State Information Technology Agency (SITA). Thus far, however, the co-ordination of IS/IT at central level in South Africa has been ineffective. No Minister has responsibility for IS/IT policy as a whole. Instead, national policy, public sector policy, communication infrastructure, and computer services are spread over four Ministries. In this power vacuum, two major contenders emerged, both of which promoted centralist agendas.

On the one hand, the Department of Communications was seeking control over all data communication networks. It already has, through the national PTT (Telkom), exclusive control of the public service telephone network. On the other hand, Central Computer Services, which offers bureau functions, with the rump of the Defence Force information systems division, Infoplan, was seeking to establish an overarching agency which, as a state-owned company, would offer a one-stop service to government departments. This goal was realised late in 1998 when SITA came into effect through an Act of Parliament (RSA, 1998b), with these bodies as its founding core alongside the Department of Safety and Security.

This centralising agenda runs contrary to the decentralising agenda of greater managerial autonomy found within most government transformations and to the decentralisation promised by distributed database systems. Those parties promoting centralisation did so for a range of reasons: economies of scale, use of procurement to advance the goals of redress, and the possibility of offering competitive salaries to scarce staff. To beleaguered business managers, unable to obtain satisfaction from their in-house IT divisions, this would sound like an opportunity not to be missed. But

success seems unlikely if current scoping and procurement practices remain intact, and unless innovations like those described above are adopted.

SITA is now a reality. It has the mandate to "provide IT, IS and related services in a maintained IS security environment" (RSA, 1998b:8) to the various departments of State. The agency may provide data processing services, IT and IS training, application development and maintenance, advice and support, and IT and IS management. SITA may also act as a procurement agency for IT on behalf of the State. Currently, departments may join SITA if they wish, upon which all their IT staff and assets must be transferred to SITA. Whether this freedom to be in or out will remain is a moot point, since the responsible minister may declare that all organs of state should join. One might expect that the grounds for this will turn more upon the efficiency argument, and less on actual delivery.

D2. The Presidential Review Commission

Those sections of the Presidential Review Commission dealing with IMIST tell a story familiar to those who have worked in government or with government, but the tale is skimpy and does not grapple sufficiently with the major impediments to progress. The two aspects where the Commission is weakest are those already highlighted: user requirements specification and procurement.

Some potential ways forward have been suggested above, but none of these will come to pass as long as the state remains stuck in a budget cycle which is so hopelessly out of step with the pace of technological change. Nor will it happen if one is too strongly wedded to notions of central control of IMIST. It is easy to agree with the need for common data standards, a 'single window to government', or Web-enabled transversal systems but in the meantime senior management must be free to manage. A moratorium on spending above US$0.8m, as called for by the Commission, is well intended but not practical.

The Commission calls for management to be subject to management performance contracts. That is correct, but this must be allied with managers being free to spend, subject to accountability, on the systems and technologies they require in order to implement their business goals. Information management development, coupled with RFS, provides some of the tools for managers to do just that.

While the Commission echoes the previous Minister of Finance in lamenting the 'large' spend on IT, no-one currently knows how much should be spent on IT in order for South Africa to join the emerging knowledge society. However, what is clear, is that one can, and should, get better value from the IT spend in the future. Spending on information systems and technologies is part of the competition for budget among departments. Empowering managers to describe their information needs accurately may subject this contest to more visible criteria.

E. Conclusions

For Napoleon, information was 90% of the battle. Now one fights different wars but the information issue remains the same. Obtaining better value for tax revenues, indeed effective operation of government, requires solid information systems. The public service is a complex machine, slow to produce results, slow to change direction; a bulk carrier with a cargo of clerks and administrators. The prospect of change inherent in the dismantling of apartheid occurs in the overall context of globalisation with its strong inclination toward the lean state. The implications for South Africa are that government will trim the size of the public service, union opposition notwithstanding. If the reach of services is at worst to remain constant, and at least to improve, properly functioning information systems will become a necessity.

In this brief paper it has been suggested that information management will play a key role in enhancing service delivery by ensuring better fit between information systems and strategic intent. Information management seeks to provide decision-makers with information systems that meet expectations. This it does by empowering business managers with analytical tools to evaluate information systems through definition, procurement and operation. These first measures may all be adopted within existing legal frameworks, and may then help to impel the much-needed transformation of government.

References

Amidon, D. (1997) *Innovation Strategy for the Knowledge Economy*. Boston: Butterworth-Heinemann.

Financial Mail [Johannesburg] (1998) How computers hurt companies. 17 July, p50.

Heeks, R. and Bhatnagar, S. (1999) Understanding success and failure in information age reform. In: *Reinventing Government in the Information Age*, R. Heeks (ed.). London: Routledge.

Osborne, D. and Gaebler, T. (1992) *Reinventing Government*. Harmondsworth: Penguin.

RSA (1996) *Constitution of the Republic of South Africa*. Pretoria: Government Printer.

RSA (1998a) *Presidential Review Commission into the Public Service*. Pretoria: Government Printer.

RSA (1998b) *State Information Technology Agency Act*, no.88. Pretoria: Government Printer.

Swanborough, G.R. (1998) *Bringing Information to Life*. Johannesburg: Absolute Publications.

Ward, J. and Griffiths, P. (1996) *Strategic Planning for Information Systems* (2nd edn). Chichester: John Wiley.