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December 2006

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Chief Information Officers in South Africa

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ABSTRACT

Business strategy, operations, communication and technology have converged and resulted in increased demand for business flexibility. Chief information officers (CIO) are particularly challenged because they operate at the intersection between information technology and their organisations. Amidst increasing emphasis on cost-efficiency, information technology resource investment and emergence of new technologies, stakeholders need to understand the most relevant issues within a three- to five-year period. This study was undertaken to contribute to the body of knowledge around key information systems issues in South Africa. Thirty-one responses were received from South African chief information officers surveyed in late 2004. The top issues were: security and control, building a responsive it infrastructure, it value management, service delivery, and improving is strategic planning. The ranked list of issues was compared to previous studies, and further analysed by industry and source of it services (in-house, outsource or combination). Industry and the sourcing of information services were found to have an effect on the ranking of key issues**.**

Keywords

Trends, CIOs, rankings, strategy issues.

INTRODUCTION

A significant body of literature has developed over the last three decades dealing with management issues in information systems (IS). A series of studies and published articles have periodically identified and ranked key issues, with the Society for Information Management (SIM) the first to uncover and publish key issues facing its members in 1980. Subsequent formal and informal studies have addressed IS issues within countries, regions and industries. These studies offer a strategic insight into the main challenges facing Chief Information Officers (CIO) for the next three- to five-years (Gottschalk 2000).

This study set out to identify the key information system issues faced by CIOs in South Africa in 2004, to examine how the rating of key issues in South Africa has changed over time, and to examine whether the globally predicted key issues hold true for South Africa. The effect of factors such as industry and outsourcing were considered.

It was envisaged that the study would contribute to the growing body of knowledge of key information systems issues not only in South Africa, but also globally. The specific objectives of the study were to:

- determine the current key issues amongst CIOs within South Africa

- compare the results with previous South African and International studies

- consider whether the issues differ for companies operating in different industry segments (manufacturing and non-manufacturing)

- consider whether the issues differ between organisations with different patterns of sourcing Information Technology (IT) services provision (i.e. in-house, outsourced, or a combination of in-house and outsourcing).

The paper proceeds as follows. First an understanding of the current literature on researches that have been undertaken regarding information systems management issues is undertaken. This is followed by a description of the methodology and presentation of the findings.

BACKGROUND

Rapid access to information is critical, and many Chief Executives acknowledge the potential of information technology and changing business models to improve business responsiveness (Scott 2004). It has been recognized for some time (Umbaugh, 1985) that CIOs function in a constantly changing environment, with IT driving the change. Remenyi, Lubbe and van Heerden (2000) cautioned that "given the large investment in information systems, the successful management of the organisation's IT department is crucial." Financial resources, evaluating IT and IS opportunities and investment, and strategic alignment of IT and business strategies are among the issues that require management and consideration.

Reports of IS management issues worldwide are useful to organisations' planning and implementation of IT applications (Palvia and Palvia and Whitworth 2002). In an analysis of MIS publications (Palvia and Rajagopalan, Kumar and Kumar, 1996) argued that the fast-paced changes in IT necessitate the periodic identification and analysis of key IS issues.

IS professionals can be expected to hold opinions about what comprises key IS management issues based on their own organisation's strategic goals, level of IT maturity, competitive environment, etc. A general consensus from IS peers would aid the identification of key issues for the profession. The determination of a set of important IS management issues by fellow practitioners is therefore a significant contribution. CIOs can use the key IS issues identified to provide direction and to plan.

A series of studies and published articles have intermittently identified and ranked key issues in IS over the past thirty years, with pioneer surveys by the Society for Information Management (SIM) in the 1980s. In SIM studies done between 1980 and 1986, IT Strategic planning was the top issue (Luftman 2005), and in all the subsequent SIM studies this issue has never rated lower than number 10. IT Strategic planning was rated as number 4 in the SIM 2004 study (Luftman, 2005). IT and Business alignment has been the number one ranked issues in the 2003 and 2004 SIM Surveys (Luftman, 2005).

Prompted by the SIM studies in the United States of America, researchers have conducted similar studies in other parts of the world. Palvia, *et al,* (2002) aggregated the results of these studies, with a view to exploring the linkage of these key IS issues to environmental and organisational factors. Employing a model for analysing global IT issues, the Palvia, *et al,* (2002) study provided support for a three-way classification of regions into developed, developing and under-developed.

When evaluating the results of the studies it is important to recall the purpose of the studies, namely to identify the most relevant IS management issues within a future three- to five-year period. Issues of concern at a given moment may not necessitate significant attention at a later date. Gilbert, Pick, and Ward (2000) addressed the transient nature of the IS issues reported in the research, and confirmed that these issues typically arise from technological concerns. These matters rapidly cease to be issues as the discipline learns to manage the evolving technologies.

When evaluating the results of all the studies considered representative of the mainstream key issues research, Gottschalk (2000) affirmed that only three issues were present in all, namely; improving IS strategic planning, making effective use of data resources, and improving the effectiveness of software development. Table 1 summarises studies during the 1990s in countries and regions and the top ten issues determined for each by Palvia, *et al,* (2002).

The disparity evident in the ranking of key issues endorses the impact of the level of economic development as researched by Palvia, *et al,* (2002). In the developed regions (USA) the top issues are about responsiveness to changes (infrastructure, business process, distributed systems, architecture etc). In the developing regions (Taiwan and India) the top issues are about communication between people (IS Department and users, top management, understanding/awareness) and planning (strategic, skills). In Africa (under-developed region) the issues are about obsolescence and skills. South Africa is however a mixture of developed (with sophisticated responsive nationwide banking systems), developing (skills shortages) and under-developed areas (with poor or no telecommunications or electricity).

	USA 1994-1995	Taiwan 1994	India 1992	Africa 1992
1.	Building a responsive IT infrastructure	Communication between the IS department and end users	Understanding/ awareness of MIS contribution	Obsolescence of computing equipment (hardware)
2.	Facilitating and managing business process redesign	Top management support	Human resources/ personnel for MIS	Obsolescence of operating and applications computer programs (software)
3.	Developing and managing distributed systems	IS strategic planning	Quality of input data	Proliferation of mixed vendor shops (hardware and software)
4.	Developing and implementing an information architecture	Competitive advantage	Educating senior managers about MIS	Availability of skilled MIS personnel and opportunities for professional development of MIS managers and non-managers
5.	Planning and managing communication networks	Goal alignment	User friendliness of systems	Possible government intervention/ influence in computer market
6.	Improving and effectiveness of software development	Computerisation of routine work	Continuing training and education of MIS staff	Establishment of professional standards
7.	Making effective use of the data resource	IT infrastructure	Maintenance of software	Improvement of IS productivity
8.	Aligning the IS organisation within the enterprise	System integration	Standards in hardware and software *(tie)*	
9.	Recruiting and developing IS human resource	Software development productivity	Data security	
10.	Improving IS strategic planning	System friendliness	Packaged applications software availability	

Table 1. Summary of studies during the 1990s in countries and regions Palvia, *et al,* (2002).

South African Studies

Studies into key issues in South Africa have been undertaken by amongst others, Berkowitz, Ryan, Waspe and Hart (2001) and Armstrong, Chamberlain, Moore and Hart (2002). Table 2 lists the top ten issues from these two studies. The top four issues Disaster recovery, Security and control, Decision and executive support and Business intelligence and Building a responsive IT infrastructure were unchanged although their respective rankings differed.

The mixture of developed and developing issues can be seen in table 2. The number one issue in Table 1 for the USA was 2nd in 2001 and 4th in 2002 in South Africa. The 3rd issue for Taiwan was 7th in both South African studies, and the 3rd issue in India was 8th and 6th in 2002 and 2002 in South Africa. Issues from Africa did not rate in the South African studies; this could be due to the fact that the respondents were mainly from developed urban areas of South Africa.

South Africa

The last official South African census in 2001 found 44, 8 million people in the country (Johnston, 2003). Just fewer than 12% (5.2m) had completed high school, while 4.8% had any tertiary qualification. Over half the population (53.7%) lived in urban areas, and 50.5% were female (Johnston, 2003). The percentage of South Africans who were unemployed was estimated to be between 40-45% of the population. Seventy-six and a half percent of employed South Africans earned less than US$416 per month, 20% earn between US$416 and US$1334 per month, and 3.5% earn more than US$1334 per month. (Johnston, 2003).

	2001	2002
1.	Decision and executive support and business intelligence	Disaster recovery
2.	Building a responsive IT infrastructure	Security and control
3.	Disaster recovery	Decision and executive support and business intelligence
4.	Security and control	Building a responsive IT infrastructure
5.	Aligning the IS organisation within the enterprise	Planning and managing communication networks
6.	Using IS for competitive advantage	Making effective use of the data resource
7.	Improving strategic planning	Improving IS strategic planning
8.	Making effective use of the data resource	Measuring IS effectiveness and productivity
9.	Facilitating organisational learning	Developing and implementing an information architecture
10.	Customer relationship management	Aligning the IS organisation within the enterprise

Table 2. Summary of South African studies in early 2000s.

The World Economic Forum's Global Competitiveness Report 2005-2006 (Lopez-Claros, 2006), ranked 42nd out of 104 countries in a Growth Competiveness Index, 46th in Technology index, and 31st in a Macroeconomic Environment index. In terms of the Business Competitive Index, South Africa ranked 28th (Lopez-Claros, 2006). The fifth Global Information Technology report 2005-2006 (Dutta, Lopez-Carlos, Mia, 2006) ranked South Africa 37th out of 115 countries in a Networked Readiness Index.

Limitations of Surveys

The periodic surveys undertaken by the SIM to determine the most critical issues in IS management have had a significant influence on key issues studies. Gottschalk (2000) contends that these studies have several shortcomings; notably that most studies lack a theoretical framework, there is no key issues selection procedure applied, and the application of rating rather than ranking. To facilitate reliable international comparisons, Gottschalk (2000) advocated that future studies have to make specific methodological choices concerning initial selection of key issues and survey approach. A caveat is the lack of continuity and comparability with previous studies.

RESEARCH METHODOLOGY

A postal address list for 123 organisations was compiled from the Johannesburg Stock Exchange directory. Because of the high profile of the target population, mail was selected as the most accessible medium in reaching the sample. Data was collected through a self-administered, structured questionnaire. Fifty-one responses were received from the questionnaires distributed in July 2004. Of the returns, 31 responses were from persons fulfilling the role of Chief Information Officer and thus considered valid for analysis. Descriptive statistics was used to describe the profile of the sample population and provide basic information of the mean, minimum and maximum values and measures of variation for each issue. The rated list of 25 key issues was ranked and compared with survey results of a comparative South African study undertaken in 2001 (Berkowitz et al 2001). The ranked list for 2004 was further analysed by industry and the model of information technology services employed in the organisation.

ANALYSIS AND FINDINGS

Table 3 lists the top 10 results of the 2004 key issues for Chief Information Officers in South Africa. The results are listed according to their ranking with their mean and standard deviation shown alongside. It should be noted that the ranked list represents issues that CIOs regard as important, and not necessarily as problematic. Rankings from Luftman's (2005) international study done in 2004, as well as two previous South African Studies (Armstrong et al 2002; and Berkowitz et al 2001) are also listed for comparative purposes.

ISSUE	Mean	Std. Dev.	Luftman 2004	Armstrong 2002	Berkowitz 2001
1. Security and control	8.26	1.93	3	3	4
2. Building a responsive IT infrastructure	8.16	1.49	5	2	2
3. IT value management	7.90	1.47	11		
4. Service delivery	7.84	1.77			
5. Improving IS strategic planning	7.81	1.78	4	6	7
6. Disaster recovery	7.68	2.18		1	3
7. Using IS for competitive advantage	7.65	1.76			6
8. Aligning the IS organisation within the enterprise	7.65	1.94	1	10	5
9. Making effective use of the data resource	7.61	1.54		9	8
10. Developing and implementing an information architecture	7.42	1.46	9	8	11

Table 3. Summary and comparison of South African key issues.

Correlation of issues with the previous study results

Security and control ranked highest in the survey concerns. This issue shows as increasingly important after being ranked fourth in the Berkowitz, et al, (2001) study and third in the Armstrong, *et al,* and (2002) study. This high ranking was predicted by the Gartner Group in 2004 and confirmed in the results of the SIM 2003 (Luftman and McLean 2004) and 2004 surveys (Luftman 2005). "Anything to do with security, data security management, and data privacy and protection will get emphasised by CIOs" said Marcus Blosch, a vice president for Garter Executive Programs in March 2004 (Keizer 2004).

The high ranking of this issue, along with the issue of Disaster recovery reflects the worldwide concern around security and privacy issues. Organisations are vulnerable to viruses, hackers and "at the same time, the public has begun demanding greater protection from identity theft and other privacy threats" (Luftman and McLean, 2004). Building a responsive IT infrastructure was ranked second as it was in the two previous South African studies. Being able to respond with speed to a changing environment has become vital in the era of globalisation (Scott, 2004). The way in which value is assigned to IT investments and the measurement thereof is becoming an important concern for IT executives (McKeen and Smith 2004; Poe 2002). Its ranking confirms the CIO focus on improving the contribution IT makes to the organisation while still maintaining control on costs.

The issue of Service delivery was ranked for the first time in the 2004 survey. IT service delivery is unique to each business and the development of appropriate service delivery patterns (outsourcing verse in sourcing) is important for cost control and the evaluation of IT effectiveness in South Africa. This issue was not highly ranked in any of the previous studies, but is of importance to South African CIOs as many have outsourced several IT services.

Improving IT strategic planning is a highly ranked issue worldwide and the results of the 2004 South African survey confirm its continued importance. A rapidly varying business environment, increased numbers and involvement of end users and fast-paced technological change underscore the need to maintain and improve strategic planning skills. Alongside the IS organisation alignment ranking (ranked eighth in the study), these two issues underline the importance of IT and business executives to work together to leverage business resources. These are the only two issues which have been in the top 10 of all SIM studies since 1983 (Luftman, 2005).

Further analyses revealed surprises with regard to issues that were outside of the top ten CIO concerns. For instance, the two e-commerce issues (B2B and B2C) were ranked 24th and 25th respectively. In addition, Customer Relationship Management (CRM) was ranked sixteenth overall. The low ranking may be attributed to the cautious pace at which South African companies are adopting electronic commerce after the dotcom crash, particularly business-to-consumer (B2C) e-commerce. As e-commerce changes how the organisation does business and how the company maintains relationships with its customers, the adoption of B2C e-commerce is closely linked with CRM strategies.

Other critical issues worth mentioning are development and training of IS human resources (with a ranking of 14); as well as recruitment and maintenance of IS personnel (which received a ranking of 20). Before the study, it was expected that IS human resources would be highly ranked as rapid advances in IT are expected to make existing skills obsolete in a short space of time. Furthermore specialist skills are needed to administer third party agreements and in the era of globalisation and de-centralisation, manage teams situated in various locations. The result in this survey does not align with the global predictions or the SIM surveys, where 'Attracting, developing, and retaining IT professionals' ranked fourth (Luftman, and McLean 2004) in 2003, and second (Luftman, 2005) in 2004. Skills shortages is a global issue (Pesola, 2005), and one would expect this to be a major issue in a developing economy such as South Africa's (Guest 2005). "South Africa's shortage of IT skills is widely recognised, yet there is no long term solution" (Guest 2005). South African companies need to look after personnel, and invest in career paths (Guest, 2005); yet South African CIOs did not appear to agree.

The issue 'Decision and executive support and business intelligence' which was ranked as number 1 in 2001, and number 4 in 2002 in South Africa was no longer in the top 10. Could this imply that executive support and business intelligence are adequate? It must be borne in mind that the respondents were CIOs from large companies in urban (developed) areas of the country.

Statistical correlation of issues

The mean results of the 22 issues that were common to both the 2004 and 2001 studies were used to perform the Spearman Rank Order correlation test. The test found a correlation Spearman's Rho of 0.892847) between the 2004 CIO study results and the 2001 (Berkowitz et al.) study results. The Spearman's Rank correlation coefficient result represents a strong association between the rankings of the two studies and is statistically significant at $p < 0.05$.

The strong correlation between the results of the 2004 and 2001 studies could be interpreted to reflect consensus among IS managers around the most important issues in South Africa. Contributing factors could be that just three years has lapsed between studies and that only the issues common to both surveys were included. It is important to note that the full 2004 study issue list included three new issues and the 2001 study, a further six that was not included in the 2004 study. The result also illustrates that the issues for South African IS managers have remained fairly constant. Eight out of the top ten ranked issues in the 2004 study were present in the top ten of the 2001 study.

Interrelation of issues was identified during descriptive analysis and illustrated statistically for Security and control and Disaster recovery, Service delivery and Programme and project management and Developing and training IS human resources and Recruiting and maintaining IS personnel. The results confirm Gottschalk's (2000) warning that key issue lists for ranking often includes the overlap of issues and that practically, IT managers are concerned about how the key issues are interrelated rather than isolated issues.

Comparing issues in different industry segments

Two industry segments (manufacturing and non-manufacturing) were compared with previous studies. Results indicate that there is a relationship between the 2004 CIO study results and industry sector notwithstanding the limited sample size, the results concur with Armstrong et al. (2002) that "Industry type has proven to have a significant effect on key issues identified by IS managers". This has also been the global experience with a comparison of issues between manufacturing and non-manufacturing sectors by Gilbert et al. (2000) suggesting that manufacturing firms are not as focused on strategic uses of information systems as non-manufacturing firms.

The effect of sourcing IT services on the issues

Only one respondent indicated that the provision of IT services was wholly outsourced, rendering statistical inferences for total outsourcing impossible. Statistical analysis has been confined to comparing total in-house sourcing of IT versus the combination of internal and outsourced IT services. T-Tests were performed for in-house IT services and a combination of internal and outsourced services. The results showed that there is a correlation between the 2004 CIO study results and IT service sourcing at the 5% level for key issues: Developing and implementing an information architecture, Disaster recovery and Recruiting and maintaining IS personnel. Of these three issues, only Recruiting and maintaining IS personnel reflected a higher mean for organisations with internal IS services. An ANOVA test was performed on the three specific key issues identified for further analysis by the t-Test. The ANOVA test produced an F-statistic of 9.0746 and $p = 0.00028$. The F-statistic indicated at least some statistically significant differences. Responses varied by model of IT services provision and

their rankings for the top ten management issues are shown in Table 4. There was only one respondent in the total outsource category.

ISSUE	Internal services	Combination of services	Outsource IT services
1. Security and control	13	1	3
2. Building a responsive IT infrastructure	11	2	1
3. IT value management	6	4	10
4. Service delivery	8	5	10
5. Improving IS strategic planning	1	6	13
6. Disaster recovery	21	3	3
7. Aligning the IS organisation within the enterprise	15	6	3
8. Using IS for competitive advantage	2	9	20
9. Making effective use of the data resource	2	11	16
10. Developing and implementing an information architecture	20	8	13

Table 4. Summary and comparison of South African key issues by sourcing of IT services.

Seventy-four percent of respondents indicated a combination of internal and external IT service provision. The ratio of external- to internal-supplied IT services could not be interpreted in those companies using a combination of in-sourcing and outsourcing. The high percentage response for this category appears to support Gartner's prediction that by 2007, outsourcing will account for 56% of the total worldwide IT services market (Savvas, 2004). This is an important trend to document for South Africa, especially for companies that provide IT outsourcing solutions.

The responses confirmed the trend towards outsourcing IT services. The sourcing of IT services was shown to influence the ranking of key IS issues. Respondents from organisations with a combination of IT sourcing have rated the top four issues consistently higher than respondents with internal sourcing of IT services only. The top four issues are likely to be integral in third party agreements, thus their high ratings are substantiated. For organisations whose IT services are rendered internally, it is noteworthy that Improving IS strategic planning computed the highest mean.

CONCLUSION

The research achieved four specific objectives:

•   determined the 10 key issues amongst South African CIOs in 2004

•   compared the 2004 results with previous South African and international studies

•   considered the effect of industry type on the key issues

•   considered how different service sourcing models affect the issues.

The top five issues in this survey were; Security and control, Building a responsive IT infrastructure, IT value management, Service delivery, and Improving IS strategic planning. The top two and fifth were in similar positions in the two previous South African studies and in the 2004 SIM study (Luftman, 2005). IT value management was ranked 11 in the 2004 SIM survey but was not in previous South African studies. Service delivery was not ranked in the top 10 of any of the previous surveys sampled, and the issue of staffing was not ranked in the top 10 by South African CIOs in 2004. There was a high correlation between the ranking of key issues in this study and results of the 2001 study (Berkowitz, *et al,* 2001). While only three years has lapsed, it can be concluded that the studies undertaken reflect current issues and confirm that important issues have remained fairly constant. There is a keen interest in the topic of key management issues amongst the CIOs targeted, evidenced through the list of further issues provided, the willingness to participate in follow up interviews, and requests for the research outcome. Industry type was shown to have an effect on the ranking of key issues, with manufacturing firms not as focused on strategic uses of information systems. The sourcing of IT service provision was shown to influence the ranking of key issues, with organisations using a combination model rating the top four issues higher than organisations using only internal IT services. It is recommended that investigation into the key issues for South African CIOs be repeated at least

every three to five years to extend the body of knowledge in South Africa and allow sufficient time for issues to evolve. Issues that did not rank as expected could be pursued and reasons determined. Further research could be done to establish whether the issues differ for companies operating in different industry segments such as retail, manufacturing, financial, health, petro-chemical, etc.

REFERENCES

1. Armstrong, T, Chamberlain, G, Moore, B. and Hart M. (2002) Key information systems management issues for CEOs and other executives in South Africa 2002. Unpublished Empirical Research Reports, Department of Information Systems, University of Cape Town.

2. Berkowitz, S., Ryan, J., Waspe, K. and Hart, M. (2001) Key information systems management issues 2001. Unpublished Empirical Research Reports, Department of Information Systems, University of Cape Town.

3. Gilbert, A. H, Pick, R. A. and Ward, S. G. (2000) Continuing information systems issues: a comparison of the manufacturing and non-manufacturing sectors. *The Journal of Applied Business Research,* 16, 4, 27-36.

4. Gottschalk, P. (2000) Studies of the key issues in IS management around the world. *International Journal of Information Management,* 20, 3, 169-180.

5. Johnston, K. A. (2003) The South African online consumer. In Kangas, K. (2003), Business strategies for information technology management, IRM Press, Hershey.

6. McKeen, J. D. and Smith, H. A. (2004), Making IT happen, critical issues in IT management, John Wiley, USA.

7. Luftman, J. (2005) Key issues for IT Executives 2004, *MIS Quarterly Executive,* 1 4, 2.

8. Luftman, J. and McLean, E. R. (2004) Key Issues for IT Executives, *MIS Quarterly Executive,* 3, 2, 89-104.

9. Palvia, P. C, Palvia, S. C. J. and Whitworth, J. E. (2002) Global information technology: a metaanalysis of key issues, *Information and Management*, 39, 403-414.

10. Palvia, P. C., Rajagopalan, B, Kumar, A. and Kumar, N. (1996) Key information systems issues: an analysis of MIS publications. *Information Processing and Management,* 32, 3, 345-355.

11. Remenyi, D, Lubbe, S. and van Heerden, J. (2000) Some ad hoc information system issues in South Africa for the new millennium and suggestions as to how to deal with them. *Information Technology for Development,* 9, 163-174.

12. Savvas, G. (2004) "Just do it" does not apply to outsourcing, *Computerweek,* 2, 5, 19-22.