ASSESSING IT COMPETENCES OF BOARDS OF DIRECTORS: PERCEPTIONS OF MALAYSIAN CIOs

Shafi Mohamad, Conor O'Leary and Peter Best*

Shafi Mohamad, Conor O'Leary and Peter Best.
Department of Accounting Finance and Economics
Griffith Business School
Nathan Campus, Griffith University, Australia.

* Corresponding Author:
Shafi Mohamad.
Department of Accounting Finance and Economics
Griffith Business School
Building 1 (N50), Room 2.16
Nathan Campus, Griffith University
170 Kessels Road, Nathan QLD 4111, Australia.
Phone: +61 7 3735 7671
Fax: +61 7 3735 3719
email: shafi.mohamad@griffithuni.edu.au

Abstract

Information technology (IT) systems are becoming increasingly indispensable for organisations in their daily operations. Organisations therefore invest considerable capital in IT assets to support the IT needs of employees and other stakeholders. As the contemporary global business environment becomes increasingly reliant on IT, the need for IT to be governed effectively and efficiently grows. Boards play a critical role in the governance of organisations, yet despite the continued call for improved IT governance, there has been little research into how boards actually govern IT. Current research indicates boards appear to struggle to understand the state of IT within their companies and/or they lack appropriate IT skills in discussing IT issues.

This study therefore assesses IT competences of boards using a model developed from a review of IT competence frameworks in three domains, namely IT organisations/associations, professional accounting associations and academic research. The model is then tested, using Malaysia as a case study to evaluate the level of Board IT competence. Malaysia was chosen in light of the attention drawn to corporate governance in the 9th Malaysia Plan report.

A survey instrument extracted from the competences model lists 33 current critical IT issues facing boards. It then asked chief information officers (CIOs) of companies, to evaluate the importance of each issue and the level of competence their board has to deal with them. The results appear to show that there is a difference in the ranking of importance of issues and the level of IT competence boards currently hold based on what CIOs consider appropriate within a company. The findings will contribute to the research base on board IT competences from a Malaysian perspective thus highlighting areas for further improvement. If successful, the model can then be used to evaluate the state of IT governance in other international domains.

Keywords: IT competence, boards of directors, IT governance, CIOs, Malaysia.

ASSESSING IT COMPETENCES OF BOARDS OF DIRECTORS: PERCEPTIONS OF MALAYSIAN CIOs

1. Introduction

Information technology (IT) systems are becoming increasingly indispensable for organisations in their daily operations (Parent & Reich, 2009). As a result, organisations invest considerable capital into IT assets to support the IT needs of their employees and other stakeholders. This results in spending on corporate information assets accounting for more than 50% of capital outlay (Nolan & McFarlan, 2005). With more and more business being transacted online via the internet, IT dependent business transactions and capital expenditure on IT software, hardware and infrastructure is expected to continue to grow rapidly. The contemporary global business environment is increasingly reliant on IT, which in turn needs to be governed effectively and efficiently.

Currently most business organisations are governed by a board of directors. The board of directors is seen as the ultimate decision making body of the organisation and is considered to be responsible for the major investment decisions, corporate governance and the strategic direction of the organisation (Psaros, 2009). Boards play a critical role in the governance of an organisation and enhance the overall health and wealth of the entity (Borth & Bradley, 2008). Corporate governance is described by Gay & Simnett (2010) as a system by which companies are directed and managed and covers the conduct of the directors, and the relationship between the board, management and shareholders. Information technology governance (ITG) is a subset of overall corporate governance focusing on IT systems, their performance and risk management.

The rising interest in IT governance is partly due to compliance initiatives, for instance the Sarbanes-Oxley legislation in the USA (2002) and the Basel II (2004) banking regulations in Europe. IT governance is also considered critical because of the need for greater accountability for decision-making around the use of IT, in the best interests of all stakeholders.

The International Standard for Corporate Governance ISO/IEC 38500 (2008) has helped clarify IT governance by describing it as the *management system* used by directors. In other words, IT

governance is about the stewardship of IT resources on behalf of the stakeholders, who expect a return from their investment. The directors responsible for this stewardship look to management to implement the necessary systems and IT controls. Wagner (2011) amongst others notes the potential benefits that can be achieved by following best practice in all IT governance areas. It follows therefore that additional research in the area of IT governance should prove beneficial to all stakeholders. Yet, despite the continued call for improved IT governance there has been little research on how boards actually govern IT (Van Grembergen, De Haes and Guldentops, 2004). Many researchers have called for a specific focus on what boards do around IT governance, as they consider that overall corporate governance cannot be effectively discharged unless IT is governed properly (Musson and Jordan, 2005, Borth and Bradley, 2008 and Bhattacharya and Chang, 2008).

Further justification for additional research into IT governance can be found in the general area of research on corporate governance. According to the 2008 International Audit Committee Member Survey conducted by the Audit Committee Institute (ACI) of KPMG International (KPMG, 2008) nearly two-thirds of audit committees rate IT as one of the key non-financial risks over which they have oversight. The same study finds that IT is the fifth ranked overall challenge confronting audit committees, putting it ahead of regulatory and fraud concerns. To complicate matters further, many respondents to the survey believe that the information they receive about their IT risks is of a lower quality than the information received about their other risk and oversight responsibilities. Another survey conducted by the Audit Committee Institute of KPMG Australia in 2010 (KPMG, 2010) identified several significant developments which can potentially impinge on the work of audit committees. Two critical IT issues specifically identified are; the emergence of *Web 2.0* technologies and the expansion of cloud computing.

The above factors all combine to provide the motivation for the current study. A review was conducted of all the extant professional and academic literature in the area of IT governance with the expressed purpose of developing a model with which to evaluate the competences boards currently have in this area. The model was then tested within a public company environment in Malaysia, to evaluate its effectiveness. The model was found to be a reasonably good indicator of IT competences with the directors of companies in the selected jurisdiction Malaysia deemed to be lacking the appropriate IT competences in certain critical areas of IT governance.

The remainder of the paper is organised as follows. A literature review section follows, from which the various IT competence sources are summarised and based on these, three research questions are raised. Section three then outlines the proposed IT competence model extracted from the literature. Section four outlines the research methodology utilised. Section five analyses the results. Finally section six concludes the paper and offers some future research possibilities.

2. Literature Review

The literature review section is divided into three areas. Proposed sources of IT competences are extracted from three separate groups: IT associations, accountancy bodies and academic research.

IT associations

IT governance is defined by the the International Standard for Corporate Governance of IT (ISO/IEC 38500, p.3) as:

the system by which the current and future use of IT is directed and controlled. It involves evaluating and directing the plans for the use of IT to support the organisation and monitoring this use to achieve plans. It includes the strategy and policies for using IT within an organisation.

The standard provides a model, vocabulary and six *Principles for Good Governance* of information and communication technology (ICT) as follows:

1. Establish Clearly Understood Responsibilities for ICT
2. Plan ICT to best support the organisation
3. Acquire ICT validly
4. Ensure that ICT performs well, whenever required
5. Ensure ICT conforms with formal rules, and
6. Ensure ICT respects human factors.

Another model from an IT association worth considering, when assessing the competency requirements of boards of directors, is the *Control Objectives for Information and Related Technology* (CobiT) model. CobiT is a framework created by the Information Systems Audit and Control Association (ISACA) for information technology (IT) management and IT governance.

ISACA, which is an international professional association that deals with IT Governance, is an affiliate member of the International Federation of Accountants (IFAC). CobiT supports IT governance by providing a framework to ensure that:

1. IT is aligned with the business
2. IT enables the business and maximises benefits
3. IT resources are used responsibly, and
4. IT risks are managed appropriately.

These two definitive IT models are by definition very specific to IT experts. In order to equate them more specifically to the business environment it is beneficial to review what professional accounting bodies view as critical IT expertise needed by their members.

Accountancy bodies

The International Education Standard (IES 2, IFAC, 2003) for professional accountants notes the information technology component of accounting curricula should include the following subject areas and skills:

- General knowledge of IT;
- IT control knowledge;
- IT control competences;
- IT user competences; and
- One or a mixture of, the competences of the roles of manager; evaluator or designer of information systems (IFAC 2003:33).

Guidance in information technology knowledge and competences for professional accountants is further expanded upon in the *International Education Guideline 11: Information Technology for Professional Accountants* (IEG 11, 2003). Table 1 lists 22 skills and the level of attainment required for these items

Insert Table 1 here

Similarly, a review of the competency requirements of various national accounting bodies in countries such as Australia, Canada, the UK, USA, South Africa, and Malaysia all reveal a requirement for competence/proficiency in the IT area.

Academic research

Many academic studies have looked at the IT skills needed in the business workplace and the extent to which business people possess them. Theuri and Gunn (1998) examined the way in which information systems courses have been designed and structured in American universities and then related these practices to the systems skills expectations of the employers of accounting graduates**.** Hostrom and Hunton (1998) note how assurance services provided by the auditing profession are changing and that the fundamental issue now is that of control over information and related technology.

Coenenberg, Haller and Marten (1999) investigated the current state of accounting education for qualified auditors in Germany and identified challenges faced by that country due to changes in the accounting and auditing environment resulting from the increased use of IT in business applications. Howieson (2003) notes how IT advances will redefine the relationship between clients and professional experts, because more powerful technology will empower clients to play a bigger role in managing their own affairs.

Greenstein and McKee (2004) conducted a literature review that resulted in the identification of 36 critical information technology skills. They then surveyed academics (in accounting information systems and auditing) and audit practitioners in America to determine their self-reported IT knowledge levels and perceptions about the best places to learn IT skills. Table 2 summarises some of the major skills required.

Insert Table 2 here

Trites (2004) states that information technology (IT) plays a serious role in any modern business system. Therefore IT considerations play an important part in the controls that are necessary to preserve and protect corporate assets from misappropriation, loss and misuse. He subsequently

identified four critical categories within which IT governance could be assessed. These are discussed further in the next section. Finally, Delmond and Lebas (quoted in IFAC, 1998) note how recent developments in information technologies have increased the quantity of financial and non-financial data that can be accessed by accountants, as well as the scope and speed of data analysis and transmission.

Research questions

The above literature review highlights three disparate bodies of work, all noting various IT competences within their own domain and for their own specific purpose. The IT groups developed standards to provide assistance to IT practitioners. The professional accountancy bodies developed frameworks to ensure members are capable enough in the specific area of IT. Academic research has developed frameworks to evaluate among other things, how effective IT training is.

The stated objective of this paper is to develop a model with which to evaluate the competence of board members in relation to IT governance issues. Based upon the diverse range of sources utilised above, three research questions (RQ) are therefore raised.

RQ1: Can a framework for assessing the importance of IT issues be developed with indexes for the four critical sections identified in the literature?

RQ2: Can a framework for assessing Board IT competences be developed with indexes for the four critical areas of competence?

RQ3: Will a survey of Malaysian Chief Information Officers uncover any evidence of a knowledge gap as to the level of competence boards possess, in relation to IT governance issues?

3. Development of an IT competence model

A model with which to evaluate IT competence of directors needs to be framed in such a way as to be understandable to boards, all members of which may not be at the same level of computer expertise. Directors are responsible for overall corporate governance and so it was decided to frame the model in terms of critical general corporate governance principles. Referring to Trites (2004) study mentioned previously four critical sections were therefore identified. These are:

1. strategic planning issues,
2. internal control issues,
3. business risk issues, and,
4. privacy and legal issues.

Each section was then taken and filled in with specific points, extracted from the three categories of sources identified in the literature review section. This resulted in 15 strategic planning competences, 9 internal control competences, 4 business risk competences and 5 privacy and legal competences. Tables 3 to 6 respectively list all individual competences.

Insert Table 3 here

Insert Table 4 here

Insert Table 5 here

Insert Table 6 here

4 Research methodology

Survey instrument

The model was then incorporated into a survey instrument for testing. The survey instrument was in three parts. The first part listed five demographic questions about the respondent's company, his/her position (Chief Information Officer, Chief Executive Officer etc.) and years of

experience. As regards the company, three questions identified the size of the company (by turnover); the industry sector it was in and which stock exchanges it was listed on.

Part two then listed the 33 issues in their four categories and asked the respondents to evaluate, in terms of importance, each IT issue facing their company today. Part three then re-listed the 33 items and respondents were asked to rank the level of competence they considered the board of their company possessed to deal with each issue. Appendix 1 lists an abridged version of the questionnaire showing the questioning relating to the four "business risk" issues.

Survey jurisdiction and respondents

It was decided to use a jurisdiction with an emerging market economy and a stock exchange with stringent corporate governance requirements to test the model. The model was then tested, using Malaysia as a case study to evaluate the level of Board IT competence. Malaysia was chosen in light of the attention drawn to corporate governance in the 9th Malaysia Plan Report prepared by the Economic Planning Unit of the Prime Minister's Office and the Finance Ministry of Malaysia in 2006 (EPU 2006).

The specific individual respondents surveyed were therefore the Chief Information Officers (CIOs) of Malaysian public listed companies. The list of companies surveyed was obtained from the website of the CIO Chapter National ICT Association Malaysia (PIKOM). The link to the survey instrument in electronic format together with a covering letter was sent to the Chairman CIO Chapter PIKOM via LinkedIn with a request that the link be sent out to their members who are mainly Chief Information Officers of public listed companies in Malaysia requesting their participation. Fifty seven useable responses were received. This yielded a response rate of 7% which is deemed typical when surveying "time deficient" people such as the CIOs of public listed companies. A pilot study by Mohamad et al. (2014) of CIOs of Irish listed companies yielded a response rate of 10%. Similarly a survey of Malaysian senior management which included CIOs conducted by Yap et al. (2010) yielded a response rate of about 12%. The sample was therefore considered representative and valid as there is no reason to assume non-respondents would have had different views from those who took the time to respond.

5. Results

The results were analysed to evaluate and respond to the three research questions posed earlier. This was achieved by assessing the rankings of the CIOs in relation to (i) the importance of each particular issue and (ii) the perceived level of board competence to deal with each issue. Table 7 summarises the raw data.

Insert Table 7 here

Firstly, reliability tests were run to check the validity of the data. Cronbach Alpha scores were calculated for all eight group evaluations as per Table 7 (i.e. importance and competence scores for each of the four groups of issues). The scores ranged from 0.818 to 0.962 indicating that 82% to 96% of the items are measuring the same construct. These percentages are considered acceptable as the reliability factor analyses provide satisfactory measures when compared to Nunnally and Bernstein's (1967) seminal benchmark figure of 0.70.

The *importance* of the issues was then tested, by reviewing respondents' answers to Part two of the survey instrument. On a scale of 1-5 the lowest score given to an item was 3.67 (approximately half way between neutral and important) and the highest was 4.68 (approximately half way between important and very important). All 33 items were ranked as important with the overall average rank at 4.29 (Table 8, row 6, column 2) which is more than 4.00, making each item "very important" on average. Critically, space was left in an open ended question at the end of the survey instrument for respondents to add any other issues they considered critical to IT governance which were not already in the 33 listed competences (refer Appendix 1). None were listed.

Table 8 summarises the means on a group basis for each batch of issues. Group means, as regards the importance of the groups of issues ranged from 4.21 to 4.40. This again tends to suggest the respondents considered all items important and considered the group classification a reasonable methodology with which to evaluate overall IT importance.

Insert Table 8 here

RQ1 is therefore deemed to be answered in the affirmative, up to this point. This would appear to be a good basis with which to develop a model to evaluate how well or otherwise, boards are managing IT issues for their companies. The first task is to come up with a structured list of important items, and a scale with which to measure them. The current model appears to have achieved this. The respondents agreed all items were important and there was consensus among the respondents as to the items assessed. Finally, no items were identified which had been omitted from the lists.

Additional support for the evaluation of RQ1 and an assessment of RQ2 was then performed by reviewing respondents' answers to Part three of the survey instrument, the assessment of their board's *competence* to deal with the IT issues identified. Scores ranged from 2.98 to 3.90 with the overall average rank at 3.40 (Table 8, row 6, column 4) which approximates to 3.50. The group mean assessments of competence are summarised in Table 8 and range from 3.29 to 3.50. This tends to suggest respondents were able to use the model to evaluate how competent their boards were in relation to IT governance issues.

RQ1 can therefore be evaluated in the affirmative. Respondents considered the 33 issues as important, did not identify any omitted IT issues and were able to use the matrices to assess the performance of their boards as regards competence in the IT governance area.

Further support for the veracity of the model is derived from a review of Table 8 rankings of the groups of issues. In terms of importance, Internal Control issues were ranked most important followed by Privacy and Legal Issues. Strategic Planning and Business Risk issues were then jointly ranked third. When competence to deal with these issues was then evaluated, a slightly different ranking order emerged. Strategic Planning issues were ranked first, followed by Internal Controls, Business Risk then Privacy and Legal issues in that order. This suggests that although respondents recognised the importance of the issues however they evaluated their board competence to deal with these same issues differently, thus resulting in a slightly different ranking pattern.

RQ2 is also answered in the affirmative. Management of the evaluated companies considered overall that their boards of directors were reasonably competent in dealing with current IT issues.

Finally in relation to RQ3 about a knowledge gap differences were noted when it came to the evaluation of the importance of issues versus the corresponding board competence to deal with it. Table 7 lists mean scores both for the importance of the 33 IT governance issues as well as the competence of directors in relation to their oversight responsibilities for those same issues as scored by the CIOs. For the importance of issues the mean scores ranged from a minimum of 3.667 to a maximum of 4.684 with an overall average of 4.29 (Table 8, row 6, column 2). Meanwhile for the competence of directors the mean scores ranged from a minimum of 2.983 to a maximum of 3.895 with an overall average of 3.40 (Table 8, row 6, column 4). It appears that across the board for all 33 issues and competences surveyed the CIOs scored the competence of directors lower than they scored the importance of the corresponding issue.

This is indicative of possible issues with IT governance which need to be reviewed. Thus it appears as if CIOs of Malaysian companies consider their boards presently to be not fully on top of some current critical IT governance issues. This might be expected in an emerging market economy with a reasonably well developed stock exchange system, which Malaysia currently enjoys.

6. Summary and Conclusions

The importance of IT governance has undoubtedly escalated over the last decade but as Van Grembergen and De Haes (2010) observe, boards sometimes appear to be struggling to understand the state of IT within their companies. On occasion they do not have sufficient information to govern IT effectively, with many board members displaying a lack of IT skills and interest in discussing IT at board meetings. Company boards are ultimately responsible for IT governance. Chalaris *et al.* (2005) summarise these responsibilities as: the realization of promised benefits as a result of IT's alignment with that of the organization; the exploitation of opportunities and maximization of benefits from IT enabling the organization; the responsible use of IT resources; and the appropriate management of IT-related risks. Hence, some assistance as to the specific necessary competences boards should have in the IT area appears critical.

These also need to be framed in a model directors can understand, as all directors do not have the same level of IT skills and training.

This research study therefore attempts to address a perceived gap in the IT governance literature, by providing an actual model with which to evaluate the level of IT competence boards actually possess. A model of 33 specific competences from 4 overall categories of IT governance issues was therefore developed from three separate sources. These are: IT bodies, professional accounting bodies and academic research. The model was then tested in Malaysia, using public companies listed on Bursa Malaysia the local stock exchange. Results suggest the model is an effective tool to evaluate board IT competence levels. However, in this particular jurisdiction, board competences were assessed by company management to be still lacking in some areas of IT governance. This was not entirely surprising for a jurisdiction with an emerging market economy and a fairly sophisticated stock exchange system with the observance of corporate governance regulations mandatory as a pre-condition for membership.

Past literature on IT governance has focused on the domains of IT strategic alignment, IT resource management, risk management, performance measurement, and IT value delivery. These five domains have gained global recognition as accepted relevant domains of IT governance (Johnson, 2005). But the IT environment is dynamic and the increased reliance on outsourcing these days by major corporations and advances in cloud computing will only expand the areas of IT governance. This in turn will expand company boards' needs for IT competences. A model to evaluate such competence levels therefore appears important. This highlights the significance of the current research.

The model can now be used to evaluate IT competence levels in other jurisdictions. The level of competence could then be compared from one jurisdiction to the next. It can also be used to evaluate whether the competence of company boards as regards IT issues, varies with the level of (i) corporate legislative controls (ii) stock exchange requirements and (iii) corporate governance codes. Critically, the current study has requested *management* (via CIOs) to evaluate board level competences. Future research could get boards to self-evaluate their competence and then get management to evaluate board competence and compare the two to see if any competence "gaps" appear. The results of such future research may assist boards to better understand the governance of IT and allow them to consider the impact of IT structure on board IT governance processes.

Limitations

As with any study of this ilk, results and analysis are dependent upon the responses received from participants. Whether the responses they provide are an accurate reflection of their true thoughts on the matter, or have been adjusted (to provide responses which would appear more appropriate) is a matter the research cannot determine. For example CIOs may have been afraid to be too critical of the boards of their company for fear of reprisal. The small sample size (only representing 7% of the population) is also acknowledged, but as explained previously, a manageable total population with appropriately satisfactory governance characteristics was considered critical to an effective evaluation of the model's capabilities and limitations. The participants in this particular jurisdiction did not identify any shortcomings in the model, such as other critical IT issues not considered. Testing in a different environment may have uncovered such items. Future research may shed some light on this possible limitation.

Appendix 1 – Abridged version of Survey Instrument

PART 1: DEMOGRAPHIC PROFILE

Please tick 1 box to answer each of the following questions.

1. What is your company's industry sector?

Manufacturing ☐ Finance ☐ Service ☐ Retail ☐ Media ☐

Plantation ☐ Tourism ☐ Mining ☐ Agriculture ☐ Other ☐_____

PART 2: IMPORTANCE OF IT ISSUES

3. Business Risk Issues						
Please rank your assessment of the IMPORTANCE of the following IT issues to your company, by marking one box on the scale provided						
#	**Issues**	**Very**	**Fairly**	**Neither Unimportant nor Important**	**Fairly**	**Very**
		Unimportant			**Important**	
1	Being cognisant of developments in IT trends and emerging technologies for future business needs					
2	Ensuring that all issues related to IT business continuity risk are identified and acted upon					
3	Ensuring appropriate use of social media platforms to track and assess consumer sentiment					
4	Ensuring relationships with third party IT service providers are sustainable					

PART 3: BOARD IT COMPETENCY

3. Business Risk Competences						
Please rank the level of <u>COMPETENCE</u> your board currently has to deal with these issues by marking one box on the scale provided						
#	**Competences**	**Lacking Significant**	**Lacking Some**	**Neither Competent nor Incompetent**	**Fairly**	**Very**
		Competence			**Competent**	
1	Being cognisant of developments in IT trends and emerging technologies for future business needs					
2	Ensuring that all issues related to IT business continuity risk are identified and acted upon					
3	Ensuring appropriate use of social media platforms to track and assess consumer sentiment					
4	Ensuring relationships with third party IT service providers are sustainable					

Finally, please list any other IT issues you consider important, which have not been included above:

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TABLES

Table 1. Information Technology competences as required by IEG 11		
	Information Technology Item	**Skill Level**
1	Computer-assisted audit techniques (to evaluate information system processing operations and controls and to analyse and evaluate monitoring processes and activities)	IT control & evaluator role skills
2	Operating systems	User role skills
3	Word processing (in a relevant accounting/business context)	User role skills
4	Spreadsheet software (in a relevant accounting/business context)	User role skills
5	Database software (in a relevant accounting/business context)	User role skills
6	Internet tools(Email, Web browser,FTP) (in a relevant accounting/business context)	User role skills
7	Professional research tools(in a relevant accounting/business context)	User role skills
8	Business presentation software (in a relevant accounting/business context)	User role skills
9	Anti-virus software and other security software (in a relevant accounting/business context)	User role skills
10	Utility software and other relevant software (in a relevant accounting/business context)	User role skills
11	Accounting packages	User role skills
12	E-business systems (ERP, CRM and business automation systems)	User role skills
13	Networks(LAN)	User role skills
14	Electronic commerce (B2C,B2B,encryption tools, digital signatures/certificates, key management)	User role skills
15	Back-up and recovery	User, Manager role
16	Outsourced services (Internet Service Providers, Application service providers)	Manager role skills
17	EDI and e-commerce activities	Manager role skills
18	Access controls (logical and electronic)	Manager role skills
19	Communication	Manager, Designer & evaluator role skills
20	Document design specification	Designer role skills
21	Testing of system	Designer, Manager role skills
22	Planning of system evaluation	Evaluator role skills

Table 2. List of critical IT skills from Greenstein & McKee	
The director as a user of IT: Business Automation Skills	
Element	**Capability**
Word processing	Apply word processing software in a relevant accounting/business context
Spreadsheets	Apply spreadsheet software in a relevant accounting/business context
Presentation Software	Apply presentation software in a relevant accounting/business context
Internet tools	Apply Internet tools in a relevant accounting/business context
Research tools	Apply professional research tools in a relevant accounting/business context
Image processing software	Apply image processing software in a relevant accounting/business context
The director as a user of IT: Office Management Skills	
Element	**Capability**
Database search and retrieval	Ability to search and retrieve data from a database
Knowledge work systems	Ability to work with knowledge work systems to aid directors in the creation, integration and communication of knowledge
The director as a manager, designer and evaluator of IT	
Element	**Capability**
Electronic data interchange	Ability to perform EDI(traditional and web-based) transactions
Digital communications	Ability to understand digital communications(including wireless communications)
Network configurations	Ability to understand various network configurations(internal & external)
Internet service providers	Ability to understand the issues around the management of internet service providers
Encryption software	Ability to understand the use of encryption software to change data, using some type of encoding/decoding algorithm
Firewall software/hardware	Ability to understand the use of security technology to enforce an access control policy between networks
User authentication	Ability to understand the use of software and devices to identify system users
Intrusion detection and monitoring	Ability to understand the use of security technology to identify unauthorised requests for services

Table 3. Strategic Planning Issues	
1	The strategic value of IT to the company
2	The company's awareness of options for the effective, efficient and acceptable use of IT
3	Alignment between all IT activities and the company's objectives
4	Mechanisms are in place for monitoring information security risk
5	Awareness of technology-based competitive threats
6	Innovative use of IT to undertake new businesses and improve processes
7	Making use of the latest technologies for both scheduled and impromptu meetings
8	Making use of secure IT tools for all internal communication purposes
9	Making use of data analytics to support decision making at every level throughout the organisation
10	Ability to critically evaluate IT investment recommendations
11	Considering all stakeholder concerns and needs when making IT investment decisions
12	Ensuring appropriate human resource policies are in place
13	Ensuring ample resources are available to enable staff to leverage new technologies
14	Ensuring appropriate contractual agreements are in place with IT vendors/ suppliers
15	Awareness of the influence of company culture on the overall effectiveness of IT governance

Table 4. Internal Control Issues	
1	Ensuring appropriate oversight of all IT related strategic and operational risks
2	Instituting appropriate IT governance mechanisms be it at board or at committee level
3	Ensuring standards for security and document retention are in place
4	Setting up IT fraud prevention/detection platforms throughout the organisation
5	Setting up mechanisms to ensure that the company gets value for money from all its IT investments
6	Ensuring that IT monitoring and measurement systems deliver expected results
7	Ensuring that plans and policies are implemented and effective
8	Conducting regular reviews of IT security and reliability measures
9	Ensuring appropriate IT project management systems are used

Table 5. Business Risk Issues	
1	Being cognisant of developments in IT trends and emerging technologies for future business needs
2	Ensuring that all issues related to IT business continuity risk are identified and acted upon
3	Ensuring appropriate use of social media platforms to track and assess consumer sentiment
4	Ensuring relationships with third party IT service providers are sustainable

Table 6. Privacy and Legal Issues	
1	Ensuring that all local legislative and regulatory requirements for protecting personal information as well as policy and procedures for compliance are adhered to
2	Ensuring compliance with all relevant local legislation pertaining to the use of software, hardware, service agreements and copyright laws
3	Ensuring compliance with any relevant overseas regulations such as Sarbanes-Oxley, HIPAA, Basel, etc.
4	Ensuring compliance with all professional standards, frameworks and methodologies affecting IT governance

5	Ensuring that the decommissioning or disposal of IT assets is done in accordance with environmental legislation and regulations

Table 7. Raw Data scores (Imp = importance, Comp = competence) for CIOs (n=57)			
Strategic Planning Issues		**Imp**	**Comp**
1	The strategic value of IT to the company	4.316	3.895
2	The company's awareness of options for effective, efficient and acceptable use of IT	4.544	3.649
3	Alignment between all IT activities and the company's objectives	4.404	3.702
4	Mechanisms are in place for monitoring information security risk	4.526	3.649
5	Awareness of technology-based competitive threats	4.000	3.386
6	Innovative use of IT to undertake new businesses and improve processes	4.246	3.474
7	Making use of the latest technologies for both scheduled and impromptu meetings	3.667	3.211
8	Making use of secure IT tools for all internal communication purposes	4.246	3.386
9	Making use of data analytics to support decision making throughout the organisation	4.175	3.263
10	Ability to critically evaluate IT investment recommendations	4.579	3.667
11	Considering all stakeholder concerns and needs when making IT investment decisions	4.105	3.561
12	Ensuring appropriate human resource policies are in place	4.088	3.526
13	Ensuring ample resources are available to enable staff to leverage new technologies	4.000	3.509
14	Ensuring appropriate contractual agreements are in place with IT vendors/ suppliers	4.193	3.316
15	Awareness of influence of company culture on overall effectiveness of IT governance	4.035	3.333
Internal Control Issues			
1	Ensuring appropriate oversight of all IT related strategic and operational risks	4.526	3.597
2	Instituting appropriate IT governance mechanisms be it at board or at committee level	4.386	3.368
3	Ensuring standards for security and document retention are in place	4.404	3.579
4	Setting up IT fraud prevention/detection platforms throughout the organisation	4.246	3.333
5	Setting up mechanisms to ensure company gets value for money from IT investments	4.579	3.772
6	Ensuring that IT monitoring and measurement systems deliver expected results	4.526	3.544
7	Ensuring that plans and policies are implemented and effective	4.404	3.649
8	Conducting regular reviews of IT security and reliability measures	4.509	3.316
9	Ensuring appropriate IT project management systems are used	3.983	3.228
Business Risk Issues			
1	Being cognisant of developments in IT trends and emerging technologies for future business needs	4.421	3.386
2	Ensuring that issues related to IT business continuity risk are identified and acted upon	4.614	3.649
3	Ensuring appropriate use of social media platforms to track/assess consumer sentiment	3.754	2.983
4	Ensuring relationships with third party IT service providers are sustainable	4.053	3.281
Privacy and Legal Issues			
1	Ensuring that all local legislative and regulatory requirements for protecting personal information as well as policy and procedures for compliance are adhered to	4.684	3.649
2	Ensuring compliance with all relevant local legislation pertaining to the use of software, hardware, service agreements and copyright laws	4.632	3.561
3	Ensuring compliance with any relevant overseas regulations such as Sarbanes-Oxley, HIPAA, Basel, etc.	4.035	2.983
4	Ensuring compliance with all professional standards, frameworks and methodologies affecting IT governance	4.035	3.193
5	Ensuring that the decommissioning or disposal of IT assets is done in accordance with environmental legislation and regulations	4.246	3.088

Table 8. Group Mean Scores and Ranking of Issues and Competences by CIOs (n=57)				
	Issues	Rank	Competences	Rank
Strategic Planning	4.21	3	3.50	1
Internal Controls	4.40	1	3.49	2
Business Risk	4.21	3	3.32	3
Privacy and Legal	4.33	2	3.29	4
Overall	4.29		3.40	