Effective information technology (IT) governance mechanisms: An IT outsourcing perspective

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Abstract Effective IT governance will ensure alignment between IT and business goals. Organizations with ineffective IT governance will suffer due to poor performance of IT resources such as inaccurate information quality, inefficient operating costs, runaway IT project and even the demise of its IT department. This study seeks to examine empirically the individual IT governance mechanisms that influence the overall effectiveness of IT governance. Furthermore, this study examines the relationship of effective IT governance, the extent of IT outsourcing decisions within the organizations, and the level of IT Intensity in the organizations. We used structural equation modeling analysis to examine 110 responses from members of ISACA (Information Systems and Audit Control Association) Australia in which their organizations have outsourced their IT functions. Results suggest significant positive relationships between the overall level of effective IT governance and the following mechanisms: the involvement of senior management in IT, the existence of ethic or culture of compliance in IT, and corporate communication systems.

Keywords IT Governance · IT Intensity · IT Outsourcing · SEM · Australia

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1 Introduction

The issue of establishing and implementing effective information technology governance has become an important matter for modern business. Effective IT governance ensures alignment between IT and business goals. Gartner (*Top Ten CIO Management Priorities for 2003*) revealed that "Improving IT governance", selected as a topic for the first time, was ranked third by chief information officers (CIOs). IT Governance Institute (2003a) revealed that more than 80 percent of CIOs acknowledged the need for better IT governance in delivering their enterprise's strategy. The importance of IT governance was supported by a study showing that firms with superior IT governance gained profits 25% higher than those with meagre governance, given similar strategic objectives (Weill and Ross 2004). Furthermore, they also stated that "effective IT governance is the single most important predictor of the value an organization generates from IT" (Weill and Ross 2004, pp3–4).

Effective IT governance is crucial for an organization to achieve its corporate performance goals. To implement IT governance effectively, a set of IT governance mechanisms is required (e.g., IT steering committee, IT organizational structure) that encourages behaviors congruent with the organization's mission, strategy, values, norms and culture (Vaswani 2003; Weill 2004). The crucial question for business however is: which of these individual IT governance mechanisms are most cost-effective, on average, in generating a higher level of overall effective IT governance for the organization? This paper addresses that crucial question.

Moreover, it is important to understand that the factors that determine the effectiveness of IT governance cannot be generalized to all types of firms or industries because each

company has its own different characteristics. The present study addresses this gap — it extends earlier studies by proposing a contingency factor — IT intensity — that, it will argue, modifies previously found IT governance mechanisms affecting the effectiveness level of IT governance.

Organizations with ineffective IT governance, by contrast, suffer due to inaccurate information quality, inefficient operating costs, runaway IT project costs (e.g., being over budget and under specification), loss of competitiveness, the demise of IT departments, or the organization itself (Schwartz 2004, Woodhead 2004). In addressing these problems, at least in part, organizations have used outsourcing some or all of their IT functions to a third party as a strategy (Loh and Venkatraman 1992; Bharadwaj 2000; Santhanam and Hartono 2003; Teng et al. 1995; Strassman 2004; Hall and LzCiedtka 2005; Dahlberg and Lahdelma 2007). This study empirically examines the relationship between effective IT governance and the level of IT outsourcing decisions.

Thus, the general research question of this paper is: what individual IT governance mechanisms impact significantly a higher perceived level of overall effective IT governance? Two specific sub-questions are: 1) to what extent does IT Intensity influence effective IT Governance? 2) to what extent are effective IT governance and IT outsourcing decisions correlated?

The work reported in this paper contributes theoretically and practically in the IT governance area in several ways. It extends the examination of individual IT governance mechanisms to include a wider number of mechanisms; it seeks to relate these mechanisms specifically to a perceived overall level of effective IT governance in organizations; it is the first study to our knowledge that empirically examines the influence of ethic or culture of compliance and effective corporate communication systems on IT governance; it is the first study to our knowledge that empirically tests the influence of a perceived level of effective IT governance on IT outsourcing decisions while controlling for the level of IT Intensity in the organization; and, it attempts to mitigate the problems of limited generalizability and selection bias in the results of prior studies by employing a survey and generalized sampling research methodology.

2 Literature reviews and theoretical foundation

2.1 IT Governance

According to the IT Governance Institute (2003b), IT governance is defined as: "A structure of relationships and processes to control the enterprise in order to achieve the enterprise's goals by adding value while balancing risk

versus return over IT and its processes."[1] To achieve effective IT governance, an organization needs to employ well-designed, well-understood, and transparent governance mechanisms (Weill and Ross 2004). Weill and Ross (2004) surveyed CIOs from 256 enterprises in the US and identified fifteen of the most common IT governance mechanisms. Amongst them were a senior management committee (c.f., IS steering committee), an IT executive committee, an architecture committee, etc. However, their study did not relate these mechanisms to the overall level of IT governance in the organization.

Vaswani (2003), using auditors in Queensland, ran a study to determine the effectiveness of IT governance mechanisms, revealing that the existence of three mechanisms — an IT steering committee, the involvement of senior management in IT, and corporate performance measurement systems — were positively correlated with the effectiveness of IT governance. On the other hand, the other two mechanisms (centralization of IT decision-making and the position of the IT function within the organization) were not supported. The study has, however, several shortcomings that this study intends to overcome. First, Vaswani's (2003) model only explained 52.3% of the variance of effective IT governance, implying other mechanisms not included in the model were also involved. Second, it had not taken account of the conditions that contribute to the effectiveness of each of the IT governance mechanisms, for instance, the IT intensity level. Finally, Vaswani's (2003) study used a relatively small sample size and it only involved one ISACA Chapter (Queensland Chapter), thus limiting the external validity of the study's results.

Ali and Green (2007) investigated individual governance mechanisms in public sector organizations. They found that an effective IT strategy committee and a communication system that effectively disseminated policies and procedures both had a significant positive influence on the perceived overall level of effective IT governance. However, their work was limited to public sector organizations only. Bowen et al. (2007) conducted an in-depth case study into one organization's attempts to implement an effective IT governance system. Responses to questions in the interview protocol indicated that more effective IT governance performance outcomes were associated with a shared understanding of business and IT objectives; active

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[1] There are several other definitions of IT governance similar in effect to the study definition. Weill (2004, p.2) defined IT governance as "*specifying the framework for decision rights and accountabilities to encourage desirable behavior in the use of IT*." Van Grembergen et al (2004, p.5) defined IT governance as the "*organizational capacity exercised by the Board, executive management, and IT management to control the formulation and implementation of IT strategy and in this way ensure the fusion of business and IT*."

involvement of IT steering committees; a balance of business and IT representatives in IT decisions; and, comprehensive and well-communicated IT strategies and policies. While this work lends good insight to the phenomenon of effective IT governance, its results are limited to the context of one organization.

De Haes and Van Grembergen (2005) investigated specifically the link between IT governance and business/IT alignment. Through a set of multiple research methods consisting of pilot case research, Delphi research, benchmark research, and extreme case research, they concluded that organizations with more mature IT governance practices were likely to obtain a higher degree of business/IT alignment maturity. Again, their conclusion is limited to the context of the participants/organizations involved in the research methods employed. Finally, Robb and Parent (2009) investigated IT governance at two financial mutuals — one in Australia and the other in Canada. They used a case study methodology. They found that, as opposed to the Australian cooperative approach where directors, managers, auditors, and service providers all appear to work together to achieve good governance of the IT function, the Canadian coercive approach was more reliant on the ability of the CIO to devise organizational arrangements — structures, processes, and staffing — to successfully manage the interdependencies. However, again, while providing useful insight, their findings are limited to the context of the two case studies reported.

2.2 IT governance, IT intensity, and IT outsourcing

Sohal and Fitzpatrick (2002) examined IT governance and management in organizations from an information intensity perspective. They divided the organizations into three broad classifications based on a loose concept they called IT intensity level: high-tier, medium-tier and low-tier industries. Using a survey of senior IT officers from 59 large organizations in Australia, their study revealed several common characteristics among low and medium-tier organizations. The centralization of IT operation and the IT alignment issue were perceived as important for all three tiers of intensity. The speculation regarding the concept of IT intensity in their study was interesting. However the study did not explain how IT intensity was defined or operationalized, thus limiting its external validity and replicability. Sohal and Fitzpatrick (2002) also observed the IT governance mechanisms used by Australian organizations, including the existence of an IT steering committee, centralization of IT decision-making activities and the involvement of senior management in IT. However, the study did not hypothesize nor provide empirical support for relationships of the three mechanisms to the level of effectiveness of IT governance.

Furthermore, this paper addressed limitations found in Sohal and Fitzpatrick's (2002) study by clearly defining the IT Intensity variable in the current research model. Also, we examined its link with the overall level of effective IT governance and IT outsourcing decisions.

IT outsourcing has been accepted as part of modern business practices (Willcocks and Lacity 1999). The global market capitalization of IT outsourcing is predicted more than $260 billion in 2009 (Fisher et al. 2008). In this study, IT outsourcing is the contracting of various systems to outside information systems vendors (Willcocks and Lacity 1999). Many studies have examined the reason behind the IT outsourcing phenomena, such as: cost reduction and efficiency, business performance improvement, access to outsourcing provider capability and avoid a problem within the company (see Fisher et al. 2008).

2.3 Effective it governance and resource-based theories

This study adopts a resource based-view (RBV) as its theoretical basis. According to RBV, firms "compete on the basis of "unique" corporate resources that are valuable, rare, difficult to imitate, and non-substitutable by other resources" (Bharadwaj 2000, p.171). Many studies have used RBV in the context of IT (Teng et al. 1995; Bharadwaj 2000; Caldeira and Ward 2003; Clemon 1991; Jarvenpaa and Leidner 1998, Santhanam and Hartono 2003). In a similar theme to this study, Teng et al. (1995, p.80) examined the relationship between the performance of IT resources and IT outsourcing decisions. They claimed that IT resources contributed significantly towards organizations achieving competitive advantage. Thus, based on the resource-based perspective, "when the performance of existing resources falls short of expectation, outsourcing can be a strategic response to fill these gaps…Applying this perspective to information resources, when information quality, IS support quality, and other performance measures of these resources fall short of expectations, IS outsourcing becomes a viable strategic option for the organization." Effective IT governance involves the management of IT resources such that IT goals align with business goals. For the management of IT resources to be more valuable, less imitable, more rare, and less substitutable, governance mechanisms such as an IT strategy committee, IT steering committee and involvement of senior management in IT are required. The policies that these IT management mechanisms use to manage effectively the IT resources need to be also effectively communicated to the organization and a culture of compliance with the policies needs to be encouraged. Finally, the performance of the IT resources needs to be evaluated using a

corporate performance measurement mechanism. In this way, the resulting effective IT governance regime will provide a strategic resource to facilitate the organization's competitiveness. Effective IT governance will be more likely to lead to good IT performance which in turn will contribute to better firm performance (Weill and Ross 2004; Bharadwaj 2000; Santhanam and Hartono 2003). Indeed, prior studies have shown that managerial IT resources within organizations have contributed significantly to organizations' economic competitiveness (Mata et al. 1995).

3 Research model and hypotheses development

Adopting a resource-based theoretical basis, this study proposes to investigate the research model shown in Fig. 1. The individual IT governance mechanisms are derived from the theory in general and significant prior studies in particular, and they are hypothesized to contribute to effective IT governance.

3.1 IT strategy committee

As IT becomes a critical element of business strategies or core operating processes, there is a need for greater involvement of the board of directors in establishing effective governance of IT. A board can pursue these responsibilities by establishing a committee called the IT strategy committee[2] (IT Governance Institute 2003b).

The involvement of boards in IT governance implies that the organization is committed to establishing effective IT governance. Commitment is indicated by the provision of sufficient resources for meeting IT strategic objectives (Gottschalk 1999; Premkumar and King 1994), providing direction to management related to IT strategy and its approval (IT Governance Institute 2003b). A recent study by Ali & Green (2007) in public-sector organizations in Australia revealed that an IT strategy committee has a positive significant correlation with the level of effectiveness of overall IT governance. These arguments lead to the hypothesis:

H1: The existence of an IT strategy committee will positively influence the perceived level of effective IT governance.

3.2 IT steering committee

The IT steering committee[3], as a mechanism for supporting information systems planning and management, has been widely supported in the systems literature. The committee serves as a high-level executive team, comprised of representatives from various divisions or functions within the organization (such as business executives and the CIO), with the main function of linking its IT strategy and business strategy (Nolan 1982; IT governance Institute 2003b). Previous studies have empirically supported the benefits of the existence of an IT steering committee in IS planning and management.

Several earlier IS studies provide further empirical evidence of the importance of an IT steering committee. For example, a study by Karimi et al. (2000) found that an IT steering committee had a positive impact on the sophistication of IT management, and it was shown to have made improvements to IS project portfolios (McKeen and Guimaraes 1985). A more recent study by Vaswani (2003), using auditors in Australia, revealed that an IT steering committee had a positive significant correlation with the level of effectiveness of overall IT governance. Based on these arguments, therefore this study proposes that:

H2: The existence of an IT steering committee will positively influence the perceived level of effective IT governance

### 3.3 Involvement of senior management in IT

Many researchers have examined the critical role of senior management[4] practices in IS success. The involvement of senior management appears to lead to effective IS planning (Rockart 1988; Cerpa and Verner 1998; Earl 1993; Schuman and Rohrbaugh 1991; and Sohal and Fitzpatrick 2002). A lack of senior management involvement has been shown to lead to unfavorable outcomes in IS planning, and even failure to plan for IS (Cerpa and Verner 1998; Nath 1989; Sabherwal 1999; and Salmela et al. 2000). In the IT governance literature, a recent study by Vaswani (2003) has shown that senior management involvement had a significant positive effect on the level of effective IT governance. Thus:

H3: Involvement of senior management in IT will positively influence the perceived level of effective IT governance

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[2] In this study an IT strategy committee means a sub committee of board members with responsibility to provide insight and advice to the board on topics such as the alignment of IT with the business direction and the achievement of strategic IT objectives; and also to provide direction to management relating to the IT strategy (IT Governance Institute, 2003a).

[3] In this study an IT steering committee means a high-level executive management team of representatives from multiple divisions or functions that are assigned the task of linking IT strategy with business strategy by setting strategic directions, matching corporate concerns with technology potential, and building commitment (IT Governance Institute, 2003b).

[4] In this study senior management means the CEO and the level of management directly below that of the CEO.

Fig. 1 Research model
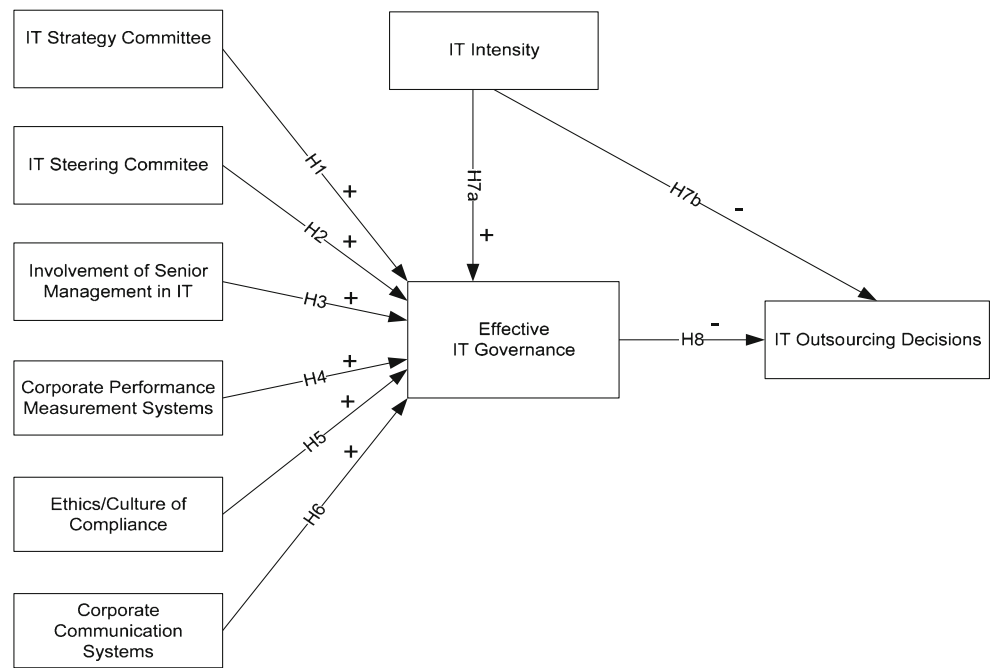
3.4 Corporate performance measurement systems

One of the IT strategy committee's duties is to supervise the implementation of the Board's strategic agenda. To achieve this outcome, effective performance measurement mechanisms, such as an IT balanced scorecard, project tracking systems, and IT charge back systems, are necessary. Such a system enables the management and the board to detect and correct any deviations and alter the strategy when necessary (IT Governance Institute 2003b). In line with this argument, Hardy (2003) contends that the use of a performance management system is an integral part in implementing effective IT governance. The system that incorporates a set of metrics provides management with a regular and precise analysis of how IT is performing on its current operations and the latest projects. Thus:

H4:   The implementation of a corporate performance measurement system will positively influence the perceived level of effective IT governance

3.5 Ethics or culture of compliance

Recent corporate collapses like Enron, WorldCom, HIH, and One.Tel have shown that the lack of an ethic or culture of compliance has adversely impacted the company's existence[5]. Effective ethic or compliance management has

several advantages. First, as employees' ethical and legal awareness increase, the employees tend to ask questions correctly and, in the end, do the right thing when facing dilemmas. Second, it influences employees to be willing to report violations to management, thus contributing better decisions in the company. Finally, it increases employees' commitment because a culture of compliance creates value congruence that generates a sense of belongingness among employees (Trevino et al., 1999; McCabe et al., 1996). In a similar vein, but with respect to IT governance, this study argues the need to promote an ethic or culture of compliance in order for firms to achieve a high level of effective IT governance. Such an environment is useful in preventing and detecting conduct that may endanger the objectives of IT governance.

To achieve an effective ethic or culture of compliance, it is important for top management to give leadership in promoting awareness of ethic or culture of compliance requirements within their organization, as it sends messages to employees that inevitably shape the culture of their organizations (Beyer and Nino, 1999). Thus:

H5:   The existence of an ethic or culture of compliance will positively influence the perceived level of effective IT governance.

3.6 Corporate communication systems

Effective IT governance requires close relationships between the business and IT so that there will be better understanding between both areas, thus creating good participation and collaboration in the organization (Henderson et al. 1993;

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[5] In this study, ethics or culture refers to similar concepts that mean "all the beliefs, values, attitudes, rituals and behaviour patterns that people in an organization share" (Meyer, 2004, p.29).

Broadbent, 1998; Luftman and Brier, 1999; Luftman, 2000; Reich and Benbasat, 2000; Callahan and Keyes, 2004). Good communication systems will enable the two parties (business and IT) to increase each other's awareness of the importance of the other's perspective in obtaining benefits from IT (De Haes and Grembergen, 2005).

Communication mechanisms are also important for effective IT governance as their purposes are to inform the organization as a whole about IT governance processes and decisions, and to encourage desirable behaviours in the organization (Weill and Ross, 2004). They also suggested that the more management communicate formally about the existence of IT governance mechanisms, how they work, and what outcomes are expected, the more effective are their governance processes. This study provides empirical evidence of the perceived influence of communication mechanisms on overall IT governance. Accordingly

H6: The implementation of a corporate communication system will positively influence the perceived level of effective IT governance

3.7 IT intensity, IT governance, and IT outsourcing

Effective IT governance mechanisms do not take place in isolation from the milieu of organizational contexts in which the governance occurs (Dehning et al., 2003). As different industries employ IT in different ways, the need for effective IT governance will be different as well. Starre and de Jong (1998) investigated IT governance and management practices by analysing the responses to a survey along five perspectives: the country of origin, company size, the ratio of IT costs to operational costs, the organizational structure of the company, and finally, the intensity with which information is used by the company. The study revealed that information intensity was the only critically important factor to IT governance. In a similar study, Sohal and Fitzpatrick (2002) surveyed 57 large organizations in Australia and found that the IT intensity was also considered an important factor in relation to effective IT governance. However, their study did not make any attempt to provide empirically investigate the link between IT intensity and IT governance performance. This study examines the influence of IT intensity based on an approach similar to that used by Clarkson et al. (2003).

According to the theory of transaction cost economics (Williamson, 1989), an organization will be likely to outsource its IT functions if it has low asset specificity, low measurement problems and low transaction frequency. Accordingly, organizations with high dependence on IT (high IT intensity) will be reluctant to give over control of a

resource that is essential to the success of their business. This view is supported by Sohal and Fitzpatrick (2002) who found that industries with high IT intensity have lower rates of IT outsourcing expenditure compared to industries with low IT intensity. Thus,

H7a: IT intensity has a direct positive influence on the perceived level of effective IT governance, and

H7b: IT intensity will have a negative impact on the degree of IT outsourcing decisions.

3.8 Effective IT governance and IT outsourcing

Effective IT governance is intended to improve IT performance in organizations. By improving IT performance, organizations expect to obtain benefits from their IT such as reliable, fast and secured solutions, to acquire a rational return on investment, and to improve efficiency and productivity (IT Governance Institute, 2003b). In line with this view, earlier studies reveal that effective IT governance contributes to higher return on assets (Weill, 2004), and provides firms with new business opportunities (Sampler and Weill, 2003).

Unfortunately, when IT performance does not contribute significantly to accomplishing organizational objectives, management faces an urgent need to re-evaluate the role of IT within the organization. One of the options available, recently applied in the business world, is shifting the burden of poorer internal IT performance to an outside party by outsourcing all or part of its IT. This view is supported by Loh and Venkrataman (1992) who found a negative correlation between IT performance and the degree of IT outsourcing in American firms. Teng et al. (1995) empirically examined IT resource performance and its influence on the IT outsourcing decision. They found a positive and significant correlation between poor IT performance and the decision to outsource the IT function. Strassmann (2004) studied US companies that outsourced their IT. His study showed that companies that performed major IT outsourcing had a decreasing profit compared to companies with a lower level of IT outsourcing. Hall and Liedtka (2005) provides similar results that poor overall firm performance and poor cost control led organizations to outsource their IT function on a relatively large scale. A more recent study by Dahlberg and Lahdelma (2007) examined the link between IT governance maturity and IT outsourcing degree. Their results showed that companies with a higher level of IT governance maturity outsourced their IT function more selectively compared with companies that had a lower level of effective IT governance. Thus,

H8: Effective IT Governance will have a negative effect on the degree of IT outsourcing.

4 Research methodology

This study used members of the Information Systems Audit and Control Association (ISACA) of Australia as data sources to test its hypotheses. In collaboration with each of the Australian chapters of ISACA, members were sent an invitation to participate in a web-based survey. In the survey instrument, the participants were requested to answer the questions either based on their own organization (for internal auditors) or based on one client organization (for external auditors). The client organization was selected by the external auditor themselves. The identity of the organization was not released to the researchers. Participants had to select one perspective only in answering the questions.

There are two main reasons why this study used the auditors. First, they have adequate professional qualifications and extensive experience in the implementation of information system (IS) control mechanisms. Second, ISACA exposes its members to up-to-date information and knowledge in IT governance mechanisms, thus enhancing their awareness and familiarity with IT governance concepts and their implementation. For these reasons, the auditors were regarded as appropriate subjects for this study. Furthermore, two rounds of pre-testing (initial testing and pilot testing) were conducted before the survey instrument was used for data collection purposes. Based on the feedback from the pilot testing, small revisions were made to the survey.

4.1 Operational measures of the study variables

The following variables were adopted from prior studies or newly developed for the purpose of this study. Except for the *level of IT outsourcing decision* and *IT intensity* variables, all the variables (dependent and independent variables) were measured using seven-point Likert scales[6].

Dependent Variables (see Appendix A).

– Perceived overall level of effective IT governance (EFFECT) was measured using two items that were

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[6] No significant difference existed between early and late respondent groups. This result implies no non-response bias. Factor analyses were performed on the individual IT governance variables to establish discriminant and convergent validity. Six final factors explaining 87.2 percent of the total variance were extracted and entered into the subsequent SEM analysis. Factor analyses were then performed to confirm that the dependent variable was extracted as one factor. Based on the Hair et al. (1998) suggestions, factor scores were derived from the two items (i.e., ITBGITEM and ITBGTEM) and used as a composite measure of IT intensity factor. Subsequent to the prior three factor analyses, a reliability test was performed for the extracted factors. None of the factors' Cronbach alpha was lower than 0.89. The full details of these validity processes are available from the authors on request.

validated by Ali and Green (2007). The two items were originally developed and validated in Goodhue and Thompson (1995).
– Level of IT outsourcing decision (IT OUTSOURCING) was measured using a scale similar to that used by Sohal and Ng (1998). The scale consists of five levels of the last year's IT outsourcing as a percentage of the last year's IT budget.

Independent Variables (see Appendix A)

– To measure IT Strategy Committee (STRACOM), three questions adapted from the IT Governance Institute (2003b) were used.
– IT Steering Committee (STEERCOM) was measured using three items that were validated by Ali and Green (2007). All three items were originally developed and validated based on a study conducted by Karimi et al. (2000).
– To measure involvement of top management in IT (INVOLVE), this study used three items that were adapted and validated by Vaswani (2003). The first two items were originally developed and validated based on a study conducted by Jarvenpaa and Ives (1991) while the last item was developed and validated by Vaswani (2003).
– Corporate performance measurement system (CORPSYS) was measured using three items that were validated by Ali and Green (2007). All three items were originally developed and validated based on a study conducted by Chan and Ho (2000).
– To measure ethics or culture of compliance (ETHICULT), three items from Trevino et al. (1999) were adapted to the context of IT governance.
– Corporate communication systems (CORPSYS) was measured using three items adapted from Weill and Ross (2004).
– IT Intensity (ITINTENT) was measured using an approach similar to that of Clarkson et al. (2003). A factor analysis was performed in order to explore the four characteristic items, based on ratios derived from respondent's responses (i.e., total of personal computers (PCs)/total employment, total IT employee/total employment, total annual IT budget/total IT employment, and total annual IT budget/total employment). The result of the factor analysis was a single composite measurement of the variable as a proxy of IT intensity.

4.2 Reliability of the measures

Based on the data from pilot testing of the survey instrument, Table 1 below shows that the reliability

Table 1 Variable characteristics

Variables	Reliability*
Overall effectiveness of IT governance	0.9815
IT strategy committee	0.9305
IT steering committee	0.8793
Involvement of top management in IT	0.9312
Corporate performance measurement system	0.9261
Ethics/Culture of compliance	0.9366
Corporate communication systems	0.9618
IT Intensity	Not applicable

*Reliability measure is Cronbach's Alpha

estimates (Cronbach's alpha) of the measures of the planned variables are well above acceptable thresholds.

5 Results and discussion

5.1 Response rate

Email invitations to participate in the web-based survey were sent out to 1,116 members of ISACA throughout Australia in 2005. The total of completed and usable responses was 176, thus the response rate for this survey is 15.77%. This response rate is relatively high compared with previous similar studies (Ali and Green 2007; Sohal and Ng, 1998). As not all organizations in this study have been outsourcing their IT functions, the 176 cases were filtered by removing the non-outsourcing organizations, thus the valid number of cases for the analysis was 110.

5.2 Sample characteristics

In regard to the audit background of the respondents, the present study reveals that there are 76 internal auditors

Table 2 Sample characteristics

	Frequency	Percentage
A. Audit background (n=110)		
Internal auditor	76	69%
External auditor	34	31%
B. IS Auditor	139	79%
C. Qualified CISA (certified information systems auditor)	86	49%
Experience and Familiarity*	**Mean**	**Std. Dev.**
D. Audit experience (years)	9.30	7.46
E. IS Audit experience (years)	7.85	6.21
F. Familiarity with IT Governance	5.69	1.23

*On a 7–point Likert scale: (1=Not at All; 7=a Great Extent)

(69%) and 34 external auditors (30.7%). The data indicates that 79% (of which 86 of them are CISA qualified) of the current study's respondents identified themselves as IS auditors. The mean audit experience is 9.30 years with the IS audit experience 7.85 years. The familiarity with IT governance implementation (or concepts), reported in this study result is moderately high with value of 5.69 (on a 7-point scale).

In Panel A of Table 3, the sample data covered a range of industry types. Sixty-three percent (110/176) of the respondents' organizations reported that their organizations were outsourcing their IT functions and 37 percent (66/176) were not.

Panel B of Table 3 shows that 44 percent (78/176) of the organizations had annual IT budgets more than $10 million, while Table 4 shows that almost 60 percent (65/110) of the organizations that reported outsourcing of their IT had values of IT outsourcing less than 25 percent of their annual IT budget.

5.3 Data examination

The structural equation modeling technique (SEM) was used to test hypotheses proposed in the model. Hair et al (1998, p.604) state that "...more typical is a minimum ratio of at least five respondents for each estimated parameter, with a ratio of 10 respondents per parameter considered most appropriate". Given the sample size of this study 110, with 20 parameters, the ratio exceeds the minimum requirement of model size in SEM. In designing the modeling strategy, this study used confirmatory modeling in which there was only a single model proposed for testing the hypotheses[7].

5.3.1 Overall model fit

Prior to evaluating a structural model, the overall fit of the model has to be assessed to ensure that it is a sufficient representation of the entire set of causal relationships (Hair et al., 1998). Hence, this study examined the absolute fit measures, the incremental fit measures, and the parsimonious fit measures using AMOS.

Absolute fit measures The chi-square value for this study model is 2.759 with 6 degrees of freedom, returning a probability value of 0.838 (See Table 5, Panel A). Since the probability value of the chi-square test is far greater than

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[7] This type of strategy is the most direct application of SEM. However, as there are no competing models examined in this approach, "if the proposed model has acceptable fit by whatever criteria are applied, the researcher has not 'proved' the proposed model but only confirmed that it is one of several possible models." (Hair et al., 1998, pp.590-591).

Table 3 Organizational characteristics

Panel A. Industry Type and IT Outsourcing (N= 176)

Industry Type	IT Outsourcing		Total
	Yes	No	
Finance, Banking, and Insurance	21	11	32
Chartered Firm/Management Consulting	14	9	23
Education	3	5	8
Energy and Mining	6	1	7
Food and Household	3	1	4
Government Agencies	31	15	46
Health Care and Biotechnology	2	1	3
IT Consulting Services	12	14	26
Manufacturing & Processing	7	1	8
Retail	1	1	2
Transportation, Communication, and Utilities	6	4	10
Tourisms & Leisure	4	2	7
Total (%)	110	65	176

Panel B. Annual IT Budget and IT Outsourcing

Industry Type	IT Outsourcing		Total
	Yes	No	
Less than $200 K	8	8	16
$200 K - $1 million	11	13	24
$1 million - $5 million	18	17	35
$5 million - $10 million	15	8	23
More than $10 million	58	19	78
Total (%)	110	65	176

the .05 level, this study fails to reject the null hypothesis that the model fits the data, or in other words suggests that the model fits the observed data. The GFI has a value of 0.994 which is above the required threshold. Finally, the RMSR value of 0.07 is deemed acceptable, given the rather strong correlations in the original correlation matrix (Hair et al., 1998). All of the absolute fit measures indicate that the model is a reasonably acceptable fit to the data.

Incremental Fit Measures (AGFI, Tucker-Lewis index, and NFI) All of the three incremental fit measures exceeded the

recommended level of 0.90 (See Table 5 Panel B), that is considered to be indicative of good model fit. (Hair et al., 1998; Bentler & Bonnet, 1980)

Parsimonious fit measures The AGFI value of 0.959 is well above the minimum recommended level of 0.90. (See Table 5 Panel B). In summary, the three types of overall measure of model goodness-of-fit provide sufficient support for the overall model proposed in this study.

Table 4 Panel C. IT outsourcing percentage

IT Outsourcing as a percentage of Annual IT Budget	N
Less than 10%	35
10% – 25%	30
25% – 50%	24
50% –75%	15
Greater than 75%	6
Total	110

Table 5 Overall model fit

Panel A. Absolute fit measures	Model values
Chi-square (χ^2)	$\chi^2=2.759$; df=6;P=0.838
Goodness-of-fit Index (GFI)	0.994
Root Mean Squared Residual (RMSR)	0.070
Panel B. Incremental fit measures	**Model values**
Tucker-Lewis Index (TLI)	1.043
Normed Fit Index (NFI)	0.994
Comparative Fit Index (CFI)	1
Adjusted Goodness-of-fit Index (AGFI)	0.959

5.4 Structural model fit

The direct influence of IT strategy committee on the overall effectiveness of IT governance (H1) was positive (See Table 6 below). However, the ρ value was not significant at the 0.05 level. The IT Governance Institute advances some possible explanations for this finding. For example, the boards are not as familiar with technical issues as they are in other aspects of the business, or that there is a lack of awareness of the importance of IT due to the low criticality of IT in their organization (i.e., the organization is outsourcing its IT functions), and/or, that the boards may not want to challenge the authority of the chief executive officer (CEO) and chief information officer (CIO) (IT Governance Institute, 2003b).

Similarly, the direct influence of the IT steering committee was positive, but again not significant at the 0.05 level. Thus, Hypothesis 2 that proposes the existence of the IT steering committee is directly positively correlated with the overall effectiveness of IT governance could not be supported. This finding is inconsistent with previous studies (Vaswani, 2003; Karimi et al. 2000) that found the IT steering committee positively influenced the level of IT governance. A possible explanation for this finding is perhaps that the organizations in this study do not consider IT as a critical factor for their organizations' business success and/or IT is not the core competitive process for their organizations. Thus, they do not consider they need to establish an IT steering committee in their organizations. It should be noted that organizations included in the model are organizations that have been outsourcing their IT functions to external parties. Furthermore, another possible explanation may be the relatively small size of the sample data. While the sample size of this study exceeded the minimum requirement for SEM analysis, it still did not reach the preferred ratio (10 respondents per parameter is considered the most desirable ratio, Hair et al., 1998).

The involvement of senior management in IT had a significant and positive effect on the perceived overall effectiveness of IT governance, which suggests support for Hypothesis 3. This finding is consistent with previous studies by Vaswani (2003), Cerpa and Verner (1998), Earl (1993) and Sohal and Fitzpatrick (2002).

The direct influence of corporate performance measurement systems on effective IT governance was significant, however the predicted sign was negative which was opposite to that hypothesized. This finding was possibly due to the mixed perceptions of the respondents in this study to the type of corporate performance measurement systems used in their organizations. The previous study by Vaswani (2003) only used the balanced IT scorecard as a proxy for corporate performance measurement system, whereas the present study used other measurement systems (including the balanced IT scorecard) such as project tracking systems and IT charge-back systems (e.g., Weill and Ross, 2004).

Ethic or culture of compliance in IT had a significant and positive influence on the overall effectiveness of IT governance. This result suggested support for Hypothesis 5 that the existence of ethic or culture of compliance in IT leads to a perception of an overall effective level of IT governance. The unstandardised coefficient for the variable was 0.401, the second largest of all the variables.

Furthermore, corporate communication systems was also found to be positive and significant in effect. This result supported Hypothesis 6 that the existence of a corporate communication mechanism relates positively to the overall effectiveness of IT governance. The unstandardised coefficient for the variable was 0.437 which was the largest score among other variables — contributing the most toward the overall effectiveness of IT governance — followed by the ethic or culture of compliance in IT variable.

The results of the analysis provide no support for Hypothesis 7a that proposes that IT intensity is a positive

Table 6 Regression weights of variables (AMOS results)

Dependent variable		Independe-nt Variable	Sign	Estimate	Standard Error	C.R	P
EFFECT	H1	STRACOM	+	0.021	0.059	0.353	0.724
	H2	STERCOM	+	0.033	0.072	0.461	0.645
	H3	INVOLVE	+	0.193	0.086	2.254	0.024*
	H4	CORPSYS	+	-0.192	0.085	-2.252	0.024*
	H5	ETICHUL	+	0.401	0.088	4.572	0.000**
	H6	COMSYS	+	0.437	0.079	5.497	0.000**
	H7a	ITINTEN	+	-0.035	0.069	-0.515	0.607
ITOUTS	H7b	ITINTEN	-	-1.625	1.979	-0.821	0.412
	H8	EFFECT	-	-0.445	1.605	-0.277	0.782

* Significant at the 0.05 level

** Significant at the 0.001 level

influence on the effectiveness of IT governance. Moreover, the result reveals that the variable has a negative sign. This finding is not consistent with prior results by Starre and de Jong (1998) and Sohal and Fitzpatrick (2002). Perhaps, given the industries from which the study's responses came e.g., banking, energy, government, once you have an IT environment (irrespective of the complexity or intensity), respondents realize that a certain level of effective IT governance is required. In other words, it is commonly accepted across the respondents that, irrespective of the level of IT intensity of their organization, they must establish a level of effective IT governance.

Similarly, the direct influence of IT intensity on IT outsourcing decisions (H7b) was not significant despite being consistent in sign with the hypothesized direction. A possible explanation for this result is that IT outsourcing might have been perceived as a commonly accepted strategy in the contemporary business environment regardless of the level of IT intensity within organizations. As IT requirements for business purposes become more complex, organization's resources may not be able to provide the complex requirements. The banking industry is a good example of this phenomenon. The banking industry heavily relies on IT for implementation of its business processes, which means higher IT intensity. Yet, IT outsourcing practices are commonly found across banking organizations of varying size and intensity in the banking industry (Knapp et al. 2007). The non-significant result may also be due to the potential imprecision of the proxy this study used for measuring the IT intensity variable. These potential explanations need to be investigated in further research.[8]

Finally, a similar result was also found for the direct impact of the overall level of IT governance on the level of IT outsourcing decisions in which the coefficient was not significant even though the sign was consistent with the hypothesized direction. According to Peterson (2004a), IT governance encompasses not only IT governance mechanisms but also IT structure and IT process. The non significant results may be due to incomplete picture of effective IT governance measurement used in this study as this study only focused on IT governance mechanisms. This result may also due to the proxy measures used for the level of IT outsourcing decisions.

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[8] In this study, researchers used a similar approach for measuring the level of IT outsourcing. There are five levels of IT outsourcing decisions with certain range values on each level and respondents were asked in what range their organizations' IT outsourcings values fell in. This approach was used as it was impractical and almost impossible to ask respondents to give an accurate value of their IT outsourcing decisions. To facilitate the empirical analysis, this study used the mid-point for each respondent answer related to the IT outsourcing question as a proxy for IT outsourcing decisions.

The path analytic model that summarized the study results of the model is depicted in Fig. 2. The dotted lines represent non-significant paths.

## 6 Summary, contribution, limitation and recommendation future study

This study sought to examine empirically the individual IT governance mechanisms that influence the overall effectiveness of IT governance. This study provided empirical evidence about the impact of effectiveness of IT governance in an organization on its level of IT outsourcing decisions.

This study advances our understanding of the roles of IT governance mechanisms and their impact on the overall effectiveness of IT governance. In particular, this study found robust empirical support that (1) the existence of ethics and a culture of compliance in IT is positively correlated with the overall effectiveness of IT governance; (2) the existence of corporate communication systems support greatly enhances the overall effectiveness of IT governance; (3) involvement of senior management on a regular basis is crucial to high levels of effective IT governance; and (4) a corporate performance measurement system significantly impacts the level of effective IT governance however this impact may be negative if the measurement system is not used appropriately.

Moreover organizations that outsourced their IT functions, two IT governance mechanisms (IT strategy committee and IT steering committee) were found not to be correlated with the overall effectiveness of IT governance. This finding may imply that the organizations that outsourced their IT functions deemed IT to be a non-critical factor (i.e., a low IT intensity) in their business success.

This study has some limitations that should be considered when interpreting its findings. The limitations also serve as references for performing future research. First, this study used a proxy for measuring IT intensity factor within each organization. that the approach used of asking respondents to give values of the four items (total PCs, total employment, total IT employment and the last year's IT budget) has difficulties. Future research should focus on establishing a more appropriate means of measuring the IT intensity factor. The approach used by Dehning et al. (2003) that asked some experts in IT to classify IT intensity level for certain types of industry may result in a more reliable approach to a proxy for the IT intensity variable.

Second, a similar limitation applies in relation to IT outsourcing decisions. This study asked respondents to choose one out of five levels of IT outsourcing value options that best represented the level of IT outsourcing

Fig. 2 Path-analytic model
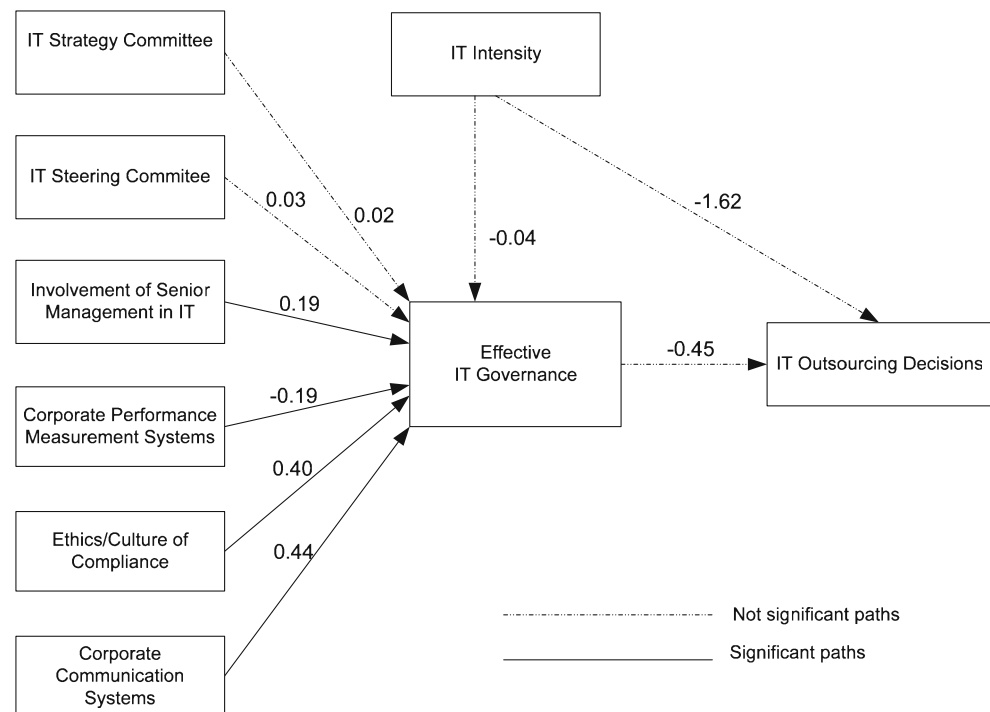
value for their organizations. Each level has a certain range of value (e.g., less than 10% of last year's IT budget, and so on). To facilitate the empirical analysis, this study used a mid-point of the level that each respondent answered as a proxy for IT outsourcing decisions. Accordingly, any future study should address this issue by establishing a more appropriate approach.

Third, more reliable measures of the overall effectiveness of IT governance in an organization also need to be developed because subjective and indirect measures (based on auditor's perceptions) do not provide the same strength as direct objective measures. This limitation was similar to that of an earlier study (Vaswani, 2003) and was deemed unavoidable, as the type of research methodology used was a perceptual questionnaire approach.

Four, there are some issues of structural equation modeling design that may have limited the external validity of the results such as the limited sample size for the model and the usage of a confirmatory model strategy instead of other strategies (e.g., a competing models strategy). Further analysis using a competing models strategy may provide a richer and better understanding of the structural relationships of the existing variables in the model.

Finally, as IT governance is complex and dynamic in nature, consisting of a set of interdependent subsystems (a mix of structures, process and relational mechanisms) that work together as a whole (Peterson 2004b; Sambamurthy and Zmud, 1999; Weill and Ross, 2004), the existence of the IT governance mechanisms does not necessarily

guarantee that effective IT governance can be attained within the organization. Later researchers need to study other requirements (i.e., structures and process) that support effective IT governance and its relation with IT governance mechanisms.

Appendix A

Variable, questions and source of constructs in the study (continue)

QUESTIONS

Perceived overall effective IT governance

■ To what extent do you agree with the following: The current individual IT governance mechanisms within my organization's IT environment has a large, positive impact on the overall level of effective IT governance within the organization.

■ To what extent do you agree with the following: The current individual IT governance mechanisms within my organization are an important and valuable aid to implementing overall effective IT governance within the organization

IT outsourcing Decisions

What is the percentage of the outsourcing contracts to the annual IT budget?

- Less than 10%

- 10% – 25%

- 25% – 50%

- 50% –75%

- Greater than 75%

IT strategy committee

- To what extent does IT strategy committee provide strategic direction and the alignment of IT and the business issue?
- To what extent does IT strategy committee provide direction for sourcing and use of IT resources, skills and infrastructure to meet the strategic objectives?
- To what extent does IT strategy committee provides direction to management relative to IT strategy?

IT steering committee

- To what extent does IT steering committee provide strategic direction to IT project that are in line with the strategic directions of the organization?
- To what extent does the IT steering committee provide a mechanism for coordinating IT practices?
- To what extent does the IT steering committee provide leadership in deriving benefits from IT?
- To what extent does the IT steering committee provide leadership in managing IT?

Involvement of top management in IT

- To what extent does top management get involved in strategic matters related to the use of IT within the organization, outside of the IT steering committee?
- To what extent is top management knowledgeable about IT opportunities and possibilities for the organization?
- To what extent is top management knowledgeable about IT innovations that have been developed by major competitors?

Corporate performance measurement system

- To what extent does your organization's corporate performance measurement system measure the degree to which the organization's IT strategy supports the business strategy?
- To what extent does your organization's corporate performance measurement system produce a concise model to assist managers in tracking the organization's progress?
- To what extent does your organization's corporate performance measurement system provide management with control measures on IT expenses?

Ethics/culture of compliance

- To what extent does your organization's ethics/culture of compliance enables to achieve objectives in IT?
- To what extent does your organization's ethics/culture of compliance enables to circumvent any violation that could hinder organization to achieve its IT objectives?
- To what extent does top management provides leadership in ethics/culture of compliance related with IT objectives?

IT Intensity

- What is the total number of personal computers (PCs) in your organization (or client organization)? Please Select
- Less than 50
- 51 – 100
- 101 – 500
- 501 – 1000
- 1001 – 2000
- 2001 – 3000
- 3001 – 4000
- 4001 – 5000
- More than 5000
- What was your organization's client's organization) annual IT budget

for the previous fiscal year? Please Select

- Less than $200 K
- 200 K – $1 million
- 1 million - $5 million
- $5 million - $10 million
- More than $10 million
- What is the total number of employees in your organization (or client organization)? Please

Select

- Less than 50
- 51 – 100
- 101 – 500
- 501 – 1000
- 1001 – 2000
- 2001 – 3000
- 3001 – 4000
- 4001 – 5000
- More than 5000
- What is the total number of employees providing information technology (IT) services in your organization (or client organization)? Please Select
- Less than 50
- 50 – 100
- 101 – 500
- 501 – 1000
- More than 1000

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