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# **The Role of Boards in Reviewing Information Technology Governance (ITG) as part of organizational control environment assessments**

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## **Abstract**

IT Governance (ITG) is an important topic as US companies must now monitor ITG under the provisions of the Sarbanes-Oxley Act (2002) (Hoffmann, 2003). Trites (2003) indicates that directors are responsible for strategic planning, internal control structures and business risk. The control environment is defined in Australian Auditing Standard AUS 402 to mean “the overall attitude, awareness and actions of management regarding internal control and its importance to the entity”.

This paper contributes to the knowledge of ITG by forming an integrated ITG Literature (IIL) which links prior research to four key dimensions of ITG. The paper presents a review of literature on ITG performance measurement systems which assess the ability of organizations to achieve these four ITG dimensions. A revised ITG Dimensions Model offered for consideration. The final contribution of the paper is to propose critical issues Boards should consider as part of their assessment of organizational control environments.

**Key Words:** IT Governance; Internal Control Environment; Boards; IT Governance Dimensions.

## **1. INTRODUCTION**

ITG is a very important topic at present, especially in light of the requirement that US companies must monitor ITG as part of their compliance with the provisions of the Sarbanes-Oxley Act (2002) (Hoffmann, 2003). Similar responsibilities are likely to fall on Australian organizations in the near future. As IT becomes more critical to an organisation's success and IT-related decision making becomes more complex, Boards are realizing that ITG processes are becoming a necessity (Broadbent, 2003). There has been a paucity of research which has focused the Board's role with regard to ITG processes.

This paper contributes to the knowledge of ITG by drawing together prior research to form an Integrated ITG Literature (IIL) regarding the four ITG dimensions. The paper also presents a detailed review of the literature on ITG performance measurement systems. Performance measurement was presented as a fifth dimension by Hardy (2003), however it can be argued that performance measurement is not really a dimension in its own right but a measurement process which is important to the four key dimensions. This paper presents a revised ITG Dimension Model incorporating the need for an overarching measurement process which is separate from the other dimensions. Finally, the paper contributes to our understanding of the relationship between ITG dimensions and Board assessments of the organisational control environments.

Section 2 of the paper will discuss governance concepts and ITG in particular. Section 3 will develop the IIL around the four key dimensions of ITG. Section 4 focuses on Boards' governance responsibilities and Section 5 indicates how governance theories provide theoretical support for Board review of ITG. Section 6 will propose a set of critical issues developed from the IIL for use by Boards in reviewing ITG as part of organizational control environment assessments and Section 7 will present a conclusion to the paper.

## **2. WHAT IS IT GOVERNANCE?**

Governance literature indicates that organizational governance processes encompass three main areas (corporate governance, ITG and enterprise governance). Researchers report these areas to be inextricably linked. Corporate and ITG are said to be key sub-components of enterprise governance (Boudariat, 2001, Hamaker & Hutton, 2003, Korac-Kakabadse & Kakabadse, 2001).

Enterprise Governance has been described as "the set of responsibilities and practices exercised by the Board and executive management with the goal of providing strategic direction, ensuring that objectives are achieved, ascertaining that risks are managed appropriately and verifying that the enterprise's resources are used responsibly" (ITGI, 2001, p.6).

Corporate Governance has been defined as "the ethical corporate behaviour by directors or others charged with governance in the creation and preservation of wealth of all stakeholders" (Roussey, 2003). The Australian Stock Exchange Corporate Governance Council (ASX Corporate Governance Council, 2003, p.6) considers corporate governance to be "the systems by which companies are directed and managed. It influences how the objectives of the company are set and achieved, how risk is monitored and assessed, and how performance is optimized."

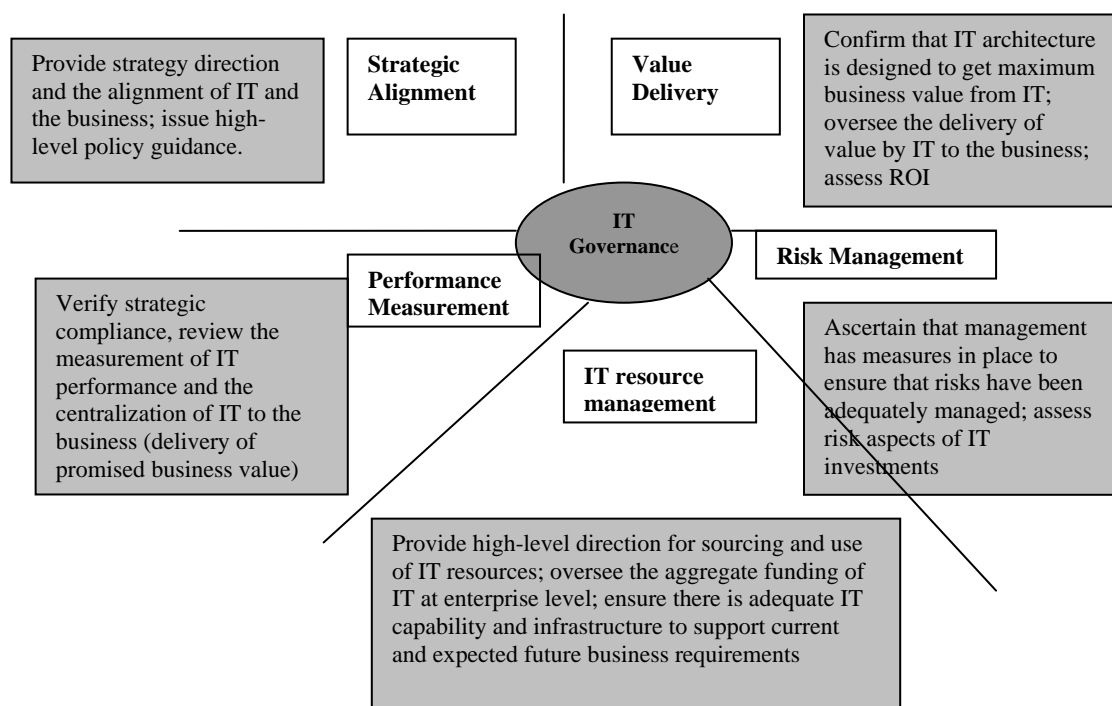
ITG has been defined by the ITGI as "the management process which ensures delivery of the expected benefits of IT in a controlled way to enhance the long-term, sustainable success of the enterprise" (ITGI, 2000, p.27). Broadbent (2003, p.13) indicates that "ITG is about assigning decision rights and creating an accountability framework that encourages desirable behaviour in the use of IT".

ITG is considered important because it enables an organization to effectively address major business issues, to protect its strategic information systems, and to manage its significant investment in IT including systems and networks. The ITGI (2001, p.9) indicates that “ITG is the responsibility of the Board of directors and executive management. It is an integral part of enterprise governance and consists of leadership and organizational structures and processes that ensure that the organisation’s IT sustains and extends the organisation’s strategies and objectives.

### 3. DEVELOPMENT OF AN INTEGRATED ITG LITERATURE (IIL)

Hardy (2003) proposed that ITG is comprised of five key dimensions (see Figure 1).

**Figure 1 Dimensions of IT Governance**



**Source: Hardy (2003)**

The dimensions identified were strategic alignment, value delivery, IT resource management, risk management and performance measurement. This section of the paper will relate research from a variety of disciplines to these dimensions to form an Integrated ITG Literature (IIL).

#### 3.1. Strategic Alignment Dimension

Strategic alignment (SA) is concerned with “whether a firm’s investment in IT is in harmony with its strategic objects (intent, current strategy and enterprise goals) and thus building the capabilities necessary to delivery business value” (ITGI, 2001). SA ensures that the organisation will be more likely to use its IT resources to achieve its business objectives in an efficient and effective manner and work towards common business goals.

One of the key developments in this body of literature is the Henderson & Venkatraman (1991) Strategic Alignment Model (SAM). This model proposes six key components of BIT alignment (Business & IT Strategy; Organisational & IT Infrastructure and Processes; and

Internal & External Strategic Fit) and outlines the important interactions between these components. The model has been discussed in a series of other SA papers (Henderson & Venkatraman, 1993, 1999, Henderson & Thomas, 1992, Venkatraman et al., 1993). The model has been extended to form the Strategic Alignment Framework (SAF) of Luftman et al. (1993) and was empirically tested using surveys & interviews in Burn & Szeto (1999). Burn & Szeto (1999) found there were no significant differences in perspectives of IT and business managers on what factors contribute to successful strategic alignment. Sauer & Yetton (1997) expanded the SAM model by developing a lead-lag model and Weil & Broadbent (1998) built a theory based on SAM which recommended how IT infrastructure investments should be made to support BIT alignment (reported in Scamzny, 2001). Maes (1999) enhanced SAM by developing a Unified Framework that incorporated additional functional and strategic layers to include information and communication issues (reported in Avison et al., 2004) whilst Avison et al. (2004) tested the SAM model and developed a practical framework for managers to determine current alignment and to control future alignment.

Scamzny (2001) considered that due to major market changes SAM was no longer sufficient to assist companies with understanding and assessment of BIT alignment and proposed that the concept of fusion between business and IT strategies should be the new way of aligning BIT. Bergeron et al. (2003) tested the impact of fit between the four domains identified in SAM on firm performance. The study found that conflictual co alignment patterns of business strategy, business structure, IT strategy and IT structure will lower performance. Luftman (2003) expanded the idea of strategic alignment by developing the Strategic Alignment Maturity Assessment Tool. The primary objective of this tool is to identify specific recommendations for improving BIT alignment. The tool uses 6 BIT alignment criteria or maturity categories for assessment and is similar to the maturity ratings used in the COBIT framework.

The empirical study of Broadbent & Weill (1993) identified organisational processes that contribute to and enhance BIT alignment. Luftman et al. (1999) added considerable value to this area of research by identifying the key enablers and inhibitors to BIT alignment. The key enablers are senior executive support for IT, IT involvement in strategy development and IT understanding and working in partnership with business. Dousa et al. (2004) consider that viewing the IT department as a partner not as a subordinate is important when planning the future direction of the organization. Broadbent (2003) in conjunction with the Gartner group have developed a matrix which uses governance styles and decision dimensions to get a clear picture of an organisation's ITG arrangements. More recently, Coughlan et al. (2005) has studied BIT alignment from a communication based view using interviews with mid-high management to identify key issues that inhibit alignment. The study found that BIT sections of an organization must work and communicate with each other in partnership to be successful.

BIT alignment is a key component of ITG as having BIT focusing on important business objectives is imperative to the successful management of and value delivery from organizational IT systems. Understanding the key research findings associated with this dimension assists the Board to improve BIT alignment and thus overall ITG processes.

### **3.2. Value Delivery Dimension**

IT value delivery is defined as “delivery on time, within budget and with the benefits that were promised. In business terms, this often translates into: competitive advantage, elapsed time for order/service fulfillment, customer satisfaction, customer wait time, employee productivity and profitability” (ITGI, 2001, p.24). This critical component of ITG processes aims to confirm that IT architecture is designed to get maximum business value from IT, oversee the delivery of value by IT to business and assess return on investment.

Karimia et al. (2000) examined the impact of IT steering committees on the management of IT functions. This study considered the level of sophistication of IT management involved in an organisation's long-term IT strategic planning and found that increased IT management sophistication was positively related to better value delivery from IT. Doughty (2000) developed a method of determining the effectiveness of IT steering committees and thus increase IT value delivery. The level of influence by the Board or senior management was also considered important to IT value delivery. Young & Jordan (2003) found that where senior management committed time to participate in the IT project, the project was more likely to be successful and provide increased IT delivery value to the organization. McKay et al. (2003) established a model to broaden considerations of the value of IT.

Davern et al. (2000) expanded on the work on value of IT systems and presented a theoretical framework of the enablers of potential value whilst Sircar et al (2000) extended the work on assessing the impact of IT on firm performance by developing a framework which shows the relationship between firm performance and IT investments. Ryan & Harrison (2000) identified some of seldom-considered costs and benefits of IT investment decisions in order to improve the traditional IT valuation methods proposed to this point and Chan (2000) investigated the possible trends in IT value measurement over the prior decade and found that most articles in that period focused on organizational measures of IT value. Tallon et al. (2000) developed a process-oriented model to assess the impacts of IT on critical business activities in order to evaluate the intangible impacts of IT. All these studies add to the understanding of IT value delivery from quite diverse perspectives.

Research on value delivery assists the board to understand the key issues which drive this dimension of ITG. With the increased focus by shareholders on value delivery from all aspects of the organization, the issues raised in the research findings from this key ITG domain will further assist Board understanding of ITG processes.

### **3.3. IT Resource Management Dimension**

IT resource management is concerned with the management of IT resources and the organisation of IT infrastructures within a corporation. This critical dimension of ITG processes aims to provide high level direction for sourcing and use of IT resources, to oversee the aggregate funding of IT at the enterprise level and to ensure that there is adequate IT capability and infrastructure to support current and expected future business requirements (Hardy, 2003).

Much of the research on IT resource management has focused on the structure of organisations in terms of IT decision making processes (Hamaker & Hutton, 2003, Peterson et al., 2000, Sundaramurthy & Lewis, 2003, Sambamurthy & Zmud, 1999). These studies identified primary IT resource management structures to be centralized, decentralized, federal and hybrid. Peterson et al. (2000) & Peterson (2001) focused on hybrid IT resource management models and found that no matter how IT divisions were organized and made decisions, one of the most important issues for good IT governance was good coordination of IT resources. Schwarz & Hirschheim (2003) extended the knowledge of prior studies on IT division structure and found that organisations need to focus on two-way relationship-oriented approach to optimally manage organizational IT resources and thus contribute to good ITG.

Hamaker (2000) proposed that producing a regular inventory of IT resources assists with better management of IT resources. Ribbers et al. (2002) considered contemporary IT resource management theories regarding the process mechanisms of ITG. Broadbent (2003) identified that ITG was about assigning decision rights about how ITG resources are to be managed, who has input to these decisions and who controls the decision-making process.

Another important aspect of this dimension of ITG research is the issue of project management. Management of new IT projects must be properly governed as these projects have considerable impact on the financial position and strategic direction of the organization. With the large percentage of projects currently reported as being over budget or out of control governance of IT resource management has become a critical concern for many organizations (Saryup, 2003). Research on IT resource management allows the Board to have a better understanding of the issues associated with managing new and existing IT resources and to determine the ITG processes needed to overcome these problems.

### **3.4. Risk Management Dimension**

Risk management activities for Boards have become increasingly important in this era of increased litigation. Trites (2003) indicates that risk management is one of three key Board responsibilities. Business organisations have traditionally focused on financial risk, but have more recently become concerned with operational and systematic risk due to pressure from regulators and other governance bodies. Technology risk and information security issues form a prominent part of operational and systematic risk considerations (ITGI, 2001).

As business organisations become increasingly dependent on IT systems, the quality of information produced by these systems and the reliability of service of these systems to stakeholder groups significantly impact IT risks. To protect stakeholder groups, to provide quality information and to protect Board directors from personal litigation, it is important for the Board to focus on risk management as one of its key ITG processes.

SAS Institute (2004) conducted an international survey on operational risk management in the financial services industry and found that “nearly one-fifth of respondents say their firms do not have an operational risk program” and “respondents still identify IT and systems failure as the biggest sources of operational risk”. The survey also identified that “one third of respondents reported operational risk losses in excess of \$20 million per year”. Mir & Nicholson (2004) identify that “the strategic and financial risks in undertaking major transactions can be reduced to a significant extent by disciplined processes and planning”. This planning needs to be conducted by the Board to ensure the right level of focus is given to risk management processes. Levine (2000) indicated that regulatory and commercial pressures are forcing organizations to spend more on technology to manage risks.

Despite the fact that risk management has been identified as a critical component of Board ITG processes, there has been little research which has focused on this issue. There are however a number of risk management frameworks (COSO for example) which have been recently developed to assist Boards to assess the risks associated with organizational IT resources.

Risk management is important where stakeholders and competition increases the risk of litigation on the issue of IT systems. Shareholders expectations of the reliability, confidentiality and accuracy of organizational IT systems are very high. Risk management in an organisation must be concerned with potential losses from litigation, IT resource damage, loss of confidence in the organisation and potential loss of shareholder value. IT security is a high risk area for most corporations where regular attempts at unauthorized intrusions occur on IT systems. Research on this dimension of ITG assists the Board to fulfill one of its key responsibilities and to better manage the risks associated with organizational IT resources.

### **3.5. Performance Measurement and ITG**

Performance measurement is concerned with determining whether IT systems have achieved the goals set for them by the Board and senior management. These measurement systems aim to assess the ability of organizations to achieve the four dimensions of ITG.

Much of the research in this area focuses on the development and testing of the IT balanced scorecard and links to the corporate balanced scorecard. A number of studies have developed a cascade of scorecards that can be used to measure IT system processes (Japanese Information Development Corporation, 2000, Van Grembergen, 2000, Van Grembergen & Amelinckx, 2001, Van Grembergen et al 2003, Van Grembergen et al., 2003). These studies assist in the development of future performance measures of four key dimensions of ITG.

The ITGI has also developed the COBIT framework (Control objectives for Information and Related Technology) in conjunction with the Information Systems and Control Foundation to provide good practice guidelines and measurement techniques for control over information, IT and related risks. The processes identified by COBIT are operational level measures of ITG processes and are grouped under planning and organisation, delivery and support, acquisition and implementation and monitoring (ITGI & ISCF, 2000).

There have been a number of brief studies on the implementation of the COBIT framework which have examined the implementation problems associated with this management framework (Tyler, 2000, Wiederkehr, 2000) and also on the use of the COBIT maturity model to assess the level of ITG processes being used in a corporation (Guldentops, 2003, Guldentops et al., 2002; Pederiva, 2003). A further area of research has focused on the acceptance of COBIT as a management tool for use with ITG (Guldentops, 2002, Legrenzi, 2003).

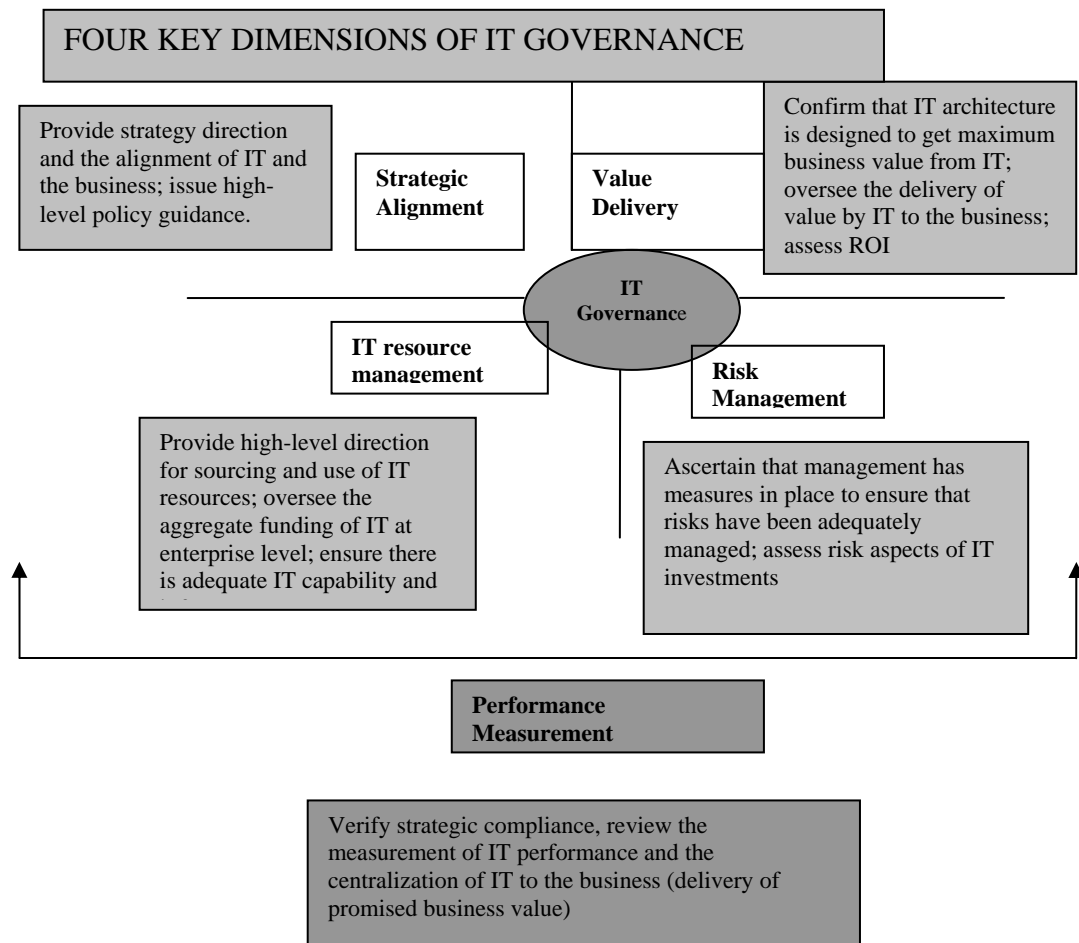
Understanding the different measurement systems which may be applied to the review of ITG assists the Board to identify how to monitor ITG processes to ensure management is taking responsibility for all four domains of ITG.

### **3.6. Summary**

This section presented a detailed review of literature relevant to the four key dimensions of ITG (strategic alignment, value delivery, IT resource management and risk management). The prior literature on the development of performance measurement systems for reviewing the four key dimensions of ITG was also presented. Drawing together these different aspects of IT prior research to form an IIL supports the need for Board review of ITG. The model by Hardy (2003) see Figure 1 should be revised to remove performance measurement as a dimension of ITG and make it an overarching element of ITG which is relevant to all four ITG dimensions. Figure 2 presents this revised model.



**Figure 2 Revised IT Governance Dimensions Model**



#### 4. BOARDS' GOVERNANCE RESPONSIBILITIES

Boards undertake a number of key roles in strategic level governance processes. Their primary role is to protect the interests of stakeholders. A secondary but important role for the Board is ensuring that quality information is produced by the organization, used in decisions and reported regularly to stakeholders (IT Governance Institute & Information Systems and Control Foundation, 2000). The board is also responsible for governing the organisation and in particular the top management team. The top management team is then responsible for governing the divisions of the organization through various departments (McGinnis et al., 2004).

The Board is responsible for ensuring that the organization has a good control environment. Trites (2003) indicates "that directors' responsibilities include responsibility for strategic plans, internal control structures and business risk". The Board also provides guidance to management, monitors management and corporate performance, ensures organizational compliance with regulatory principles and laws, controls financial reporting and risk management processes, supervises the allocation of financial resources and budgets, deals with crisis situations and conflicts, and ensures that appropriate internal and external communication occurs on important organizational issues (Van den Berghe & De Ridder, 1999).

The Board also expects management to be responsible for initiating and monitoring the operational level governance processes in the organization. The Board must ensure management has performed these tasks and performed them efficiently and effectively. Many Boards pass governance oversight functions down to a sub-committee of the Board, usually the Audit Committee. As the majority of corporate financial systems are IT-dependent, governance processes conducted by the Audit Committee may also include a review of IT systems (DeZoort et al, 2002).

The Board is also responsible for ensuring the control environment in the organization is strong by encouraging all staff within the organization to be focused on internal controls within their daily functions and relaying the importance of a strong control environment to the continued success of the organization.

ITG is considered important in assisting organisations to place reliance on their IT systems and the information produced by these systems (Broadbent, 2003; Lindup, 1996). Boards must also ensure that IT delivers value and enables the organisation's business and IT-related risks to be mitigated. ITG processes have been heavily promoted as the way in which Boards can have increased confidence in their IT systems and their operations (ITGI, 2003a).

Prior literature associated with ITG has focused on the need for IT governance and has given strong support to the inclusion of ITG processes in organizational governance processes. These studies have supported the need for the Board to be active in specifically reviewing ITG processes and has proposed that ITG is needed to manage the ever changing nature of IT systems within business operations (Broadbent, 2003, Cilli, 2003, Guldentops, 2001, Hamaker & Hutton, 2003, Hoffmann, 2003, Huff, 1987).

## **5. THEORETICAL SUPPORT FOR BOARD ESTABLISHMENT AND REVIEW OF ITG**

Agency theory focuses on the contractual relationships between the owners of the corporation i.e. shareholders (principals) and the Board and management (agents). Agency theory also treats the relationship between Board and top management as a principal-agent relationship (McGinnis et al., 2004). Agency theory "argues that cooperative effort within organizations is often plagued by opportunistic behaviour and that incentive systems and control structures can help mitigate problems with such behaviour" (Bhattacharjee, 1998, p.141). Agency costs occur in this relationship when the agent is not acting in the best interests of the owners and instead is involved in self-serving or opportunistic behaviours which may impact negatively on the owner's wealth (Daily & Cannella, 2003, Hillman & Dalziel, 2003, Jensen & Meckling, 1976, Sundaramurthy & Lewis, 2003).

Agency theory takes a control approach aimed at curbing these agency behaviours and reducing agency costs by investing in monitoring processes which track the actions of the board (agents) and their decision making processes (Daily & Cannella, 2003, Eisenhardt, 1989, Hillman & Dalziel, 2003, Jensen & Meckling, 1976, Sundaramurthy & Lewis, 2003). Establishment and review of ITG processes will reduce the agency costs and will provide monitoring information concerning the actions of the Board and senior management to the stakeholders (Daily & Cannella, 2003, Hillman & Dalziel, 2003, Sundaramurthy & Lewis, 2003).

Fama et al (1983) extended the research on agency theory to consider the issue of separation of ownership and control by contending that agency costs are reduced where the ratification and monitoring of decisions (decision control-Board responsibility) is separated from the initiation and implementation of the decisions (decision management-management

responsibility). By reducing agency costs of this type, governance and the organizational control environments are considered to be stronger.

Stakeholder theory adopts the view that in many situations the interests of the board and management converge around management of the business for the benefit of all stakeholders. The organization is viewed as a vehicle for coordinating stakeholders' interests and the directors have a fiduciary relationship to all stakeholders (Deegan, 2002). Monitoring management through IT and corporate governance processes and Board establishment and maintenance of a strong control environment encourage and remind management to act in the best interests of all stakeholders at all times.

Resource dependency theory focuses on the "ability of the organization to effectively identify and network with other organizations" (McGinnis et al., 2004, p.3). This theory considers the issue of Board capital. It focuses on both human capital (Board member experience, expertise and reputation) and relational capital (network of ties to other organisations) (Hillman & Dalziel, 2003). This theory contends that including outside directors with IT expertise on the Board, encourages the Board to establish and review IT governance processes (McGinnis et al., 2004). The inclusion of IT expertise on the Board ensures that IT systems are considered to be a strategic organizational resource and are managed appropriately.

Organisations in their annual reports signal information to owners and stakeholders. Governance disclosures are now required in publicly listed corporation annual reports. Signaling theory indicates that where there is an appropriate incentive to disclose, Boards will signal positive organizational behaviour to stakeholders via the annual report (Toms, 2002). Disclosure of governance processes indicates to stakeholders that the organization is socially responsible and is protecting stakeholder interests by ensuring a sound governance system is in place.

Support from governance theories above for ITG processes assists the notion that ITG should form a key component of the organizational control environment as these processes help the Board to ensure management acts in the best interests of shareholders and signals appropriate behaviour via annual report governance statements.

## **6. ITG AND ORGANISATIONAL CONTROL ENVIRONMENT ASSESSMENTS**

ITG is considered to be an important part of the organisational control environment of 21<sup>st</sup> century corporations. Prior literature and theoretical support for ITG has provided strong motivation for the Board to review ITG as part of the assessment of organisational control environments. To review ITG, the Board should identify a set of critical issues under each of the four ITG dimensions for a sound control environment. Such a set of critical issues developed from ITG research literature is presented in Table 1.

**Table 1 – Board Review of ITG as part of Organisational Control Environment Assessments**

Dimensions of ITG	Issues to be considered by the Board in assessing the Organisational Control Environment
<b>Strategic Alignment</b>	<ul style="list-style-type: none"> <li>• Is the IT strategic plan linked to business strategic plan?</li> <li>• Does the CIO regularly communicate with the CIO and CFO?</li> <li>• Does the organisation have a Business-IT relationship manager?</li> <li>• Is IT a key component in every business initiative and development?</li> <li>• Does the CIO define and communicate the role of IT to the rest of the organisation?</li> <li>• Does IT play a strategic role in achieving business strategies of the organisation?</li> <li>• Are the IT and business divisions functionally integrated?</li> <li>• Does IT management report to the CIO or the Board?</li> <li>• Is senior management supportive of the IT function?</li> <li>• Does the IT division understand and work in partnership with business divisions?</li> </ul>
<b>Value Delivery</b>	<ul style="list-style-type: none"> <li>• Do the CIO &amp; management consider value delivery from IT systems to be important?</li> <li>• Is value delivery part of the IT strategic plan?</li> <li>• How does management aim to deliver value from its IT systems?</li> <li>• Are IT and business divisions well aligned?</li> <li>• Does the IT division regularly meet business division expectations?</li> <li>• Does the organisation have an IT steering committee or IT value models?</li> </ul>
<b>IT Resource Management</b>	<ul style="list-style-type: none"> <li>• Do IT projects have a clear budget and timeline?</li> <li>• Is the organisation centralized, decentralized or hybrid in its IT decision making processes?</li> <li>• Does the organisation take a regular inventory of its IT resources?</li> <li>• Does the organisation link its mission critical functions to its IT systems?</li> <li>• How are IT resources coordinated within the organisation?</li> </ul> <p>Is there a policy for replacement or upgrading of IT resources?</p>
<b>Risk Management</b>	<ul style="list-style-type: none"> <li>• Does the organisation conduct an organisational risk management assessment?</li> <li>• Does the IT division consider the risk associated with its operations on a regular basis?</li> <li>• Does the organisation have a sound IT security framework in place?</li> <li>• Does the organisation have a business continuity plan in place?</li> <li>• Are the security and business continuity processes regularly tested?</li> <li>• Does the organisation have a policy for 3<sup>rd</sup> party contacts?</li> </ul>

## 7. CONCLUSION

This paper has developed an Integrated ITG Literature (IIL) by drawing together research from a variety of disciplines by determining their links to the four dimensions of ITG. The paper developed a revised ITG Dimensions model for consideration which removes performance measurement as a dimension from the Hardy (2003) model and recognizes the need for an overarching measurement process for all four ITG dimensions. The paper also presented the current literature associated with ITG performance measurement systems as part of this review. The final aspect of the paper was to propose the key issues that the Board should consider when reviewing ITG as part of an organisational control environment assessment. All three aspects of the paper make a substantive contribution to research on ITG and its link to Boards and organisational assessments of control. Further research on all four dimensions of ITG will assist Boards' understanding and effective review of ITG as part of organizational control environment assessments.

## 8. REFERENCES

- ASX Corporate Governance Council. (2003, 6/8/03). *Principles of Good Corporate Governance and Best Practice Recommendations*, 2003, from <http://www.shareholder.com/visitors/dynamicdoc/printwindow.cfm?CompanyID=ASX>
- Avison, D., Jones, J., Powell, P., Wilson, D. (2004). Using and validating the strategic alignment model. *Journal of Strategic Information Systems*. Vol.13. pp. 223-246.
- Bergeron, F., Raymond, L., Rivard, S. (2003). Ideal patterns of strategic alignment and business performance. *Information & Management*. Vol. 41. pp1003-1020.
- Bhattacharjee, A. (1998). Managerial Influences on Intraorganizational Information Technology Use: A Principal-Agent Model. *Decision Science*. Vol. 29(1). pp. 139-162.
- Bourdariat, J. (2001). Corporate Governance and ICT: a Marriage of Reason. *Information Systems Control Journal*. Vol., 6. pp. 23-26.
- Broadbent, M. (2003). The right combination. *CIO*. April. pp. 13-14.
- Broadbent, M., Weill, P. (1993). Improving business and information strategy alignment: Learning from the banking industry. *IBM Systems Journal*. Vol. 32(1). pp. 162-179.
- Broadbent, M., Weill, P. (1997). Management by Maxim: How Business and IT Managers can create IT Infrastructures. *MIT Sloan Management Review*. Vol. 38(3). pp. 77-92.
- Bruce, K. (1998). Can you align IT with Business Strategy? *Strategy and Leadership*. Vol. 26(5). pp. 16-21.
- Burn, J.M. & Szeto, C. (1999) A comparison of the views of business and IT management on success factors for strategic alignment *Information & Management*. Vol. 37. pp. 197-216.
- Chan, Y.E. (2000). IT Value: The Great Divide between Qualitative and Quantitative and Individual and Organizational Measures. *Journal of Management Information Systems*. Vol. 16(4). pp. 225-261.
- Cilli, C. (2003). IT Governance: Why a Guideline? *Information Systems Control Journal*. Vol. 3. pp. 22-23.
- Daily, C. M., Cannella, A. A. J. (2003). Corporate Governance: Decades of Dialogue and Data. *Academy of Management Review*. Vol.3. pp. 371-382.
- Davern, M.J. Kauffmann, R.J. (2000). Discovering potential and realizing value from information technology investments. *Journal of Management Information Systems Armonk*. Vol. 16(4). pp. 121-144

- D'Souza, D. Mukherjee, D. (2004). Overcoming the Challenges of Aligning IT with Business. *Information Strategy: The Executive's Journal*. Winter. pp. 23-31.
- Deegan, C. (2002). *Australian Financial Accounting* (Third Ed.). Australia: McGraw-Hill.
- DeZoort, F. T., Hermanson, D. R., Archambeault, D. S., Reed, S. A. (2002). Audit committee Effectiveness: A synthesis of the empirical audit committee literature. *Journal of Accounting Literature*. Vol.21. pp. 38-75.
- Doughty, K. (2000). *The Myth or Reality of Information Technology Steering Committees*, from [www.isaca.org/art3a.htm](http://www.isaca.org/art3a.htm)
- Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*. Vol. 4. pp57-74.
- Fama, E. F., Jensen, M. C. (1983). Separation of Ownership and Control. *Journal of Law and Economics*. Vol. 26. pp.1-32.
- Gable, G. G. (1994). Integrating case study and survey research methods: an example in information systems. *European Journal of Information System*. Vol. 3(2), pp112-126.
- Gold, R. S. (2002). Enabling the Strategy-focused IT organisation. *Information Systems Control Journal*. Vol. 4. pp. 21-23.
- Guldentops, E. (2001). Asking the right questions for IT governance. *Information Systems Control Journal*. Vol. 4. pp. 13-15.
- Guldentops, E. (2002). COBIT 3rd Edition Usage Survey: Growing acceptance of COBIT. *Information Systems Control Journal*. Vol. 6. pp. 25-26.
- Guldentops, E. (2003). Maturity measurement- first the purpose, then the method. *Information Systems Control Journal*. Vol. 4. pp. 15-16.
- Guldentops, E., Van Grembergen, W., Haes, S. (2002). Control and Maturity Survey: Establishing a reference benchmark and a self-assessment tool. *Information Systems Control Journal*. Vol. 6. pp. 32-35.
- Hamaker, S. (2003). Spotlight on Governance. *Information Systems Control Journal*. Vol. 1. pp. 15.
- Hamaker, S., Hutton, A. (2003). Principles of Governance. *Information Systems Control Journal*. Vol. 3. pp. 44-49.
- Hardy, G. (2003). Coordinating IT Governance - A new Role for IT strategy committees. *Information Systems Control Journal*. Vol. 4. pp. 21-24.
- Henderson, J. C., Thomas, J. B. (1992). Aligning Business and Information Technology Domains: Strategic Planning in Hospitals. *Hospital and Health Services Administration*. Vol. 37(1). pp. 71-82.
- Henderson, J.C., Venkatraman, N. (1991). Understanding Strategic Alignment. *Business Quarterly*. Vol. 55(3). pp. 72-78.
- Henderson, J. C., Venkatraman, N. (1993) (1999). Strategic Alignment: Leveraging Information Technology for transforming organizations. *IBM Systems Journal*. Vol. 32(1). pp. 4-16.
- Hillman, A. J., & Dalziel, T. (2003). Boards of Directors and Firm Performance: Integrating agency and resource dependence perspectives. *Academy of Management Review*. Vol. 3. pp. 383-396.
- Hoffmann, T. (2003, October 25). Sidebar: Guidelines Meld IT Governance, Sarbanes-Oxley Compliance. *Computerworld*, July.
- Huff, S. L. (1987). Information Technology Governance. *Business Quarterly* (March), pp.12-19.
- IT Governance Institute. (2000). *IT governance Portal - IT Governance Roundtable 2*. Retrieved 16/1/01, 2001, from [www.itgi.org](http://www.itgi.org)
- IT Governance Institute. (2001). *Board Briefing on IT Governance*. Retrieved September, 2003, from [www.itgi.org](http://www.itgi.org)
- IT Governance Institute. (2002, 30/9/03). *IT Strategy Committee*, from [www.itgi.org](http://www.itgi.org)
- IT Governance Institute. (2003a, February 2003). *IT Governance Executive Summary*, from [www.itgi.org](http://www.itgi.org)
- IT Governance Institute. (2003b, 16/10/03). *Purpose of IT governance*, from [www.itgi.org](http://www.itgi.org)

- IT Governance Institute, & Information Systems and Control Foundation. (2000). *COBIT Framework* (3rd Edition Ed.). USA: Information Systems Control Foundation.
- Japanese Information Development Corporation. (2000). *Corporate Approaches to IT Governance*, from [www.jipdec.or.jp/chosa/MITIBE](http://www.jipdec.or.jp/chosa/MITIBE)
- Jensen, M. C., Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure. *Journal of Financial Economics*. Vol. 3(4). pp. 305-360.
- Karimia, J., Bhattacharjee, A., Gupta, Y. P., Somers, T. M. (2000). The effects of MIS Steering Committees on Information Technology Management Sophistication. *Journal of Management Information Systems*. Vol. 17(2). pp. 207-230.
- Korac-Kakabadse, N., Kakabadse, A. (2001). IS/IT governance: Need for an Integrated model. *Corporate Governance*. Vol. 1(4). pp. 9-11.
- Legrenzi, C. (2003). The second edition of the European survey on the economic value of information technology: inventory of practices concerning IT governance. *Information Systems Control Journal*. Vol. 3. pp. 50-55.
- Levine, R. (2000). Risk Management Systems: Understanding the Need. *Information Systems Management*. Spring. pp. 31-37.
- Lindup, K. (1996). The role of information security in corporate governance. *Computers & Securit.* Vol. 5(6). pp. 477- 485.
- Luftman, J. N., Lewis, P. R., Oldach, S. H. (1993). Transforming the Enterprise: The alignment of business. *IBM Systems Journal*. Vol. 32(1). pp.198-221.
- Luftman, J. N., Papp, R., Brier, T. (1999). Enablers and Inhibitors of Business-IT alignment. *Communications of the Association for Information Systems*. Vol. 1. (Article 11). pp. 1-32.
- Luftman, J.N. (2003) Assessing IT/Business Alignment *Information Systems Management*. Fall. pp. 9-15.
- McGinnis, S.K., Pumphrey, L.K., Trimmer, K., Wiggins, C. (2004). Sustaining and Extending Organisation Strategy via Information. *Proceedings of the 37<sup>th</sup> Hawaii International Conference on System Sciences*. *IT Governance Minitrack*. Accessed at <http://www.hicss.hawaii.edu>.
- McKay, J., Marshall, P., Smith, L. (2003). *Steps Towards Effective IT Governance: Strategic IT Planning, Evaluation and Benefits Management*. Paper presented at the 7th Pacific Asia Conference on Information Systems, Adelaide, South Australia.
- Mir, S., Nicholson, L. (2004). Facing the Risks: corporate decision making and transactional risk management. *Keeping Good Companies*. pp 204-205.
- Pederiva, A. (2003). The COBIT maturity model in vendor evaluation case. *Information Systems Control Journal*, Vol. 3. pp. 26-29.
- Peterson, R. R., O'Callaghan, R., Ribbers, P. M. A. (2000). *Information Technology Governance by Design: Investigating Hybrid configurations and integration mechanisms*. Paper presented at the International Conference of Information Systems, Brisbane, Queensland, Australia.
- Peterson, R. (2001) Configurations and Coordination for Global Information Technology Governance: Complex Designs in a Transnational European Context. *Proceedings of the 34<sup>th</sup> Annual Hawaii International Conference on System Sciences*. Accessed at <http://www.hicss.hawaii.edu>.
- Roussey, R.S. (2003) Buoying Investor Confidence *Marshall Magazine*. Spring. pp 42-49.
- Ryan, S.D. and Harrison, D.A. (2000). Considering Social Subsystems Costs and Benefits in Information Technology Investment Decisions: A view from the Field on Anticipated Payoffs. *Journal of Management Information Systems*. Vol. 16(4). pp. 11-40.
- SAS Institute (2004). Operational Risk Management in the Financial Services Industry: International benchmark survey conducted by SAS and Risk Magazine June 2004. Accessed at [www.sas.com](http://www.sas.com).

- Sircar, S., Turnbow, J.L., Bordoloi, B. (2000) A Framework for Assessing the Relationship between Information Technology Investments and Firm Performance. *Journal of Management Information Systems*. Vol. 16(4). pp. 69-97.
- Smaczny, T (2001) Is alignment between business and information technology the appropriate paradigm to manage IT in today's organisations? *Management Decisions*. Vol. 39(10). pp. 797-801.
- Sundaramurthy, C., Lewis, M. (2003). Control and Collaboration: Paradoxes of Governance. *Academy of Management Review*. Vol. 28(3). pp. 397-415.
- Tallon, P.P., Kraemer, K.L. and Gurbaxani, V. (2000). Executives' Perceptions of the Business Value of Information Technology: A Process-Oriented Approach. *Journal of Management Information Systems*. Vol. 16(4). pp. 145-173.
- Toms, J. S. (2002). Firm Resources, Quality Signals and the Determinants of Corporate Environmental Reputation: Some UK Evidence. *British Accounting Review*. Vol. 34. pp. 257-282.
- Trites, G. (2003). *Director Responsibility for IT governance*. Paper presented at the University of Waterloo IS Assurance Symposium, University of Waterloo Canada.
- Tyler, R. (2000). Implementing COBIT in New South Wales Health. *Information Systems Control Journal*. Vol. 3. pp.30-32.
- US Congress. (2002). Sarbane-Oxley Act.
- Van den Berghe, L., & De Ridder, L. (1999). *International Standardisation of Good Corporate Governance*. Boston: Kluwer Academic Publishers.
- Van Der Zee, J. T. M., & De Jong, B. (1999). Alignment is not enough: Integrating Business and Information Technology Management with the Balanced Scorecard. *Journal of Management Information System*. Vol. 16(2). pp. 137-156.
- Van Grembergen, W. (2000). The Balanced Scorecard and IT Governance. *Information Systems Control Journal*. Vol. 2. pp. 40-43.
- Van Grembergen, W., Amelinckx, I. (2001). Measuring and managing E-Business projects through the Balanced Scorecard. accessed from [www.itgi.com](http://www.itgi.com).
- Van Grembergen, W., De Haes, S., Amelinckx, I. (2003). Using COBIT and the Balanced Scorecard as Instruments for Service Level Management. *Information Systems Control Journal*. Vol. 4. pp. 56-62.
- Van Grembergen, W., Saull, R., & De Haes, S. (2003). Linking the IT Balanced Scorecard to the Business Objectives at a Major Canadian Financial Group. *Journal of Information Technology Cases and Application*. Vol. 5(1). pp. 23-45.
- Venkatraman, N., Henderson, J. C., & Oldach, S. (1993). Continuous strategic alignment: Exploiting information technology capabilities for competitive success. *European Management Journal*. Vol. 11(2). pp. 139-150.
- Wiederkehr, B. J. (2000). Group Wide Implementation of COBIT Framework. *Information Systems Control Journal*. Vol. 5. pp. 27-29.
- Young, R. C. (2002). *IT Governance and Risk Management: an integrated multi-stakeholder framework*. Paper presented at the Asia Pacific Decision Sciences Institute, Bangkok, Thailand.
- Young, R. C., & Jordan, E. (2003, 10-13 July). *Passion & IT Governance*. Paper presented at the 7th Pacific Asia Conference on Information Systems, Adelaide South Australia.