

# **Development of a Board IT Governance (ITG) Review Model**

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## **Abstract**

Information Technology Governance has become increasingly important as countries across the world establish legislation and guidelines on the responsibilities of Boards of Directors (Boards) for ITG within organizations. As a result of organizational dependence on Information Technology (IT), Boards are realizing they must more effectively govern their considerable investment in IT systems and resources or risk potential loss from unauthorized access to their IT systems, poor IT resource management, ineffective integration of IT and business and reduced delivery of value from their IT resources. Despite the clear theoretical motivation for Boards to focus on ITG as part of Board processes there has been a paucity of research which has focused on this issue.

This paper makes a key contribution to the research on ITG by proposing a Board ITG Review Model (BIRM) as a mechanism to assist Boards to identify critical ITG issues and the supporting evidence they should review as the ultimate custodians of organizational IT systems and resources. The model is developed around four of the key ITG focus areas identified by the IT Governance Institute (ITGI). To test one of the components of the model a set of potential critical ITG issues was identified from ITG literature. The critical issues were pilot tested with a group of 100 industry professionals to gauge their importance and appropriateness for Board use. The results from this pilot testing process will be used to refine the BIRM for the future. Future research will test and refine the model further using online survey and case study methodologies.

**Keywords:** Information Technology, Governance, Boards of Directors

## **1. INTRODUCTION**

ITG has become very important in the past few years, 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 with the establishment of a voluntary Australian Standard AS8015-2005 "Corporate Governance of Information and Communication Technology" by Standards Australia (2005).

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) suggests that "ITG is about assigning decision rights and creating an accountability framework that encourages desirable behaviour in the use of IT".

As IT systems have become more critical to an organization's success strategic and operational success, Boards have come to realize that establishing good organizational ITG processes and the monitoring of ITG at a Board level is becoming a necessity to their operations (Broadbent, 2003, Nolan & McFarlane 2005). Williams (2006) reports that a recent ITGI shows that "while 95% of companies believe the successful deployment of IT is vital to long-term business success, almost 50% rarely or never discuss IT at Board-level." Currently it appears that organizations are very reliant on ITG reporting from the Chief Information Officer (CIO) and many CIO's are encouraging ignorance at the top as it lets them operate without interference. We believe that Boards must now focus on how to improve their understanding of ITG processes within the organization and the growing role they must play in ensuring ITG is comprehensively reviewed by the Board each year.

This paper develops a Board ITG model and conducts pilot testing. Section 2 will consider the responsibility of Boards for ITG. Section 3 will summarize prior research on ITG. Section 4 will present theoretical motivations for Board monitoring of ITG. Section 5 will explain the model development process and identify the critical issues for Boards and finally Section 7 will identify research opportunities associated with Boards and ITG.

## **2. BOARDS' IT GOVERNANCE RESPONSIBILITIES**

Boards undertake a number of key roles in strategic governance processes. Their primary role is protection of stakeholders interests (Moodie 2001). A secondary but nevertheless important role for the Board is ensuring the production of quality information which is regularly reported to stakeholders (ITGI & Information Systems and Control Foundation (ISACA), 2000). The Board is responsible for strategic governance of the organization and in particular executive management. The executive management team is then responsible for governing the departments and divisions of the organization (McGinnis et al., 2004).

Trites (2003 p3) suggests "that directors' responsibilities include responsibility for strategic plans, internal control structures and business risk". Board are also usually responsible for guiding and monitoring management and corporate performance, ensuring compliance with regulatory principles and laws, controlling financial reporting and risk management processes and supervising the allocation of financial resources and budgets (Van den Berghe & De Ridder, 1999).

ITG is considered important in assisting organizations to place reliance on their IT systems and the information produced by these systems (Broadbent, 2003; Lindup, 1996). Nolan & McFarlane (2005) considered that Boards to date have lacked the knowledge to ask the right questions about IT risk issues and ITG issues in general. Moodie (2005 p29) indicates that ITG "is emerging as an issue at a

time when directors and senior executives are hardened by more than a decade's worth of corporate law reform".

The Board expects management to be responsible for initiating and monitoring the operational level ITG processes in the organization. The Board must however 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 or risk management committee (DeZoort et al, 2002). A small group of international organizations have realized the dilemma they are faced with ITG and have established separate and more rigorous ITG committees (Nolan & McFarlane 2005).

The ITG Institute believes that including ITG processes in Board governance processes ensures (ITGI 2001):

- ❖ The Board is protecting the interests of key stakeholder groups
- ❖ The Board is providing quality information to stakeholders on a regular basis
- ❖ The Board is ensuring that sound governance is operating within the organization
- ❖ The IT sections of the organization are efficiently and effectively deploying secure, reliable information and applied technology
- ❖ The Board is focusing on the strategy and risk factors associated with the enterprise's dependence on IT systems on a day-to-day basis
- ❖ IT is aligned with the enterprise and realizing its promised benefits
- ❖ IT is enabling the enterprise by exploiting opportunities and maximizing benefits
- ❖ IT related risks are being managed appropriately.

IT governance plays an important role in the management of organizational IT resources. Boards are under increasing scrutiny concerning their ability to manage the organization and its resources. The inclusion of IT governance in Board processes signals to stakeholders that the Board considers management of organizational IT resources to be extremely important. Review of these processes by the Board gives it improved confidence that a large portion of the organization's assets are being successfully managed (ITGI 2003).

Moodie (2001 p17) considers current Boards must now "be smaller, younger, leaner and more diversified, and of course, technology savvy, sometimes mixing more experienced business acumen with young, energetic, entrepreneurial drive". Nolan & McFarlane (2005 p p98) indicate that "a lack of Board oversight for IT activities is dangerous; it puts the firm at risk in the same way that failing to audit its books would". Ineffective ITG has been linked to problems such as project overruns, computer system crashes and IT security breaches (ITGI 2003b). Boards must continue to expand the IT knowledge base of their members as failure to successfully review/monitor ITG at a board level by devolving this task to the CIO or other senior management is we consider tantamount to shirking their ITG responsibilities.

### **3. MOTIVATION FOR BOARD REVIEW OF ITG**

Agency theory indicates that Boards must act in the best interests of the owners of the corporation i.e. shareholders (principals) and must monitor the actions of senior management and other employees to ensure they are not acting opportunistically and thus negatively impacting on the owner's wealth (Daily & Cannella, 2003, Hillman & Dalziel, 2003, Jensen & Meckling, 1976, Sundaramurthy & Lewis, 2003). Establishment and review of ITG processes is reported to reduce agency costs associated with poor management behaviour and provides 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 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). This new development identified that IT strategy should be developed at a Board level, and that operational planning should be developed and implemented at a management level

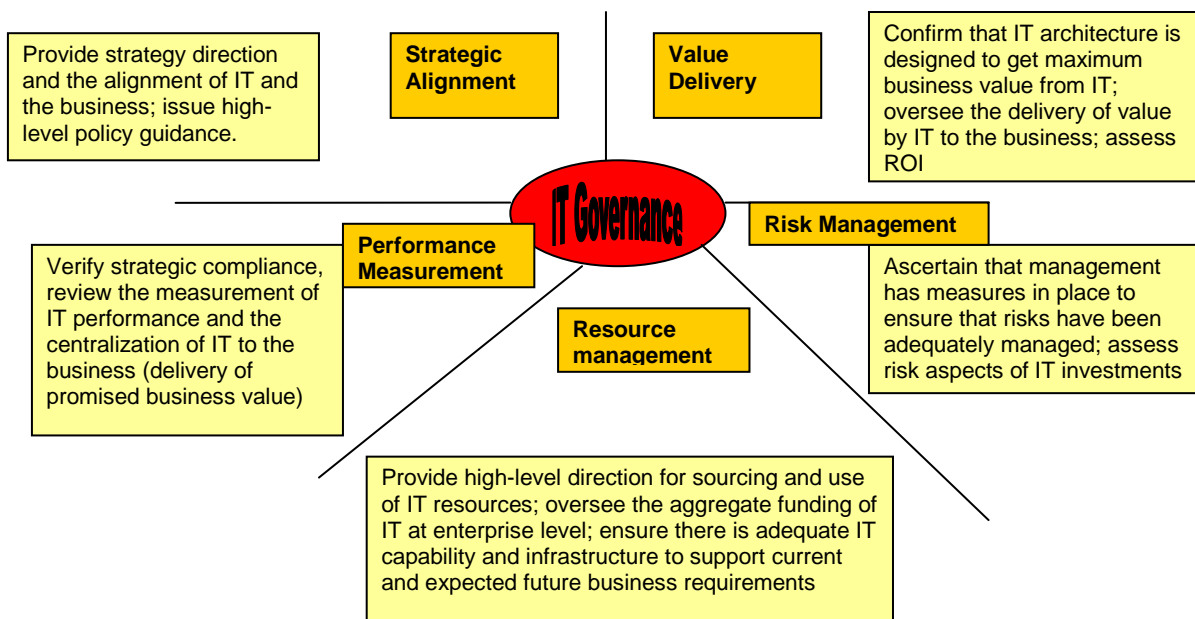
Stakeholder theory adopts the view that Boards should manage the business for the benefit of all stakeholders (Deegan, 2002). The Cadbury report (Committee on the Financial Aspects of Corporate Governance (London, E. and A. Cadbury, Sir. (1992.)) encouraged the corporate world to focus more on governance particularly corporate governance. The concepts of governance discussed in the Cadbury report ie openness, integrity, accountability, improvements to corporate behaviour and internal controls can equally be applied to IT governance. Stakeholder theory can be applied to ITG in that Boards should be responsible for the management of the organizations' considerable IT resources in order to oversee the interests of all stakeholders (Daily & Cannella 2003).

Governance theories provide strong motivation for IT governance to be a key component of Board decision-making and processes.

#### 4. PRIOR RESEARCH ON IT GOVERNANCE AND BOARDS

Prior research on ITG is broad and diverse. Much of the literature comes from past IT research, but areas of business and organizational research are also key contributors to ITG research. The literature can be categorized based on the key focus areas (formerly domains) of ITG identified by ITGI (2000) and Hardy (2003) being strategic alignment, value delivery, resource management, risk management and performance measurement. Figure 1 provides a graphical view of the components of ITG and includes further details of the five key areas as identified by Hardy (2003).

**Figure 1 - Model of the Components of ITG (Hardy 2003)**



The following sections provide a concise summary of the key developments in ITG prior research in each of the five focus areas.

#### **4.1. Prior Research - Strategic Alignment Focus Area**

Strategic alignment (SA) is defined by the ITGI (2003, p22) as “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”. Strategic alignment between business and IT processes should ensure that IT assets are being used effectively to assist the entire organization.

One of the key developments in the body of literature associated with this focus area is the Henderson & Venkatraman (1991) Strategic Alignment Model (SAM). This model proposes the BIT alignment consists of six key processes (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 further embellished in a series of other papers (Henderson & Venkatraman 1993, 1999; Henderson & Thomas 1992, Venkatraman et al 1993). The model was extended by Luftman et al (1993) to form the Strategic Alignment Framework (SAF) and was empirically tested using surveys & interviews in Burn & Szeto (1999).

A number of researchers expanded and enhanced the SAM model (Yetton (1997); Broadbent & Weill (1997); Maes (1999), Maes et al 2000). 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) 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.

Luftman (2003) expanded the idea of strategic alignment further by developing the Strategic Alignment Maturity Assessment Tool. The primary objective of this new tool was 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 and broadened organizational understanding of strategic alignment issues.

Broadbent & Weill (1993) identified organisational processes that contribute to and enhance BIT alignment and Luftman et al (1999) identified 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. Broadbent (2003) in conjunction with the Gartner group developed a matrix which used governance styles and decision dimensions to get a clear picture of an organisation’s ITG arrangements. More recently, Coughlan et al (2005) studied BIT alignment from a communication perspective using interviews with middle to senior management to identify key issues that inhibit alignment. The study by Coughlan (2005) found that Business and IT sections of an organization must work and communicate with each other in partnership to be successful.

#### **4.2. Prior Research - Value Delivery Focus Area**

IT value delivery is defined as “delivery on time, within budget and with the benefits that were promised” (ITGI, 2001 p24). 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 in IT strategic planning processes. The study 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 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.

#### **4.3. Prior Research - Resource Management Focus Area**

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.

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 (Sarup 2003).

#### **4.4. Prior Research - Risk Management Focus Area**

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).

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. Young (2002) developed an integrated model for risk management and IT governance which incorporated multiple stakeholders. Their study reviewed “the development of all major traditions of risk management and proposed an IT governance framework which is able to communicate from an operational level through all decision makers to Board level and beyond” (Young, p1). Levine (2004) identified that spending on risk management technology is on the rise as Boards realize that risk management is increasingly important and want to have systems in place to deal with enterprise 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 a number of risk management frameworks (COSO; Standards Australia) 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.

#### **4.5. Prior Research - Performance Measurement Focus Area**

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. There has also been considerable research on this issue focusing primarily on the development and testing of the IT balanced scorecard and ITG measurement frameworks.

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 2003a, 2003b; Van Grembergen et al 2005a, Van Grembergen & Haes 2005b, 2005c; Van Grembergen & Haes 2006).

In addition to the measurement processes the ITG Institute has been instrumental in developing an ITG measurement framework “The Control Objectives for Information and Related Technology Framework (CobIT)” to provide good practice guidelines and measurement techniques for control over information, IT and related risks (ITGI & ISACA 2004). The processes identified by CobIT 3.0 and 4.0 include operational level measures of ITG processes and are grouped under planning and organization, delivery and support, acquisition and implementation and monitoring (ITGI & ISACA 2004).

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 evaluate and collect support information on ITG processes to ensure management is taking responsibility for all four focus areas of ITG. The performance measurement focus area is important to the assessment and evaluation of the other four focus areas and has been separated from the other four areas in the model development process.

#### **4.6. Prior Research - Boards and ITG**

Despite the importance of ITG to Board processes there has been a paucity of research which has focused on this relationship to date.

Trites (2003) developed a conceptual view of directors ITG responsibilities. In addition the ITGI produced a publication outlining Board responsibilities for ITG and related this to the five domains of ITG as outlined in sections 5.1-5.5. The most recent discussion of Board ITG responsibilities is by Nolan & McFarlane (2005) who have developed a IT strategic impact grid to assist Boards to determine their ITG involvement based on whether their IT process are offensive or defensive. Nolan & McFarlane (2005) give advice to Boards on how they should conduct their IT oversight and whether an independent IT Governance committee is needed. They also developed an IT governance calendar to assist organisational IT governance committee to address certain issues in their oversight function. Nolan & McFarlane (2005) also considered Board ITG responsibilities using case studies of six large international companies.

### **5. BOARD ITG REVIEW MODEL**

There is considerable theoretical motivation for why Boards should review ITG as part of their Board processes. Stakeholders consider that management, alignment and value delivery from significant IT investments is an important issue of Board focus. Prior research provides a clear indication that Board ITG responsibilities have become increasingly important and that Boards now need to regularly review ITG issues as part of their yearly Board responsibilities. Prior research clearly indicates that there are four key focus areas (strategic alignment, value delivery, IT resource management and risk management) which when considered together form a comprehensive view of ITG across an organization. Research also clearly identifies that measurement of these four key focus areas is important if the organization wants to improve their organizational ITG processes over time. The dilemma we consider currently facing Boards is not whether they should be reviewing ITG or not but

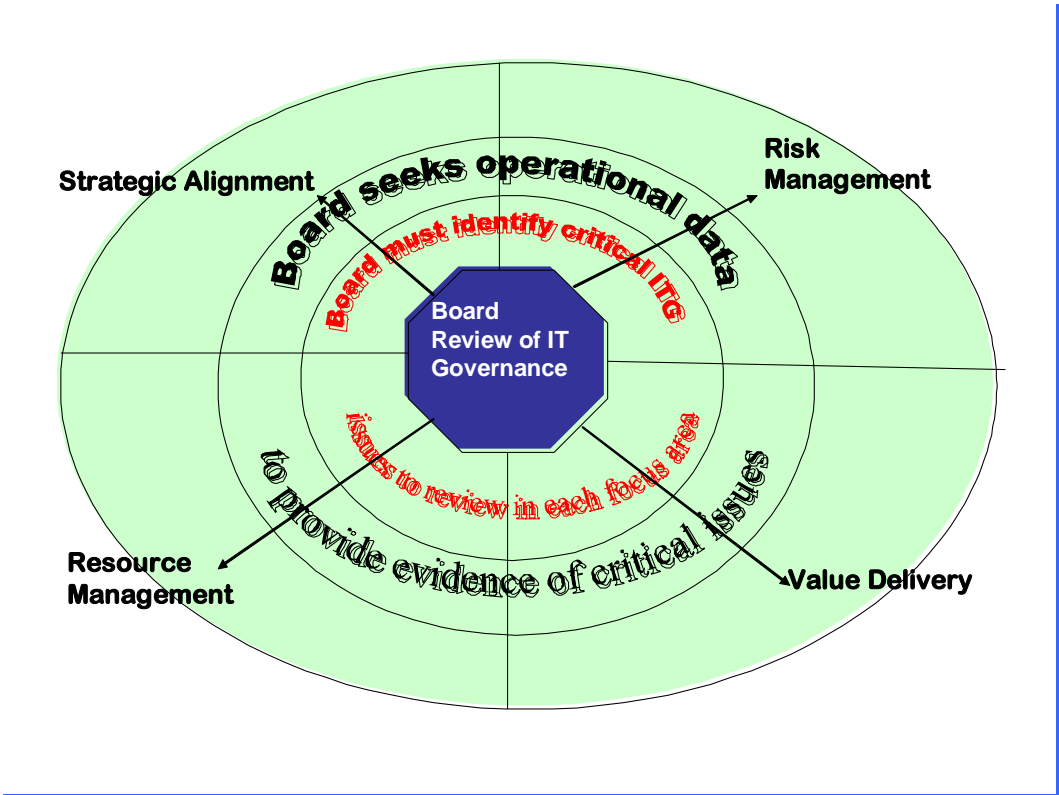


determining the critical issues they need to consider in ensuring a quality review of ITG occurs each year.

### 5.1 Development of the Model

The BIRM in Figure 2 has been developed to assist Boards to have a clearer idea of how a possible ITG review could occur at Board level. The model indicates that the Board needs to identify a series of critical ITG issues in four ITG focus areas (previously identified in the ITG literature) and to gather operational data to enable the board to evaluate each of the ITG critical issues as part of their Board processes. To identify the ITG critical issues, the Board would talk to executive management and the Chief Information Officer (CIO) about the ITG issues that are critical to the organization or may use a list identified from ITG literature as a starting point for the discussions.

Figure 2 – Board ITG Review Model



The model clearly indicates that the Board needs to gather supporting operational information to be able to adequately assess ITG at a Board level. The supporting evidence allows the Board to evaluate whether the organization has some degree of achievement in each critical area. The Board can then determine a qualitative assessment of what critical ITG issues they need to monitor in future years.

To provide Boards with a starting point for discussion of what constitutes critical ITG issues for an organization and to provide evidence of the appropriateness of the model, a list of critical ITG factors were identified from prior ITG research. Issues were identified from the research in each focus area and were chosen based upon them emerging as a consistent theme throughout the literature. At the end of this process twenty-nine critical ITG issues had been identified as shown in Table 1.

**Table 1 – List of Possible Board ITG Critical Issues**

<b>Strategic Alignment Focus Area</b>
Operational alignment of Business & IT strategy
IT department is strategically aligned with mission and goals of the university
Information Technology is a key component in every business initiative and development
Executive Management are supportive of the IT Division and regularly communicate with the head of this division.
The IT Division has clearly defined roles and responsibilities within the organisation and communicates this well to the community
The Board has established performance measurement processes to regularly monitor the level of strategic alignment
<b>Risk Management Focus Area</b>
The Board ensures a enterprise risk assessment is conducted each year
The Board is conversant with Enterprise Risk models and their suggested risk management policies
The Board considers IT risks separately from organisation risk assessment processes
The Board ensures the organisation has appropriate IT internal controls and procedures in place to minimise IT risks
Senior management and the Board regularly review and monitor organisational IT risks
The Board ensures that the organisation has a sound IT security framework in place
The Board regularly reviews organisational IT continuity plans
The Board ensures security and business continuity plans are regularly tested and monitored
The Board has established suitable performance measurement processes to regularly monitor the level of IT risk within the organisation
<b>Value Delivery Focus Area</b>
The Board focuses on delivery of value from University IT systems and ensures this issue is addressed in organizational IT strategic plans
Senior Management have established processes to deliver value from IT resources
Business and IT divisions are well aligned and focus on achieving business objectives together
The Board has established an IT steering or other board sub-committee to focus on achieving value from IT investments
The Board regularly seeks stakeholder assessment of value delivery from IT systems
The Board has established suitable performance measurement processes to regularly monitor the level of value being delivered from organisational IT resources
<b>Resource Management Focus Area</b>
The Board is focused on managing its IT resources effectively and efficiently
The IT division takes regular inventory of its IT resources and reports this to the Board
The IT division is well structured to achieve optimal IT decision making
The Board has established a sub-committee to focus on effective management of IT resources
The IT division has a good system of coordination of organisational IT resources
The Board has established suitable policies and processes for replacement or upgrading of IT resources
The Board ensures that all IT projects have clear budgets and timelines and that projects are regularly monitored for excess costs or time overruns
The Board has established suitable performance measurement processes to regularly monitor the management of IT resources in the organisation

## 5.2 Testing the Model

To determine the appropriateness of the model and the developed list of ITG critical Board issues, a pilot study with a 100 industry professionals was conducted. The professionals were asked to rate the importance of each of the 29 critical issues using a 5 point Likert scale which asked respondents to rate the issues from Not Important at all to Very Important. Responses were received from 32 professionals and the average importance rating for each issue has been summarized in Table 2.

**Table 2 – Results of Pilot Study**

<b>List of Critical Board ITG Issues</b>	<b>Average Importance Rating</b>
<b>Strategic Alignment Focus Area</b>	
1. Operational alignment of Business & IT strategy	4.44
2. IT department is strategically aligned with mission and goals of the university	4.25
3. Information Technology is a key component in every business initiative and development	3.75
4. Executive Management are supportive of the IT Division and regularly communicate with the head of this division.	4.06
5. The IT Division has clearly defined roles and responsibilities within the organisation and communicates this well to the community	4.16
6. The Board has established performance measurement processes to regularly monitor the level of strategic alignment	4.13
<b>Risk Management Focus Area</b>	
7. The Board ensures a enterprise risk assessment is conducted each year	3.78
8. The Board is conversant with Enterprise Risk models and their suggested risk management policies	3.91
9. The Board considers IT risks separately from organisation risk assessment processes	2.90
10. The Board ensures the organisation has appropriate IT internal controls and procedures in place to minimise IT risks	4.00
11. Senior management and the Board regularly review and monitor organisational IT risks	4.10
12. The Board ensures that the organisation has a sound IT security framework in place	4.28
13. The Board regularly reviews organisational IT continuity plans	3.75
14. The Board ensures security and business continuity plans are regularly tested and monitored	3.94
15. The Board has established suitable performance measurement processes to regularly monitor the level of IT risk within the organisation	4.03
<b>Value Delivery Focus Area</b>	
16. The Board focuses on delivery of value from University IT systems and ensures this issue is addressed in organizational IT strategic plans	4.17
17. Senior Management have established processes to deliver value from IT resources	3.8
18. Business and IT divisions are well aligned and focus on achieving business objectives together	4.37
19. The Board has established an IT steering or other board sub-committee to focus on achieving value from IT investments	4.06
20. The Board regularly seeks stakeholder assessment of value delivery from IT systems	3.58
21. The Board has established suitable performance measurement processes to regularly monitor the level of value being delivered from organisational IT resources	3.61
<b>Resource Management Focus Area</b>	
22. The Board is focused on managing its IT resources effectively and efficiently	3.61

23. The IT division takes regular inventory of its IT resources and reports this to the Board	3.5
24. The IT division is well structured to achieve optimal IT decision making	3.94
25. The Board has established a sub-committee to focus on effective management of IT resources	3.63
26. The IT division has a good system of coordination of organisational IT resources	3.73
27. The Board has established suitable policies and processes for replacement or upgrading of IT resources	3.87
28. The Board ensures that all IT projects have clear budgets and timelines and that projects are regularly monitored for excess costs or time overruns	4.13
29. The Board has established suitable performance measurement processes to regularly monitor the management of IT resources in the organisation	4.03

The results indicate that most of the issues were considered important to Board review of ITG. Only one issue “The Board considers IT risks separately from organization risk assessment processes” rated on average in the unimportant category. Fourteen issues rated in the neither important or unimportant (or neutral) category (rating between 3 and 4). The remainder of the issues (14) rated important. No issues were considered by all respondents to be very important (average rating of 5). The importance ratings provide evidence that most of critical issues identified are appropriate and valid. The issues identified as unimportant or neutral will be reviewed after further importance testing with a large group of participants has been performed. The importance results also provide support for the main component of the BIRM. Case studies with Boards will test the operational data component of the model to determine the validity of the inclusion of this component in the BIRM. These case studies will be conducted in future research on this topic.

## 6. CONCLUSION

This paper makes a key contribution to the research on ITG by proposing a BIRM as a mechanism to assist Boards to identify critical ITG issues and the supporting operational data necessary to successfully evaluate ITG at a Board level. The model was pilot tested using a list of twenty-nine potential Board critical ITG issues which had been gathered from prior ITG research with a group of external industry professionals who had links to Board processes. The results of the pilot testing process indicated that the majority of critical issues were important to the review of ITG at a Board level. The pilot study also provided support for the inclusion of the critical issues component in the BIRM. The pilot study also drew attention to the fact that some of the critical issues need to be refined or removed in future testing of the model. The gathering of operational data component of the model will be tested once a list of potential operational data sources has been identified for each critical issue in future research on ITG.

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