

Adoption and Implementation of IT Governance: Cases from Australian Higher Education

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Abstract

Over the past decade, IS/IT governance has become a key issue of concern for senior IT decision makers around the world. The underlying goals for adopting formal IT governance practices are improvement of business performance and conformance with regulations. This exploratory study examines and compares how IT governance is implemented through a number of structures, processes, and relational mechanisms in two Australian institutions of higher education and how the adoption of industry best practice frameworks such as COBIT, ITIL and ISO17799 have been utilized in the implementation. The study reveals a number of important findings in the context of the implementation of IT governance in the higher education environment. The relationship between IT governance adoption and implementation and business benefit issues are also discussed in the paper.

Keywords

IT governance structures, IT governance processes, IT governance relational mechanisms, higher education

INTRODUCTION

IT governance has emerged as an important issue for organizations across the world. An organization's IT management and governance practices are generally influenced by its IT history. This paper analyzes how formal IT governance is implemented in two major Australian institutions of higher education, how their history influence the practices and the issues that they face in the implementation of IT management and governance frameworks. The next few sections of this paper contains a detailed literature review regarding IT governance, and the important IT related issues in the Australian higher education sector. This is followed by a discussion of the research questions and methodology and then the case study institutions are described. Finally, the findings from the study are presented and the conclusions and directions for future work are discussed.

LITERATURE REVIEW

Corporate and IT Governance

Corporate governance has become increasingly important worldwide, especially in the wake of the Enron and MCI WorldCom incidents in the US. The Australian Stock Exchange Corporate Governance Council defines corporate governance as "... *the system 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 optimised*" (ASX 2003). IT governance has increasingly become a key area of concern under the umbrella of corporate governance because of the pervasive influence of information systems and the associated technology infrastructure in every area of an organization's activities. The IT Governance Institute describes IT governance as being an integral part of the corporate governance which consists of "*the leadership and organizational structures and processes that ensure an organization's IT sustains and extends the organization's strategy and objectives*" (ITGI 2003).

Previous Research in IT Governance

The term IT governance, started to appear in the research literature towards the late 1990s, with its main proponent being the IT Governance Research Institute (De Haes and Van Grembergen 2005). Since then, the need to implement and improve IT governance has been receiving growing recognition by senior IT management across the world. However, implementing IT governance can be an extremely complex undertaking (Brown

1997; Sambamurthy and Zmud 1999; Duffy 2002; Marshall and McKay 2003; De Haes and Van Grembergen 2004; Weill and Ross 2005). A survey of top 10 priorities for senior IT management by Gartner Inc. in 2003, found the need for improving IT governance to be included in the list for the first time (DeHaes and Van Grembergen 2004). In 2003, the IT Governance Institute conducted a survey through PricewaterhouseCoopers of 335 CEO/CIO level executives around the world in order to determine their IT governance priorities (ITGI 2004). The survey found that while 75% executives recognized the requirement for implementing IT governance only 40% were taking any action in this direction.

De Haes and Van Grembergen (2004) propose that IT governance can be implemented through a framework of structures, processes, and relational mechanisms. This framework is presented in Table 1. Structures include the existence of well defined roles and responsibilities and IT steering committees. Processes involve strategic decision making and the use of various IT governance frameworks and standards (e.g. COBIT and ITIL) which can provide the IS organization with the means of examining its activities and its value to business. Relational mechanisms include shared learning and strategic dialogue between business and IT, and ensuring proper communications at all times.

	Structures	Processes	Relational Mechanisms	
Tactics	<ul style="list-style-type: none"> - IT executives and accounts - Committees and councils 	<ul style="list-style-type: none"> - Strategic IT decision making - Strategic IT monitoring 	<ul style="list-style-type: none"> - Stakeholder participation - Business / IT partnerships 	<ul style="list-style-type: none"> - Strategic dialog - Shared learning
Mechanisms	<ul style="list-style-type: none"> - Roles and responsibilities - IT organization structure - CIO on board - IT strategy committee - IT steering committee(s) 	<ul style="list-style-type: none"> - Strategic information systems planning - Balanced IT scorecards - Information economics - Service level agreements - COBIT and ITIL - IT alignment/ governance maturity models 	<ul style="list-style-type: none"> - Active participation by principal stakeholders - Collaboration between principal stakeholders - Partnership rewards and incentives - Business/IT co-location 	<ul style="list-style-type: none"> - Shared understanding of business/IT objectives - Active conflict resolution (non-avoidance) - Cross-functional business/IT training - Cross-functional business/IT job rotation

Table 1: A framework of structures, processes and relational mechanisms for implementing IT governance
(Source: De Haes & Van Grembergen 2004).

IT Governance Frameworks and Standards

A number of IT best practice frameworks and standards such as Control Objectives for Information and Related Technology (COBIT), ISO/IEC 17799, IT Infrastructure Library (ITIL) and Capability Maturity Model (CMM) are available to IT organizations to help them improve their accountability, governance, and management. COBIT is designed by the IT Governance Institute as a high-level “umbrella” framework for IT governance and it works very well with other frameworks like ITIL and ISO/IEC 17799 which focus on specific aspects of IT management. The framework identifies 34 IT processes over 300 control objectives across four IT domains: (1) planning and organization, (2) acquisition and implementation, (3) delivery and support, and (4) monitoring (ITGI 2000; 2005). The planning and organization domain addresses strategic and tactical issues and how IT can optimally contribute to achieving business goals. The acquisition and implementation domain deals with the development or acquisition of IT solutions, as well as their implementation and integration with business processes. This domain also covers the maintenance of existing systems. The delivery and support domain covers the actual delivery of services ranging from security and continuity related operations to training. Support processes are required to ensure the delivery of services. The monitoring domain addresses the issue of management oversight of the organization’s control processes and the need for independent audits. The IT Governance Institute has recently published the fourth edition of COBIT, the first update since 2000. It is described as an incremental improvement on COBIT 3.0 and provides a number of useful additions to the older version (Bodner 2006, Symons 2006).

The Central Computer and Telecommunication Agency (CCTA) in the UK established the Information Technology Infrastructure Library (ITIL) in 1989 (Sallé 2004) in order to improve its IT organization. The framework began to be widely adopted by the mid 1990s (Wikipedia 2006). In 2001 the CCTA was absorbed into the UK’s Office of Government Commerce (OGC). The OGC is now responsible for managing ITIL. ITIL is also supported by the IT Service Management Forum (itSMF). The Library was so named because it consists of a collection of eight books (Wikipedia 2006). The areas covered by the books are: (1) service delivery, (2) service support, (3) ICT infrastructure management, (4) security management, (5) the business perspective, (6) application management, (7) software asset management, and (8) planning to implement service management. A

ninth book has now been added to this collection. This provides implementation guidelines for smaller IT organizations.

In 2000, the British Standards Institute published BS 15000 as an IT service management standard that extended ITIL (Sallé 2004). This has now been replaced by ISO/IEC 20000:2005 which is based on BS 15000. Like its predecessor, ISO/IEC 20000 is a two part standard (ISO 2005a). The first part specifies requirements for IT service management while the second part provides a code of practice.

Another standard that can be implemented alongside COBIT and ITIL is ISO/IEC 17799:2005 (expected to be renamed ISO/IEC 27002 in 2007). The standard was originally developed from BS 7799 which provides a code of practice for developing information security standards in an organization (ISO 2000). However, unlike COBIT and ITIL, it was not designed to be a certification standard. It has recently released a companion standard, ISO/IEC 27001 that can be used for the purpose of certification instead of the older and superseded BS 7799-2 on which it is based (ISO 2005b). A new risk management standard BS 7799-3:2006 is also presently available from the British Standards Institute. This standard provides support and guidance for the risk management aspect of ISO/IEC 27001:2005.

In addition to these frameworks and international standards, Australian organizations have three local standards available to guide their IT governance and management practices. These are AS 8015-2005 (ICT governance standard), AS 8018.1-2004 (specification for ICT service management) and AS 8018.2-2004 (code of practice for ICT service management).

The ICT governance standard, AS 8015-2005, provides a set of guiding principles for senior business decision makers regarding the effective and efficient use of information and communication technology (ICT) within their organizations, irrespective of the industry sector. The standard addresses the governance of ICT resources for the provision of information and communication services within the enterprise (Standards Australia 2005).

Standards Australia (2004a; 2004b) provides a two part service management standard AS 8018-2004. The first part (AS 8018.1-2004) outlines the requirements that a service provider needs to fulfil in order to deliver an acceptable quality of managed service to customers, while the second part (AS 8018.2-2004) recommends a common terminology for IT service providers, so that effective processes may be established. AS 8018.1-2004 is based on BS 15000-1:2002 and AS 8018.2-2004 is based on BS 15000-2:2003. The two standards are currently under revision and the drafts DR 06555 CP (revision of AS 8018.1-2004) and DR 06556 (revision of AS 8018.2-2004) are available for public comment from the Standards Australia website. DR 06555 CP and DR06556 adopt ISO/IEC 20000-1:2005 and ISO/IEC 20000-2:2005 respectively (Standards Australia 2006a; 2006b).

Implementation of these frameworks may vary from one region to another. A recent Forrester Research survey of 135 IT managers in North America revealed that about 20% rely on COBIT while another 20% use ITIL (Dubie 2005). A survey of 110 respondents by Cater-Steel and Tan (2005) at a recent Australian itSMF conference showed that while all respondents were at different stages of implementing ITIL, less than a third are also implementing COBIT. These frameworks are not necessarily mutually exclusive and increasing the value of IT from a business perspective requires an understanding of their strengths, weaknesses and focus (Symons 2005). IT governance frameworks are being increasingly adopted around the world because they not only assure conformance with regulations but also help in ensuring performance (Liew 2006). Organizations may benefit from adopting what they find useful from each framework rather than just adopting a single one (Chickowski 2004).

There are, however, very few academic publications examining the issues and problems with the adoption and implementation of these frameworks and standards. Ridley et al. (2004) found that this to be particularly true in the case of publications related the COBIT framework, a majority of which tend to be practitioner publications. Cater-Steel and Tan (2005) make a similar observation regarding the available publications on ITIL.

IT Governance in Australian Institutions of Higher Education

Higher education is a multi-billion dollar industry in Australia, and as such, it is of vital importance to the country's economy (Higher Education IT Consultative Forum 2000; Nelson 2002). It is both a major consumer of IT products and services as well as a major provider of services using ICT. IT has helped the improvement of a range of activities including research, teaching, learning and administration in the higher education environment. Significant developments have been made by these institutions in the area of online teaching and learning. The demand for IT based products and services, has also increased as a result of the rapid increase in student population in the last 15 years.

There is much work needed to be done by university governing bodies and policy makers in order for these universities to continue tapping emerging information technologies in order to maintain their competitive positions internationally (Higher Education IT Consultative Forum 2000). The issues range from infrastructure,

applications, delivery and services to staffing and appropriate regulatory frameworks. IT applications have also not yet penetrated all aspects of university teaching and more effort is required to bring about improvements in this area. However, despite the wide range of concerns facing IT governing bodies in Australian universities in the information economy, there has been very little research regarding how IT governance may be suitably implemented in these institutions in order for them to provide optimal benefits to higher education.

RESEARCH QUESTIONS AND METHODOLOGY

The paper investigates the adoption of IT governance in two Australian institutions for higher education. The research question is:

How is formal IT governance adopted and implemented within the higher education environment in Australia?

As suggested by Benbasat et al. (1987), the case research method is useful for addressing the “how” questions, i.e., in the exploratory stage of knowledge building. This is particularly useful for a study on IT governance in the context of institutions of higher education in Australia, where the knowledge of researchers regarding new methods, techniques, problems and prospects lags that of practitioners. A case research strategy is expected to provide rich insight in this context. Two leading institutions of higher education in Australia in different stages of adopting and implementing formal IT governance practices were selected for the study based on the availability of senior IT and business decision makers in these institutions for participating in this research. In keeping with participants’ requests for anonymity, the institutions will be referred to as Institution A and Institution B in this paper. The data collected was primarily qualitative in nature. The data was gathered from semi-structured interviews with senior IT and business decision makers in both institutions as well as from relevant documents obtained from interviewees and the websites of the institutions. The interviews were recorded and later transcribed and analyzed. The data sources from the institutions are summarized in Table 2.

Institution	Interviewees	Documents
Institution A	<ul style="list-style-type: none"> - 2 senior IT decision makers - 2 senior business decision makers 	<ul style="list-style-type: none"> - Overall strategic plan and strategic IS plan - Disaster recovery plan - Organizational chart and committee structures - Security policies and procedures - Personnel statistics - Student satisfaction surveys
Institution B	<ul style="list-style-type: none"> - 2 senior IT decision makers - 1 senior business decision maker 	<ul style="list-style-type: none"> - Overall strategic plan and strategic IS plan - Proposed IT governance model - Organizational chart and committee structures - Security policies and procedures - Personnel statistics

Table 2: Data sources from the two case study institutions.

THE CASE STUDY INSTITUTIONS

Institution A was established in the 1960s. The institution has over 3,000 academic and administrative staff members and over 30,000 students. Its primary goals are to achieve excellence in teaching, learning, research and development. Its present priorities include providing flexible learning opportunities, developing facilities and technological infrastructure to support research priorities, forming partnerships with industry and government and improving its revenue generation. The institution has an overall strategic plan as well as a number of divisional plans and maintains a balanced scorecard. It has six academic divisions which are subdivided into several schools, centres and departments, as well as a number of support areas including central IT services, finance, and student and staff services. The institution is publicly funded, with annual revenue of around A\$400 million, 10% of which is spent on IT. The institution’s IT history began in the 1960s, with the acquisition of a computer for the mathematics department. In the early 1970s, a computer system was installed primarily for teaching purposes. This was followed by the in-house development of an accounting package, signalling the first move towards corporate applications. The institution decided on continued development of both teaching and administrative applications, although these were to be handled separately. Since the various teaching and administrative divisions had specific application needs, the decisions regarding the procurement or development of applications lie with the divisions. In the late 1980s the institution received its first Australian Academic and Research Network (AARNET) connection and the use of email followed soon after.

Institution B was established in the early 1900s. It has over 2000 academic and administrative staff members and over 16,000 students. Like Institution A, it aims to advance teaching, learning and research. It has nine academic divisions and a number of support areas. The institution has an overall strategic plan and a number of

divisional plans. The publicly funded institution's annual revenue is around A\$500 million about 1.5% of which is spent on central IT and about 4.5% across the divisions. Divisional IT services and the library have separate IT budgets. Historically IT has been devolved to central administration, the academic divisions and the library.

In 1999 Institution A had an ICT review conducted by an external consulting firm. The review identified a devolved IT structure. A number of key issues including the negative impact of divergent IT directions in the divisions on overall corporate effectiveness, inadequate strategic planning and coordination related to ICT across the institution, inadequate ICT resources and lack of leadership at the senior level of senior management were reported in the review. As a direct result of the 1999 review, they adopted COBIT in the year 2000 to evaluate the current IT processes within the institution.

Institution B has recently adopted a formal IT governance model. In early 2006 they commissioned a new Strategy Manager and Director of IT to set up their IT governance model with an aim to centralize their IT governance structure. The next three sections explore the adoption and implementation of IT governance through a mixture of structures, processes and relational mechanisms in these two institutions.

IT GOVERNANCE STRUCTURES

IT governance structures include clearly defined roles and responsibility of IT executives to manage the IT structure within the organization (De Haes & Van Grembergen 2004). This may include setting up of IT committees to oversee various IT strategies and functions of IT within the organization.

Institution A

Currently, Institution A has about 200 staff members employed in the IT area. Of the 200 staff members, 100 are located in the central IT services and the other 100 within the divisions. Despite the observations made in the 1999 review it has not been possible to integrate the ICT across the institution into a single unit due to lack of an institution wide support for such a change. However, some enterprise wide standards for ICT have been developed and the need for compliance by the divisions has been recognized. Duplication of some services across the divisions remains a cause of significant concern and it is believed that considerable cost savings could result from avoiding such duplication.

Institution A has a formal reporting channel whereby the Director of central IT services reports to the Pro-Vice Chancellor. The role of the Director is primarily that of a technology professional though there is a growing realization of the need for the role to be more business oriented. The Director of central IT oversees three Associate Directors who are responsible in the infrastructure, applications and services areas respectively. A recent development has been the formation of the IT strategy committee, which reports to and advises the institution's planning and management committee. The IT strategy committee in its present form was established in mid 2005. It currently includes the Director of central IT services, representatives of all divisional IT groups, the Director of Finance, representatives from R&D, the Pro-Vice Chancellor and key stakeholders. The committee makes recommendations regarding the alignment of ICT with the goals of the institution, monitors the activities of the central and divisional IT service providers and fosters effective communication amongst them.

The formation of the IT strategy committee in mid 2005 and the development of the enterprise wide standards reflect the recognition by senior business and IT decision makers of the need for a formal IT Governance model to support a centralized decision making structure. The shift from a devolved or decentralized IT structure to a centralized structure in Institution A is consistent with the results of a survey by Mendez (2005) of IT executives in Europe which showed a significant shift in the IT organization structure from decentralized or federated models to centralized ones.

Telecommunication and network related decision making in the institution has been centralized since the beginning. However, this has not been the case with desktop computers and servers because of the IT revolution in the 1980s. This has continued to this day, resulting in the institution's federated IT organization structure. There are six divisional IT groups which manage their own servers and desktop PCs independently of central IT. The divisional IT groups have independent funding and decision-making structures from central IT. Although they provide the same kind of services as the central IT group, their standards and practices may vary from those of central IT. Over the past year central IT has moved towards developing good relationships with divisional IT managers. This has helped in the achievement of some alignment between the central and divisional IT groups.

Institution B

In Institution B, there are about 70 IT staff in central IT and a similar number spread over the nine divisions and the library. As in the case of Institution A, this structure has led to considerable duplication of IT staff efforts. IT has five major areas – administration including budget and staffing, strategy and governance, client services including desktop and student internet support, systems services including database support and systems

development, and technical services looking after network and servers. The managers of these areas report to the Director of IT who reports to the Director of Finance. Unlike Institution A, the role of the Director of IT in Institution B is that of a general business manager rather than a technology professional. This shift in the role for the Director of IT was decided in 2005 by the new Director of Finance based on his experience in the resources sector. It was believed that the position of the Director of IT required someone who clearly understood the business needs of the institution and has an overall technology focus.

A formal IT governance model specifying the various roles and responsibilities based on COBIT 4.0 was adopted at the beginning of 2006 when the new Strategy Manager was appointed. This model is now in the process of being implemented. The adoption of the model has led to a significant improvement in the involvement of business in IT decision making. The IT steering committee is expected to meet on a quarterly basis and provide an opportunity for communication on key IT issues amongst IT and business decision makers. The IT steering committee is advised by a technical advisory group which is comprised of all the central and divisional IT managers. Smaller working groups are also constituted from the divisional stakeholders and central IT staff as and when required for specific projects. The IT Director and Strategy Manager are responsible for decisions regarding standardization of IT infrastructure strategies and architecture. Decisions regarding business application needs are made by business decision makers with input from IT.

A summary of IT governance structures in Institution A and Institution B, based on the De Haes and Van Grembergen framework is shown in the table below.

	Structures	Institution A	Institution B
Tactics	<ul style="list-style-type: none"> - IT executives and accounts - Committees and councils 	<ul style="list-style-type: none"> - Yes - Yes 	<ul style="list-style-type: none"> - Yes - Yes
Mechanisms	<ul style="list-style-type: none"> - Roles and responsibilities - IT organization structure - CIO on board - IT strategy committee - IT steering committee(s) 	<ul style="list-style-type: none"> - Yes (evolving) - Yes (evolving) - No - Yes (recent) - No 	<ul style="list-style-type: none"> - Yes (evolving) - Yes (evolving) - No - No - Yes (recent)

Table 3: A summary of IT governance structures in the case study institutions.

IT GOVERNANCE PROCESSES

IT governance processes involve strategic decision making and the use of various performance monitoring frameworks and tools such as Strategic Information Systems Planning, COBIT, ITIL, Balanced Scorecard, Information Economics and others (De Haes & Van Grembergen 2004).

Institution A

The institution has an overall strategic plan and follows a balanced scorecard. ICT has an ICT enabling plan, which is regularly updated. An important issue in this regard is that this ICT enabling plan is not directly associated with a budget for strategic expenditures. The present budget allocation for ICT is for staff, software licenses, site licenses, and refreshing the IT infrastructure. Although the need for a new document management system has been recognized by both IT and business decision makers, in order for the institution to improve its record keeping, appropriate funds for such procurement are yet to be acquired.

IT management decision making within the institution is influenced by the guiding principles of the Australian ICT governance standard AS 8015-2005 and the service management standards AS 8018.1-2004 and AS 8018.2-2004. COBIT 3.0 has been adopted since the year 2000 for assessing and improving the institution's IT governance processes. A direct effect of this has been the realization by senior IT decision makers that the effective utilization of COBIT across the institution requires a more centralized IT governance environment. However, given the size of the COBIT 3.0 framework, only a small number of processes and objectives are identified for review each year. The objectives were initially based on a large number of interviews conducted across the campus in 2000 by IT staff. In subsequent years, objectives have been identified based on the original interviews and results of an annual survey of student and staff satisfaction on IT issues.

ITIL is used as the standard for service management. A number of operational level staff members have ITIL Foundation level training. The current focus is on getting better at incident management, change management, problem management, IT strategic planning and managing the IT architecture. The progress made has also been assessed against COBIT and ITIL. Consultative, Objective and Bi-functional Risk Analysis (COBRA), a software package, based on ISO17799 is being used for facilitating risk management.

Since COBIT requires the use of a standard project management methodology, Project Management Body of Knowledge (PMBOK) has been selected as the guide in this regard. Based on the perceptions of business decision makers, in the last two years IT has shown considerable maturity in project management and delivery. This is the result of adopting a strong project management methodology.

People Capability Maturity Model (P-CMM) is used as the standard of IT staff management and development. However, a lot of work is required in the area of staff development.

The value to business from the implementation of best practice frameworks has been in terms of reducing the number of ad-hoc processes, bringing a lot of discipline to IT support activities and improving accountability. Whilst IT has made significant strides since the year 2000, the IT management recognizes that there is a long journey ahead.

One problem that has been faced in implementing the best practice frameworks like COBIT, which have high resource requirements, has been the shortage of adequate staff. The demand for staff time and services are also increasing. Most of the central IT teams find it difficult and at times challenging to achieve their operational objectives. Staffing in the server support area, for example, consists of about 10 people supporting 300 servers of various kinds, implementing changes to the infrastructure as well as managing large applications being used by thousands of people. Despite the staffing issue, however, process improvements continue to take place because of the continued commitment of senior IT management.

Another key area of difficulty has been that of finding appropriate performance metrics. Currently, technical measures being used include percentage downtime, percentage access failure, the number of students accessing their email on a regular basis on the official communications channel and so on. One particular measure, the number of available desktops in the computer laboratories per student was found to be not particularly useful. It was found that when the number of desktops was doubled based on survey responses; the satisfaction level was actually lower than in the previous year. Management decision makers in the institution attribute this to the increasing expectations from ICT facilities with the rapid advances technology. The institution continues to work on developing balanced business-IT metrics.

Institution B

While Institution A has been using COBIT 3.0 to evaluate and improve key IT processes, Institution B has utilized COBIT 4.0 to develop its overall IT governance model and outline the various roles and responsibilities. The development of the IT governance model has resulted in substantial involvement of business decision makers in making decisions regarding IT investment, risk and priorities. This has made it easier for business decision makers to appreciate the value of key decisions regarding IT. The initial problem faced in the implementation of the model was the lack of IT governance concepts amongst business decision makers and the resistance to change. This is gradually being overcome and the need for accountability for IT related decision making across the institution is better accepted. This is achieved by communicating to business decision makers their roles and responsibilities in IT related decision making for the benefit of the business, without making it necessary for them to know any technical details regarding COBIT.

COBIT is also being used for risk assessment and management. While ISO17799 provides guidance on what needs to be done in the context of security, COBIT guides management on how these goals should be achieved. The IT security manager has been trained in ISO17799 and will additionally undertake the security management training program provided by the developers of COBIT.

The institution has an overall strategic plan and central IT undertakes strategic information systems planning under the supervision of the IT steering committee. Service level agreements are in place for hosting and managing application systems including the student system, the facilities management system, the HR and finance system.

At present there is a lack of enterprise-wide standards for infrastructure and applications. The key issues that IT intends to tackle over the next year include the lack of standards and controls and the existence of multiple help desks. As part of the central IT service desk project, it is planned to implement ITIL to handle change and incident management over the next few months. As part of the ITIL implementation service desk staff will be required to undertake ITIL Foundation level training. Capability is also being built up in the project management and business process analysis domain to reduce the current dependence on external consultants.

As in the case of Institution A there is difficulty in deciding on which metrics to measure. Current metrics being used include the number of service calls being answered to completion, the number of network and database administrators and the ratio of total IT cost to organizational cost. However, there is a realization that these metrics are not adequate for representing the value of IT to business.

A summary of IT governance processes in Institution A and Institution B, based on the De Haes and Van Grembergen framework is shown in the table below.

	Processes	Institution A	Institution B
Tactics	<ul style="list-style-type: none"> - Strategic IT decision making - Strategic IT monitoring 	<ul style="list-style-type: none"> - Yes - Yes 	<ul style="list-style-type: none"> - Yes - Yes
Mechanisms	<ul style="list-style-type: none"> - Strategic IS planning - Balanced IT scorecards - Information economics - Service level agreements - COBIT and ITIL - IT alignment/ governance maturity models 	<ul style="list-style-type: none"> - Yes (improving) - No (some technical measures) - No - No - Yes along with other standards since 2000 - No (considered early days for maturity models) 	<ul style="list-style-type: none"> - Yes (improving) - No (some technical measures) - No - Yes - COBIT with ISO17799 since early 2006 - No (considered early days for maturity models)

Table 4: A summary of IT governance processes in the case study institutions.

IT GOVERNANCE RELATIONAL MECHANISMS

Relational mechanisms according to De Haes and Van Grembergen (2004) include shared learning and strategic dialogue between business and IT, and ensuring proper communications at all times.

Institution A

The key stakeholder groups for central IT include teaching staff, students, business process owners, research and development, and divisional IT management whilst those for divisional IT include teaching staff and students. There are efforts being made by central IT to improve the quality and frequency of communications with these groups.

Communications often take place at the tactical level. For instance, if a significant outage of services is being considered, divisional IT contacts and business process owners are informed and their responses are used to guide appropriate decision making. In case of policy changes, emails are sent out by the particular group within IT that is responsible for that policy. The senior IT decision maker responsible for infrastructure also meets with the divisional IT management on a monthly basis. Over the last couple of years there has been emphasis on strategic level dialog. The monthly meetings of the newly formed ICT committee are also helping to improve communications between business and IT. This increased effort made by IT decision makers to liaise with business, has led to a growing perception of IT as a valued service provider rather than just a cost of doing business.

An area requiring further attention is staff development. Currently there is no staff retention program for IT staff and no opportunity for cross-training. There is also a need for increasing staff numbers in central IT. While an integration of IT services centrally might help solve the problem of staff shortage, opposition at the divisional level has yet to be overcome.

Institution B

Communication with key stakeholders is being considered to be of vital importance over the coming months in order to successfully implement the new IT governance model. The principal stakeholder groups for IT include the teaching staff, students, research and development, university administration, and the library. Communication with these groups is carried out through informal discussions, working groups and committee meetings. Unlike in previous years, conflicts between central IT and divisional IT are now actively resolved through discussions at the steering committee meetings.

The understanding of IT by business and vice versa is improving gradually and IT is emerging as an asset and a valued service provider. There has been a recent policy shift geared towards more balanced business and technical hiring within central IT.

A summary of IT governance relational mechanisms in Institution A and Institution B, based on the De Haes and Van Grembergen framework is shown in the table below.

	Relational Mechanisms	Institution A	Institution B
Tactics	<ul style="list-style-type: none"> - Stakeholder participation - Business/IT partnerships - Strategic dialog - Shared learning 	Improving on all counts	Improving on all counts
Mechanisms	<ul style="list-style-type: none"> - Active participation by principal stakeholders - Collaboration between principal stakeholders - Partnership rewards and incentives - Business/IT co-location - Shared understanding of business/IT objectives - Active conflict resolution (non-avoidance) 	<ul style="list-style-type: none"> - Improving - Improving - No - Improving - Improving - Recent attempts 	<ul style="list-style-type: none"> - Improving - Improving - No - Improving - Improving - Recent attempts

	- Cross-functional business/IT training	- No	- No
	- Cross-functional business/IT job rotation	- No	- No

Table 5: A summary of IT governance relational mechanisms in the case study institutions.

FINDINGS

The paper addresses the question of how formal IT governance practices can be adopted within the higher education environment. The increased dependence of IT in the higher education environment has also led to the awareness of the need for adopting formal IT governance practices. As seen in the previous sections both institutions have been implementing IT governance through a mixture of structures, processes and relational mechanisms. Based on the experiences of Institutions A and B, the following findings emerge with regard to the implementation of IT governance:

- (i) Professionals in both institutions agree that while an institution of higher education has to deal with low staffing levels, this should not be a deterrent in adopting industry best practices. They also agree that instead of adopting any one best practice framework, it is important to evaluate the strengths and weaknesses of the business and selectively adopt a combination of the relevant elements of best practice frameworks and standards such as COBIT, ITIL, ISO17799, AS 8015-2005, AS 8018.1-2004 or AS 8018.2-2004 that are necessary to support the business.
- (ii) The two institutions vary in their approach in implementing COBIT and in the version of COBIT being implemented. The application of COBIT 3.0 for improving individual processes was an important eye-opener for management in Institution A because it focused attention on the need for centralization of decision making, having well defined IT governance roles and responsibilities, and developing enterprise-wide standards. In Institution B the overall IT governance structure is being implemented based on the COBIT 4.0 framework. It is believed that this approach would help in the utilization of COBIT 4.0 for improving processes across the university rather than just at central IT.
- (iii) Institutions of higher education may benefit from experiences gained in IT governance implementation in other industries. In the case of Institution B, the background of the Director of Finance in the resources sector helped in identifying the need for the role of the Director of IT to be more business oriented (a need also being gradually recognized in Institution A). The Strategy Manager's background in the finance sector helped in developing the governance model for the institution fairly quickly based on the COBIT 4.0 framework.
- (iv) COBIT requires the use of a good project management methodology. Institution A's adoption of COBIT has led to its adoption of PMBOK. This was particularly important as the institution's IT staff does a considerable amount of the project implementation and delivery work in-house.
- (v) A key difference between COBIT and ITIL noted by professionals in both organizations is in the availability and cost of documentation. There is a considerable amount of COBIT related documentation and research papers available free of cost from the Information Systems Audit and Control Association (ISACA) website and additional information is available through mailing lists. ITIL documentation, on the other hand, is considerably more expensive.
- (vi) Both institutions have realized that although the use of multiple learning management systems and multiple email systems may be the existing norm in the divisions, this leads to duplication of ICT staff efforts without increasing the satisfaction of staff and students across the institution. A consolidation of systems could potentially help in the reduction of staff numbers (leading to reduced costs) while providing a better direction for staff efforts.
- (vii) In both institutions, the disparity in ICT services across the institutions lead to difficulties in managing the perceptions of students and staff. In Institution A, student dissatisfaction with ICT services at the divisional level is reflected on their perception of ICT in general in the annual surveys. A consolidation of services (e.g. helpdesks, printing) could help in maintaining the same standards of services across the institution (in both cases) and make it easier to manage perceptions.
- (viii) In both institutions improving communication between central IT and divisional IT groups are helping in the general acceptance of central IT standards.
- (ix) In both institutions improving communication between IT and business has led to the gradual acceptance of IT as a valued service provider rather than just a cost of doing business, in an institution whose core business is not IT.

De Haes and Van Grembergen (2004) provide a broad framework for implementing IT governance through a mixture of structures, processes and relational mechanisms (as discussed in Table 1). However they do not

explicitly discuss the relations between these three and how they relate to corporate structures, processes and relational mechanisms and IT-business alignment. The model that is emerging as a result of this study is illustrated in Figure 1.

As illustrated in Figure 1, the study suggests that the development of IT governance structures (eg. an IT strategy committee) leads to improved relational mechanisms and the adoption of IT governance processes (eg. the implementation of best practice frameworks such as ITIL) across the enterprise. The findings associated with Institution A suggests that there is a need to have a formal IT Governance structure with clearly defined roles and responsibilities in order to facilitate the adopted IT governance processes. As discussed in the findings, Institution A is shifting to a centralized IT governance structure. By adopting a formal IT Governance structure, Institution A strives to strengthen relational mechanisms. Improving relational mechanisms through formal and informal communications ensures broader support for improving IT governance structures and processes. The findings associated with Institution B affirms the model as shown in Figure 1 in that they used COBIT to guide, develop and establish a formal IT Governance model including various structures, processes and relational mechanisms. Whilst Institution B presently lacks enterprise-wide standards (eg. architectural, service management), they plan to implement ITIL as the service management standard with their IT staff requiring to undertake ITIL Foundation level training. Institution B has also considered key stakeholders to be vital and this has resulted in a policy geared towards a more balanced between business and IT hiring within central IT. Optimizing the balance between structures, processes and relational mechanisms could lead to substantial benefits for business through improvements in the five focus areas of IT governance identified by the IT Governance Institute (ITGI 2005). The focus areas being strategic alignment, value delivery, performance measurement, resource management and risk management as indicated in Figure 1.

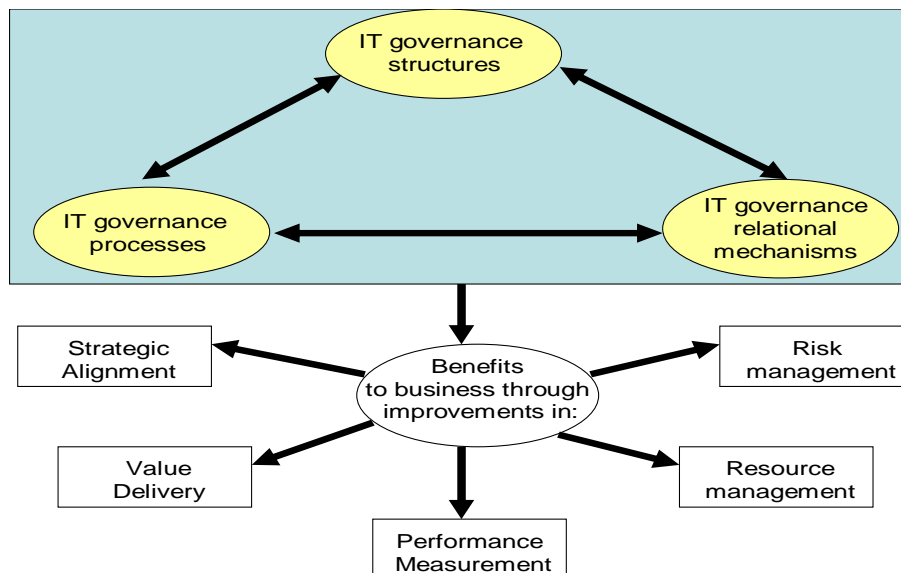


Figure 1: The emerging IT governance and business benefits model.

CONCLUSIONS AND FUTURE WORK

The paper highlights some key issues regarding the adoption of formal IT governance practices in the higher education sector for the benefit of practitioners, academics, and researchers. While some useful insights into IT governance practices in this sector have been obtained from this study, the researchers intend to conduct a number of case studies in order to generalize findings in the context of this sector. Further investigations of the nature and extent of IT governance practices in the higher education sector in Australia would also help in testing the IT governance-business benefits model discussed in the previous section. A longitudinal study would give a better indication of the business benefits of formal IT governance practices.

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