2001

Electronic Commerce Risk: The Role For Standards

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Abstract

Boards of directors are under increasing pressure to be fully responsible for the risks undertaken by their organisations. Electronic commerce applications, especially business-to-business, generate risk across a broad spectrum. Australian standards exist for information security management and risk management but they may be inadequate to meet the increased challenges of electronic commerce and the increasing accountability of boards. This paper reports on the first stage of a study that will test the adequacy of existing Australian standards, and develop monitoring tools and business processes that will enhance security and assess risks. Board members have been interviewed to develop a set of constructs that describe their risk governance of electronic commerce projects.

Keywords

Electronic commerce, IS risk management, standards, disaster plans

INTRODUCTION

> The effectiveness of a board is dependent to a substantial extent on the form, timing and quality of the information which it receives (Hampel 1998, p.23)

Corporate boards must be informed about the organisations that they control, and exercise due diligence in ensuring the minimisation of risk. Today, however, the risks associated with growing electronic commerce are complex and interdependent. It is the over-riding aim of this research to build a bridge of understanding between the electronic commerce system developers and the boards governing their organisations.

Electronic commerce is having a significant impact on the Australian economy in terms of investments, retail activity and business-to-business efficiencies. Banks have developed on-line banking, stockbroking and loan applications. Retailers offer on-line shopping, often linked to loyalty programs, electronic mail and personalised shopping. Computer hardware vendors offer customer sales and support globally through their websites. Electronic communities between business organisations have redefined the relationships between suppliers and purchasers in many industries and product areas. Business-to-business electronic commerce is growing rapidly, with electronic procurement exchanges available to most organisations.

The Parliament of Australia, Parliamentary Library Research Paper 18 (Cobb 1998) highlighted Australia's vulnerability to high technology risks, particularly to our trade infrastructure and computerised systems. It proposed that a National Infrastructure Protection Agency should be established to include (*inter alia*) a warning centre responsible for monitoring the operation of the infrastructure and detecting irregularities. Furthermore, the (Australian Federal) Minister for Financial Services and Regulation, Mr Hockey, has drawn attention to the failure of corporate boards to deal with the challenges of the so-called 'new economy' (SMH 2000).

Globalisation means that, simultaneously with the increased opportunity for Australian organisations to sell their goods and services to a world-wide market, Australian markets are themselves opened up to competition from around the world (DFAT 1999). Well-managed electronic commerce systems will be a cornerstone of significant economic development in Australia. This situation is mirrored in all developed economies.

The appearance of electronic commerce applications within the information technology portfolio of an organisation will typically increase the overall level of complexity. The new system has its dedicated hardware and software, but it must also be integrated into existing back-office or legacy systems, as well as working with industry alliance partners, customers and suppliers. Transaction volumes (such as in online stockbroking) have the potential to increase significantly as new behaviours (e.g day trading) emerge in the marketplace. While returning flexibility to users and creating new profit streams for organisations, such growth also represents real shifts in the risk experienced by those charged with overseeing corporations.

Risk in e-commerce is only partially understood. The inherent insecurity of the internet, through its openness, is one example of such risk. To date, the internet security issue has taken a predominantly technological approach to this point.

Within this context, there is growing pressure around the world for higher standards of corporate governance to be required. The Hampel (1998) report from the UK establishes principles that can reasonably be expected to emerge in Australia and around the world. Boards of publicly listed companies and public corporations are expected to exert their duty of care to monitor the risks that the organisation is taking. Yet the risks are increasing - a double-edged sword.

Aims

Security is the persistent challenge impeding electronic commerce system proliferation. Our overall aim is to build upon and enhance existing theories of communicating risk to corporate boards, faced with this challenge. Specifically we will assess risk management and information security management practices that are utilised in providing information to board members and in communicating the board’s directives to the organisation.

This research aims to test and enhance existing theories of information security management and risk management so that they can be used to monitor the risks of electronic commerce systems to meet the elaborated needs of corporate boards.

The proposed research will work from three directions: requirements of boards, implemented architectures of electronic commerce systems, and established practices in risk and information security to establish theories that can be applied at the operational level that will generate appropriate information at the board level. This paper is concerned with only the first of the three components.

This research lies at the heart of the challenge to governments to let electronic commerce deliver significant economic benefits. The (Australian) Commonwealth Government has, through the National Office of the Information Economy, indicated the potential that may be derived for the economy, and has made significant investments in innovative programs.

Major impediments to the rapid uptake of electronic commerce systems are the perceived risks (Ernst & Young 2000). With increasing pressure on boards to take responsibility for risk undertaken by their organisations, it is critical to supply them with rigorous, tested, reliable information about the risks that these systems generate.

We aim to generate new, valuable theories that link elements of risk from the lowest, operational levels in the organisation, through the risk management function to the risk governance that is required of the board. Furthermore, key variables - performance indicators - for risk management will be established to enable further rigorous research in the domain.

THEORETICAL FRAMEWORKS

There have been many approaches to risk management within organisations, coming from such perspectives as audit and control, financial management, insurance, operational continuity, crisis and emergency management, and from the professional practice of 'risk managers'. An even wider view (Pricewaterhouse Coopers 1999) included entrepreneurial risk within a framework for developing a risk map for an organisation. Increasing concern that boards should monitor and take responsibility for risk management has been shown in Hampel (1998), whose report has been adopted by UK listed companies. In Australia, the Australian Stock Exchange (ASX) now requires listed companies to include a "Statement of Corporate Governance Practices" in their annual report and also to identify areas of significant business risk and arrangements used to manage those risks.

In 1995 Standards Australia (in cooperation with Standards New Zealand) issued a risk management standard, now revised (Standards Australia 1999) that describes a generic approach to risk management, that is being considered for adoption as a world standard by the International Organization for Standardization (Pricewaterhouse Coopers 1999).

Computerised systems have been the subject of another standard (Standards Australia 1996) which has been widely accepted in the IT industry. It modifies previous UK standards which themselves form the basis of new international standards. This standard is not prescriptive, rather presenting good practices that are to be encouraged to enhance information security. It does not include performance measures or summative indicators.

The researchers intend to build on the foundations of these two Australian standards, drawing additional influences from the Hampel and Pricewaterhouse Cooper reports, as well as the recent Ernst & Young study of risk management perceptions in Australia (Ernst & Young 2000). In particular there is a need to develop performance measures for risk management of electronic commerce systems so that contributing factors can be rigorously tested.

There has been substantial professional practice in the area of risk management, one that has not been accompanied by rigorous theories. This divergent status of practice and theory is also to be found in the board of directors' formal role in monitoring risk within the organisation, although this is a much newer concern.

RESEARCH PLAN AND METHODS

This phase of the research project is driven by two key questions:

- Are official standards in risk management and information security management sufficient for assessing risks of electronic commerce systems?
- Are Boards of Directors satisfied with information from official standards, in carrying out their duties of risk monitoring or governance?

Broad hypotheses created from these questions are as follows, focussing on electronic commerce systems as the experimental cases.

1. AS4360 (Risk Management) and AS4444 (Information Security Management) are known and used by boards
2. Boards of directors are satisfied with information according to AS4360 and AS4444.

Methodology

In this phase we conduct a study of board members of organisations, examining their perceptions of board and management actions concerning electronic commerce projects. The interviews are content analysed to test the adequacy of existing theories and to extend them in necessary areas.

A random sample of companies was selected from the Australian Who's Who of Company Directors. This was restricted to companies ranked in the Business Review Weekly top 1000 organisations in Australia. From the randomly selected companies, each director was reviewed. Those with two or more such directorships were included into the mailing list. The random sample was such that a mailing list of 50 individuals was created. Personalised letters were sent to these individuals requesting their participation in the study.

The approach taken was one of Grounded Theory (Glaser and Strauss 1967) and a short semi-structured interview framework was constructed. Items included were:

- What boards are you a member of? What is your role in these boards?
- How much do you know about electronic commerce? What do you see as its risks and rewards? Threats and opportunities?
- Have you had any involvement in electronic commerce projects? As a board member / otherwise? What were your experiences?
- How are electronic commerce ventures reviewed in your boards? Do the boards have risk assessment routines for these ventures?

An initial target of eight such directors was extended as the range of issues raised in the early interviews was wider than had been anticipated. If the issues of standards was not raised by the subjects, it was introduced by the interviewer. Eventually 13 directors took part in the study with collective representation on more than sixty boards.

In most of the interviews, two researchers were present. The proceedings were tape recorded and transcribed later. Content analysis was performed using categories raised by the subjects.

CONTEXT FOR RISK

The Australian Standard AS 4360 (Standards Australia 1999) for risk management presents the model shown in Figure 1, below.

Examination of this model reveals that the likely roles for boards and their members are in the first box: establish the context and in the oversight role: monitor and review. That is, we expect board members to be setting risk management policies and evaluation criteria. They would then assure themselves that these are in effect and are adequate, under their 'monitor and review' role. While board members should not be necessarily identifying risks, it is possible under the model for risk issues to be brought to the board's attention.

The first phase "Establish the context" contains a first step "Establish the strategic context" that includes many issues relevant to board members:

> Define the relationship between an organisation and its environment

> Identify the organisation’s strengths, weaknesses, opportunities and threats
> Context includes financial, operational, competitive, political, social, client, cultural and legal aspects.
> Identify internal and external stakeholders, consider their objectives and establish communication policies with these parties. (Standards Australia 1999) page 9.

Corporate governance requirements vary between public and private organisations, listed and non-listed, however a clear role for board members is to monitor and report on risks faced by the organisation. For this the framework adopted by Pricewaterhouse Coopers (1999) is particularly strong in referring to partner risk, entrepreneurial risk and corporate governance issues of risk. Risk of disintermediation is one risk that is frequently cited as a concern for existing intermediaries in the move to electronic commerce.

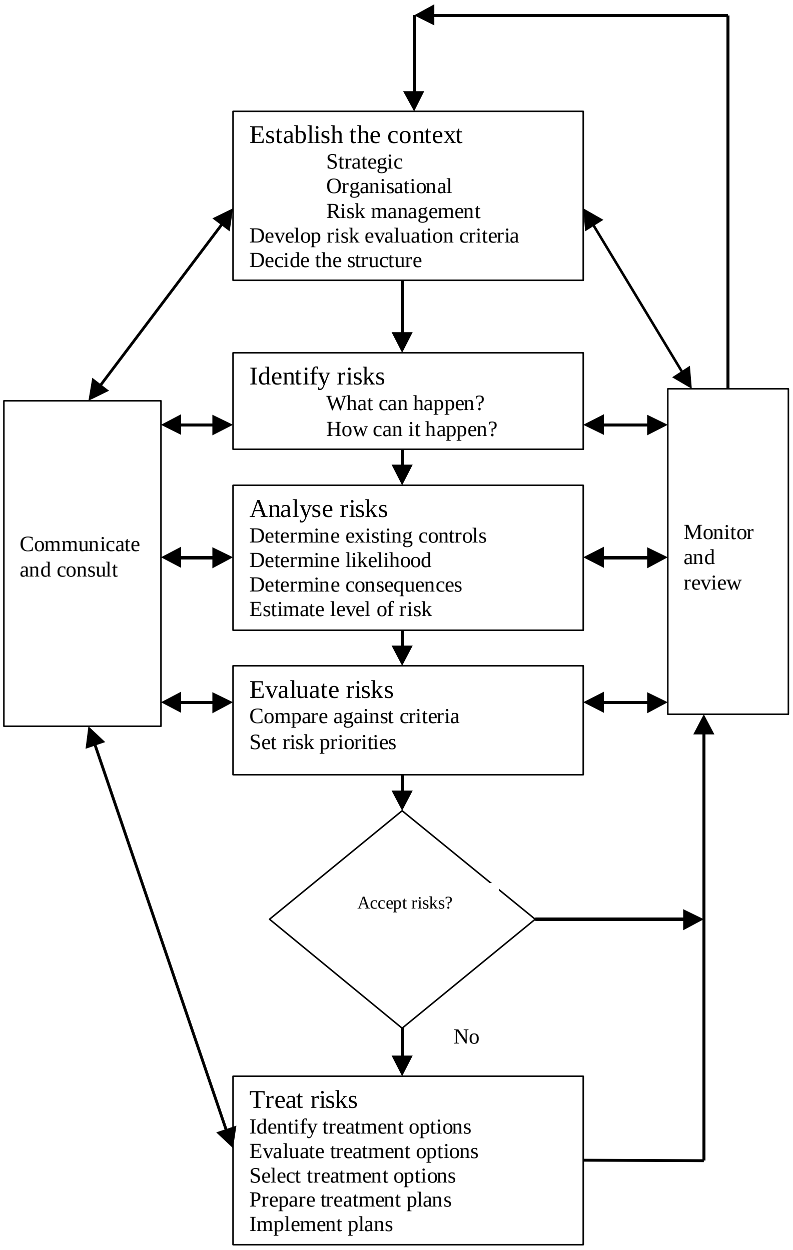

Figure 1: The risk management process (Standards Australia 1999) p.11

Thus to develop an instrument to study risk associated with electronic commerce, it will be necessary to integrate factors from many domains. Furthermore, demographic characteristics of board members, such as age, IT ‘comfort’, perceived specialist role on the board, and previous experience may have very significant impacts on the processes and methods used.

ELECTRONIC COMMERCE RISKS

Before examining the data, it is appropriate to consider the e-commerce issues that affect corporate governance. There are two main categories :

> the infrastructure on which e-commerce depends, and
> the specific security risk hazards that arise from e-commerce, both in development and in operation.

These are considered below.

Infrastructure

E-commerce relies on the technical IT infrastructure, the system that connects together and coordinates the computer systems within an organisation and supplies the common services such as databases and electronic mail (Davenport 1993). Although it is a means not an end, the IT infrastructure has strategic importance (Venkatraman 1991). The ability of an organisation quickly to introduce strategic innovations is dependent on the design of the infrastructure (Duncan 1995). An inappropriate or inflexible infrastructure can act as a constraint or inhibitor to the introduction of new facilities (Davenport 1993, Earl 1994, Wastell, White and Kawalek 1994, Brancheau, Janz and Wetherbe 1996, Weill and Broadbent 1998). Building the IT infrastructure is a long-term task (Latour 1996) and it has to be designed to remain in use for a period of years because of the costs, skill requirements and upheaval involved in adopting a new infrastructure.

It would follow that the IT choices to be made in changing IT systems to incorporate e-commerce need to be made very carefully. A short-term solution may suffice for a short period, but it may mean that significant extra expense and unforseen delays may occur before future strategic changes can be implemented. The selection of an e-commerce system thus requires both

> good and up-to-date technical knowledge, and
> a knowledge of the organisation's long term strategic intent, the medium to long term objectives of the organization (Hamel and Prahalad 1989).

Hazards of e-commerce

The opening of the infrastructure to the outside world may introduce new hazards. Three hazards are of particular concern: visibility of hardware and software failures, hacking and denial-of-service attacks, and internal breaches of security.

Hardware and software failures become more visible.	eBay, the Internet auction site had two failures in 1998, one, a two-hour failure on 3rd November caused by a server fault (Sprenger 1998a) and the second, caused by a failed software upgrade, caused a six-hour shutdown on December 6th - 7th (Sprenger 1998b).
Hacking and denial-of-service attacks	Denial of service attacks are now routine hazards that are reported in the media regularly. Particularly serious are the distributed denial of service attacks that are becoming more common. Hackers are now spoilt for choice of targets, perhaps the most significant defence.
Internal breaches of security	The KPMG 2001 Global E-Fr@ud Survey (KPMG 2001) notes that security breaches through Internet connections are typically attributed to (external) hackers. "However, based on our experience, most security breaches perpetrated through Internet connections are committed by individuals who possess intimate knowledge of the systems that they are attacking. Disgruntled or former employees may commit the breach themselves, or they may supply the information necessary to commit the breach to a more knowledgeable person, who will commit the breach on their behalf" (KPMG 2001, page 10).

Responsibilities of the Board

The previous paragraphs have outlined the nature of the risks to the organisation that e-commerce can bring. There are technical risks, which are unlikely to be known to the vast majority of board members, and operating risks, some of which will be known because of the media atttention they have drawn. To appreciate the risks to which they are exposing their organisation, then, it will be necessary for the Board members to receive advice.

ANALYSIS OF DATA

The appendix includes a range of direct quotations from board members. It has been structured to highlight their perceptions of the nature of risk, board risk management processes, the strategy-making process, and IT decisions generally. Overwhelmingly board members did not know whether their organisations followed standards and felt it was not their concern. Such decisions were to be taken by managers. Thus the hypotheses were not supported in any way by the interviewees. The interviews did give a rich understanding of the risk perceptions and context of board members, which informs their implicit role in the use of standards, even if they are explicitly uninvolved.

Executive board members, such as CEOs or Managing Directors, perceived themselves as the channel for the flow of information, issues, priorities and understanding between the board and other management. Thus the active role in the establishment of the risk context - as specified by the standard - was felt by them. This did not extend so clearly to other board members.

However, board members gave significant regard to shareholders above other stakeholders and were more concerned about threats than the other SWOT components. In many cases it was pointed out that some e-commerce opportunities were also threats, timing being critical.

Board members also emphasised their role to review and approve management decisions, rather than initiating activities. Thus the role of the board towards e-commerce projects generally was to give management proposals the strongest review and criticism.

However, the evaluation of risks was frequently mentioned as an item for which board members were responsible. Appropriate corporate governance in Australia requires board members to be aware of all risks that the business is undertaking. This is clearly interpreted to require their assessment of risk. On the other hand, board members uniformly did not expect to participate in the 'risk treatment' phase.

Thus the AS4360 Risk Management reference will be insufficient as an instrument in reviewing board roles. It is also lacking in specifics about IT projects generally. Board members discussed issues of development risk, implementation risk, partner risk, technology risk and product risk. Operational risks are covered in the Information Security Management standard, AS4444, (Standards Australia 1996) but as the standard is aimed substantially at existing systems, development and implementation issues are not covered. The relationship of IT continuity to business continuity is also important (Musson and Jordan 2000) and needs to be included.

The position is different in the UK. The "Combined Code" ("Internal Control: Guidance for Directors on the Combined Code" from the Committee on Corporate Governance of the London Stock Exchange), the mandatory risk reporting regulations for UK listed companies, says:

> "The board of directors is responsible for the company's system of internal control. It should set appropriate policies on internal control and seek regular assurance that will enable it to satisfy itself that the system is functioning effectively. The board must further ensure that the system of internal control is effective in managing risks in the manner which it has approved." (ICAEW 1999, Section 16)

This is binding on the directors of UK listed companies.

The issues that arise from the analysis can be categorised as general issues - how the board deals with risk - and ecommerce issues, where the status quo has been disturbed and board members need to modify their stances. They form the basis of the items to be included in a questionnaire developed from the responses. This questionnaire is currently being trialed and will be widely distributed to board members shortly.

General Issues	**E-commerce issues**
How does your Board manage the assessment of risk of new projects?	Has the move to e-commerce caused your business strategies to change? Who proposed the changes?
Who is responsible for the existence of risk management procedures that are satisfactory to the Board?	Do you see e-commerce as posing a risk to your organisation?
Who is responsible to the Board for taking action on risks?	Have you amended your risk management procedures to cope with the new e-commerce risks? Who produced the changes to the procedures?
How are newly arising risks within the organisation discovered and assessed?	How would your board ensure that a new e-commerce programme was evaluated for risk?
How do you and your fellow directors become aware of serious, newly arising risks to your organisation?	What risks do you see for your organisation in engaging in e-commerce?

CONCLUSION

The established literature such as Australian Standards for Risk Management and Information Security Management is clearly aimed at management, and a 'risk governance' perspective is taken by boards of directors. The proposed research instrument will examine the role of the board in monitoring the risk management processes that are used, rather than in examining the risk management processes themselves. A very significant proportion of boards are dealing with electronic commerce risks in new ways, ways that have not been used before. The responsibility of board members, to become informed of the relevant issues in electronic commerce, is an issue raised by many of the subjects.

Thus, the monitor and review component of the AS4360 model in Figure 1 is one that boards see as important for them, but **what** they are monitoring and reviewing differs somewhat from the other elements of the model. The proposed research instrument will be valuable in revising risk management thinking, in particular giving risk management professionals better guidance into the requirements and expectations of their governing boards.

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APPENDIX - SELECTED DATA

The following represents a collation of the interviews to aid the discussion and analysis in the body of the paper.

Words in brackets [ ] are added to assist understanding; they do not distort the meaning or intentions of the speaker. Italics are used for direct quotation.

The Nature Of The Risk

Some of the respondents understood the general nature of the risk of e-commerce.

> The risks included *"…operational risk…credit, legal, compliance [issues]"*
>
> *"I think that boards are increasingly looking at how do we grow this business, there are entrepreneurial risks that are taken"*
>
> There is a risk of being pre-empted by competitors *" If your whole game is threatened, if you can argue that you will be out of the game..."*

Others did not

> *"… I don't think that any [directors] see [e-commerce] as risk…"*

There were also doubts about the long-term issues raised by e-commerce.

> *"We are being confronted by things we don't understand. This technical issue; what are the hardware and software possibilities and what are the implications of poorly-understood hardware and software developments over the next five to ten years? What are the possibilities that they bring and what [do] the economics of them look like?"*

The Board Risk Management Processes For E-Commerce

The remarks on the risk management processes that would be used to examine e-commerce proposals put to the Board were less than reassuring. There were several opinions

It's A Management Task

> *"They [directors] leave it [the assessment of the risks] to management"*
>
> *"There is always a fine line between board responsibilities and management responsibilities but I think that it [the risk management process] is primarily a management responsibility. What the board has to ensure is that if there is a process, that it works"*
>
> Speaking of e-commerce risk *"It's a management decision, management would report on initiatives like that outlining the advantages and the risks"*

Or a Consultant's Task

> *"Most [directors] are very content to delegate it [risk] to management….[or] to consultants…[there is] a tendency to accept the recommendations of management which tend to echo the recommendations of the consultants"*
>
> *"You rely tremendously on experts in e-commerce"*

Or the Task of the Audit Committee

> *"The board would rely on the audit committee for monitoring [of risk]"*

Or Not!

> *"Any director who says 'e-commerce, that's the audit committee', that's a load of rubbish. The audit committee's got no more expertise. You've got to trust management".*

There are doubts about the degree of risk testing done by the board

> *"I feel that around the board table, you have got certain age groups, the older the board the larger the trend is really there not to be any e-commerce understanding and while it's seen as a shift in direction…, the average board… doesn't like change".*
>
> *"Whatever comes back to the board tends to be rubber stamped if it seems sensible, but there is no thorough analytical review in the way you would have in other areas where the directors know what is going on. It's treated as a sort of black box"*

There are some directors who can see problems with risk management for e-commerce

> *"I don't think that our processes [for evaluation of an e-commerce project] are substantially different to the process we use to evaluate new business opportunities and capex proposals"*
>
> *"Directors use the same process for all risks"*
>
> *"For businesses [who are] going to embark on an e-commerce strategy, one of the bigger risks for them is to really understand…how do they make those decisions?"*
>
> *"I don't think that risk management is taken [by boards] to a very high level in Australia today"*
>
> *"On my boards, the checks and balances have been put in, but more in a global sense than in a specific sense".*

There was no single strand of opinion on how the risks of new and strategically important ventures such as e-commerce were to be managed. The opinion generally was that the Board would rely on management or the audit committee to evaluate the risks. There seemed to be no feeling that the Board owned the risk management process.

The Strategy-Making Process

It is clear from the interviews that it is not generally the view of directors that it is a board responsibility to produce the strategic plan. It was generally their view that the board sets the broad direction of the organisation. Some of the comments, however, suggested that it was management that set the agenda and that the Board reviewed their actions.

> *"Boards should do nothing more than give the big picture…. Management should fill in the blanks, go back and do the detail and plans and the board should question them and confirm the plans.."…"The board should set the big picture, it should not be a micro-management, strategy setter…that is probably the most important role the management has, the question of making sure the focus of the company is in the right place".*
>
> *"…a board's not there to be a policeman, a board's there to be a coach, to be…an encourager and look at overall policy and strategy" . " …I'm tending to see a specific driven road being put in place by the management team".*
>
> *"the directors are conscious that they are reliant on management [for e-commerce strategy]"*
>
> *"…I really think that management should have enough expertise and capability…to really understand better than anyone else its own market and its customers and that it should… be presenting to the board…significant [new strategies]. I think it's the board's responsibility to… ask appropriate questions of management [to] ensure that management has really thought through the bigger picture…".*
>
> *" …management submit [strategic] plans to the board before implementation"*
>
> *" …[strategy is] done by management within the delegated authority"*
>
> *"The [e-commerce] projects we have done are at a level that the management had prerogative to move on anyway…"*

Only one director, a CEO of a large organisation, said that he had be instrumental in driving a strategy on e-commerce. However, he is the only executive director on the board, and in his strategy development work he was acting as the most senior member of the management team. He noted that the rest of the board was relying on him to *"make it happen"*. He said that he went to his direct reports, the CEOs of the operating divisions and told them that e-commerce was *"something that you must consider as part of the overall plan*". With these CEOs, he put together a management team to devise the strategy, or in his words *"resourced people from the various businesses, (set up a group) of people who were really looking at it"*. These submissions were made to the main board which *"evaluate(s) the company's overall strategic plan"*.

IT decisions and the Board

The Board members made few references to IT, itself a significant matter in the context of a discussion about e-commerce. The comments that were made did not engender a great deal of confidence.

> Speaking of IT projects in general *"[the CEO] put his hand up and said, you know, I'm sixty-one years of age and I don't have a clue and I probably don't want to have a clue*"
>
> *"I think a preponderant number of directors in Australia [think] that it's all too hard, and should be left to the next generation or to their children or therefore to management"*

ACKNOWLEDGEMENTS

This work could not have been undertaken without the initiative and support of Gadens Lawyers.

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