

CHAPTER 7

ENVIRONMENTAL RISK MANAGEMENT AND ENVIRONMENTAL MANAGEMENT ACCOUNTING – DEVELOPING LINKAGES

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Abstract. Frameworks for environmental management accounting refer to a number of tools that assist managers to address the environmental effects of their businesses. One area that has not received systematic attention is the link between environmental management accounting information and risk (and environmental risk) management. As a step in this direction the paper, first, reviews risk management and environmental risk management while developing five research questions related to disclosure of information by Australian Commonwealth public sector entities; second, details the research method and sample of public sector entities examined for the four-year period 1999-2002; third, considers the empirical results. These show an increasing level of disclosure and greater disclosure by non-budget entities. The paper draws conclusions and discusses possible future research opportunities in the context of links between environmental management accounting and environmental risk management.

1 INTRODUCTION

Risk is the chance of something happening that will have an impact upon objectives. It is commonly measured in terms of consequences and likelihood (SA/SNZ, 1999a s.1.3.5). Risk management is the term applied to a logical and systematic method of establishing the context, identifying, analyzing, evaluating, treating, monitoring and communicating risks associated with any activity, function or process in a way that will enable organisations to minimize losses and maximize opportunities (SA/SNZ,

1999a p. 1). Since the concept of ecologically sustainable development appeared (Commission for the Future, 1987) and the related 'precautionary principle' was introduced (Commonwealth of Australia, 1990 p. 9), environmental risk has become a growing concern (Schaltegger et al., 2003 pp. 195-203). An Australian and New Zealand Standard for risk management was introduced by two bodies working together, Standards Australia and Standards New Zealand, in 1999 (SA/SNZ, 1999a) and this was followed in 2000 by a specific environmental risk management (ERM) standard (SA/SNZ, 2000). The standards make it clear that regular, ongoing communication with the full range of the organisation's stakeholders is important to the continuing success of the risk management approach (SA/SNZ, 1999a).

In Australia, the Commonwealth¹ government accepted the importance of ERM where the interests of future generations are concerned and where there is the potential for irreversible environmental impacts (Commonwealth of Australia, 1990 p. 9). In 1992, the Commonwealth and other levels of government signed an 'Intergovernmental Agreement on the Environment' in which the parties agreed that the precautionary principle should inform policy making and program implementation (IGAE, 1992). When applying the precautionary principle decisions should be guided by (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and (ii) an assessment of the risk-weighted consequences of various options (IGAE, 1992 p. 14). Reconfirmation of a commitment from the Commonwealth government to ecologically sustainable development in the Commonwealth public sector occurred in 1999 with the passing of the Environmental Protection and Biodiversity Conservation Act (the Act). Under the Act section 516A(6)a requires Commonwealth entities², in their annual report, to include a report on how the activities of, and the administration (if any) of legislation by, the reporter during the period accorded with the principles of ecologically sustainable development, including the precautionary principle (the Act s3A) and, in effect, to document the outcome of decisions made and actions taken by management. The focus here is on the information that external parties can obtain in Commonwealth public sector annual reports through disclosures of information about management decisions related to risk management, especially ERM.

Management accounting systems provide the basic information for disclosures made in annual reports (Hornigren et al., 1997 p. 2). Environmental management accounting (EMA) relates to the environmental component of management accounting (Schaltegger and Burritt, 2000). External disclosure of EMA information about environmental risk management is largely voluntary – at the discretion of management. Given the proclivity of the Commonwealth government to encourage external reporting of ecologically sustainable development activities by Commonwealth entities since 1999, it is of interest to establish the extent and direction of disclosures relating to risk management and ERM by these entities. This provides an indication of the leadership and support being exhibited by Commonwealth entities.

An understanding of the potential EMA disclosures that could form the basis for external disclosures provides some appreciation of the current importance of risk management and ERM. No presumption is made that environmental risk is a matter that Commonwealth entities are exposed to. The empirical component of this paper simply considers whether any such entities do disclose risk, including environmental risk, management information.

The paper proceeds as follows. In Section 2, risk management and ERM processes are introduced and research questions formulated. In Section 3, the research method and characteristics of the sample are explained. Section 4 examines the results of the analysis of communication of risk, including environmental risk, management information by the sample of Commonwealth of Australia public sector entities in annual reports. Conclusions drawn and potential future research are considered in the final section.

2 THE RISK MANAGEMENT AND ENVIRONMENTAL RISK MANAGEMENT PROCESS

Risk management is an iterative process consisting of well-defined steps which, taken together, support better decision making by contributing a greater insight into risks and their impacts (SA/SNZ, 1999a iii, SA/SNZ, 1999b, Beer and Ziolkowski, 1995). The world's first risk management standard was produced by Standards Australia and Standards New Zealand (SA/SNZ, 1999a). It is a generic, strategic and operational tool, designed to help any organisation minimize the losses and maximize the opportunities generated by different types of risk³. For example, the effective delivery of public sector programs is enhanced when possible adverse outcomes are managed through this process and their potential severity reduced, or when possible opportunities are taken to benefit the organisation from reduced risk. ERM has been separately addressed, using the same principles and processes as suggested for risk management (SA/SNZ, 2000). Experiences of some organisations in implementing risk management practices have been reviewed by Standards Australia (SA, 2000), although at this stage these do not extend to experiences in implementing ERM systems.

As risk management in the public sector is considered here it is useful to be aware of the Management Improvement Advisory Committee of the Management Advisory Board's model developed for risk management in the Australian Public Service, introduced in 1996 and based on the following six-step approach (MAB/MIAC, 1996):

1. Establish the context (i.e define the political, social, economic, legal and physical environment in which the activity is conducted);
2. Identify all risks arising from the environment (i.e identify the source of each risk, when, where, why and how it is likely to occur, who might be involved and what its consequences might be);
3. Analyze the risks (i.e determine the likelihood and impact of each risk occurring, taking into consideration any existing controls which may detect or prevent potential or undesirable risks);
4. Assess and prioritize (evaluate) risks (i.e. consider the degree of control over each risk, the cost, benefits and opportunities presented by each risk, decide which risk(s) are unacceptable and rank them for treatment);
5. Treat risks (i.e. decide what cost-effective counter-measures need to be in place to help minimize the unacceptable risks and/or their impact and prepare and implement action plans); and
6. Continually monitor and review risks (i.e. periodically review the environment, known and potential risks, priorities, treatments and plans, and make adjustments as necessary).

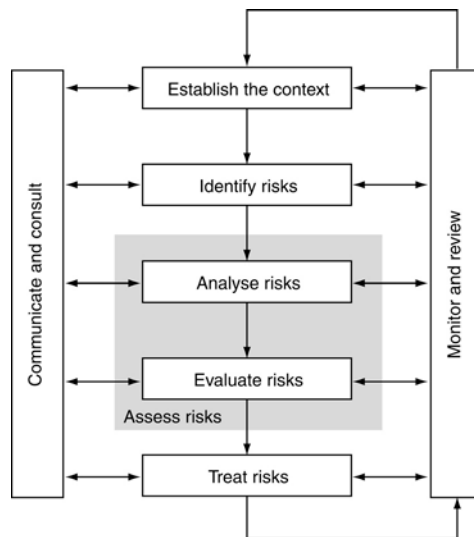


Figure 1. Risk Management Process Overview (SA/SNZ, 1999a)

Communication did not form part of the basic risk management model. However, by 1999, the importance of communication with internal and external stakeholders was specifically recognized and added to the generic risk management process as formalized by Standards Australia and Standards New Zealand (SA/SNZ, 1999a)

(see Figure 1). An additional step relating to communication and consultation has been inserted between steps five and six in the MAB/MIAC model (SA/SNZ, 2000 6):

“Communicate and consult. Communicate with and consult internal and external stakeholders at each step of the risk management process.”

Hence, external communication is now formally recognized as an integral part of risk management processes. Figure 1 outlines the seven main generic steps in risk management highlighted by the voluntary Australasian Standard (SA/SNZ, 1999a, p.11). In practice the steps interact, for example steps 6 and 7, communication and monitoring, need to be considered at each step in the risk management process.

The links between management accounting systems and external disclosure have been considered in recent reviews of management accounting literature. Otley (2001 244) argues that management accounting has become more strategic and has added the notions of being: forward looking, concerned about planning, externally focused, value focused and with an eye on other aspects of the value chain. This is echoed in DeLoach (2000) where it is argued that successful organisational risk management requires a shift from conventional practices towards characteristics also identified with strategic management accounting (see Figure 2).

Management practices		
<i>Conventional</i>	<i>Risk Focus (DeLoach 2000)</i>	<i>Strategic Management Accounting (Otley 2001)</i>
Ad Hoc	Continuous/ routine	Continuous and ad hoc
Looking at the past	Looking to the future	Looking to the future (planning)
Fragmented	Integrated	Integrated
Cost based	Value based	Value based
Reactive	Proactive	Proactive
Negative	Positive	Internal to external communication
Functionally driven	Process driven	Marketing based not production based

Figure 2. Successful risk management practice and management accounting

DeLoach (2000) argues that a successful organisational strategy will continually be monitoring, reviewing *and communicating* risk management with internal and external parties. The strategy will be integrated rather than piecemeal, removing barriers

between functions and departments. It will proactively manage key organisational risks – both monetary, with a focus on value rather than cost, and non-monetary.

EMA can be analyzed in a similar way. EMA is the part of accounting infrastructure that considers environmental and economic interrelationships. It is concerned with providing information about the organisation's impact on the environment and the effect of the environment on the organisation. Physical (PEMA), monetary (MEMA) and qualitative information about these effects is of concern to management and external parties (Burritt et al., 2002). EMA is concerned to provide information that is useful to managers and provides the foundation for voluntary external communication of environmental information about the organisation and its activities – through annual reports, environmental reports, the media, workshops, etc. Burritt et al. (2002) suggested that a comprehensive framework for EMA can be structured to provide information relevant to management. However, they included neither the risk management nor the communication function of EMA. Figure 3 provides a summary representation of key aspects in the linkages between EMA information and ERM. In terms of the comprehensive EMA framework, a strategic focus suggests the importance of routine rather than ad hoc information, and future rather than past or current information, with a movement from short-term, reactive to long-term, proactive thinking. In addition, as Einhorn and Hogarth (1999 p. 131) recognised, "All decisions are about the future. But deciding what to do and how to do it naturally draws on past experience. Looking forward involves looking back". EMA, in consequence, needs to provide ex post and ex ante information as a basis for decision-making, control and communication. A comprehensive EMA system includes all of these characteristics.

Each element in the EMA matrix (see Burritt et al., 2002) represents the tools of EMA that lend support to management, including risk management. However, as EMA remains in a state of development (see debate over the nature of EMA in for example, Adams, 2000, Bennett and James, 1998, Gray and Bebbington, 2001, Gray et al., 1993, Gray et al., 1996, Hamner and Stinson, 1995, Howes, 2002, Parker, 2000, Schaltegger and Burritt, 2000, US EPA, 1995 and White and Savage, 1995) the framework can only be regarded as a potential guide to the types of information about ERM that might in the fullness of time be disclosed in annual reports of public sector organisations. Present disclosures are expected to be far less comprehensive.

In September 2000, separate voluntary guidelines for ERM were issued by Standards Australia/Standards New Zealand (SA/SNZ, 2000) based on the same generic risk management principles and processes, including the emphasis on communication and consultation. While information about stages in the risk management process provides possible themes for disclosure, in this paper, analysis is restricted to the examination of whether risk management disclosures are made and by how many entities.

		Environmental Management Accounting (EMA)							
		Monetary Environmental Management Accounting (MEMA)				Physical Environmental Management Accounting (PEMA)			
		Short Term Focus		Long Term Focus		Short Term Focus		Long Term Focus	
		Risk	Return	Risk	Return	Risk	Return	Risk	Return
Past/Present Orientated	Routinely generated information	1. Environmental cost accounting (eg variable costing, absorption costing, and activity based costing)		2. Environmentally induced capital expenditure and revenues		9. Material and energy flow accounting (short term impacts on the environment – product, site, division and company levels)		10. Environmental (or natural) capital impact accounting	
	Ad hoc information	3. Ex post assessment of relevant environmental costing decisions		4. Environmental life cycle (and target) costing Post investment assessment of individual projects		11. Ex post assessment of short term environmental impacts (eg of a site or product)		12. Life cycle inventories Post investment assessment of physical environmental investment appraisal	
Future Orientated	Routinely generated information	5. Monetary environmental operational budgeting (flows) Monetary environmental capital budgeting (stocks)		6. Environmental long term financial planning		13. Physical environmental budgeting (flows and stocks) (eg material and energy flow activity based budgeting)		14. Long term physical environmental planning	
	Ad hoc information	7. Relevant environmental costing (eg special orders, product mix with capacity constraint)		8. Monetary environmental project investment appraisal Environmental life cycle budgeting and target pricing		15. Relevant environmental impacts (eg given short run constraints on activities)		16. Physical environmental investment appraisal Life cycle analysis of specific project	

Figure 3. Environmental management accounting comprehensive framework (based on Burritt et al., 2002)

In summary, application of the ERM and EMA frameworks are in their early days. Case study and empirical evidence about ERM are in short supply.⁴ Likewise, for EMA, Bouma and van der Veen (2002 p 279) observed that “Most research in environmental management accounting is prescriptive, contributing to the further development of tools, and often based on a limited number of case studies. Empirical research in EMA (e.g. Bouma and Walters, 1998) is scarce and is focused more on describing the current state of implementation than on analyzing or critically evaluating the effectiveness of the new tools.” Applications that involve both areas

are even less likely to be observed, but no information is yet available about whether such disclosures are made and by how many entities.

The *first research question* is to what extent do Australian Commonwealth public sector organisations report risk management information in their annual reports.

The *second research question* is to what extent do Australian Commonwealth public sector organisations report ERM information in their annual reports.

Several studies have examined environmental disclosures in the annual reports of Australian public sector entities. Gibson and Guthrie (1995) examined annual report environmental disclosures in the state of New South Wales. For the sample of annual reports of 20 public sector entities in 1994 they found that 55 per cent disclosed some environmental information (Gibson and Guthrie 1995 p. 119). Frost and Toh (1998) reported that the development of environmental accounting practices was significantly associated with management attitudes, entity size and the environmental sensitivity of the entity's operations. Frost and Seamer (2002) extended this analysis in the examination of the annual reports of 35 New South Wales public sector entities for 1996. They built upon the notion that environmental reporting assumes the existence of information generated by an environmental management system or environmental accounting practices (Dierkes and Preston, 1977, Elkington, 1993) and found an association between the level of environmental disclosure and the development of EMA practices. Burritt and Welch (1997) undertook a time series analysis of the environmental disclosures of 60 Australian Commonwealth government entities over the period 1984-1993. They found a significant increase in the average amount of environmental disclosure, with budget entities reporting a larger number of environmental themes than non-budget entities. Burritt and Welch (1997 p. 70) suggested that different commercial orientations of public sector organisations will affect environmental disclosures. Non-budget (i.e. company) entities have a focus on profitable trading and a potential interest in keeping some commercial information confidential whereas budget entities have a closer reliance on government for funding, thereby increasing the need for direct disclosure through the annual report. Hence, on the basis of this empirical evidence Commonwealth companies are more likely to have a lower level of (environmental) risk management disclosure than other Commonwealth entities.

Harris and Thomas (2001 p. 46) report that, based on the eight Australian public sector organisations they examined, the public sector appears to be making positive inroads in implementing risk management. Take up and disclosure of risk management and ERM information by public sector entities might be expected to have increased since the 1999 and 2000-Standards were introduced with their increased emphasis on communications with stakeholders through the risk management process. The expected impact would be an increase in risk management disclosures in 2000 and beyond, and an increase in ERM disclosures in 2001 and beyond.

The *third research question* is whether there is a difference in disclosures between Commonwealth budget and non-budget entities.

The *fourth research question* is has there been any change in the amount of risk management disclosure over time.

The *fifth research question* is has there been any change in the amount of ERM disclosure over time.

3 RESEARCH METHOD AND SAMPLE CHARACTERISTICS

The main methods used in this study are a review of relevant literature in section 2, as the foundation for the development of research questions, and content analysis applied to the sample of Australian Commonwealth public sector organisations.

Examination of risk management and ERM disclosures made in the annual reports of Commonwealth of Australia public sector organisations has been undertaken over a four-year period. Commonwealth entities are classified into the following four different categories as identified for annual reporting purposes in s.516A of the EPBC Act:

- Category 1. A Department of State and any other Agency (as defined in the Public Service Act, 1999);
- Category 2. A Commonwealth authority (as defined in the Commonwealth Authorities and Companies Act, 1997);
- Category 3. A Commonwealth company (as defined in the Commonwealth Authorities and Companies Act, 1997); and
- Category 4. Any other Commonwealth agency that is established by or under a law of the Commonwealth and is required by law to give an Annual Report to the responsible Minister (defined in s.528 of the EPBC Act to include a body corporate established by a law of the Commonwealth, and a person performing the duties of an office established by or under such a law, or the duties of an appointment made under such a law).

Category 1 includes Commonwealth government departments, executive and statutory agencies acting on behalf of the government. The Head is responsible for the annual report required to be published under the *Financial Management and Accountability Act* 1997. This Act provides the framework for the proper management of public money and public property by the Executive arm of the Commonwealth. Public money and public property is money and property in the custody or control of the Commonwealth. Category 2 includes Commonwealth bodies incorporated for a public purpose through separate legal entities and that hold monies on their own account (*Commonwealth Authorities and Companies Act*, 1997, s.7(1)). The directors are responsible for the annual reports of such bodies. Category 3 Commonwealth companies are registered under the Corporations Act 2001 as companies in which the Commonwealth has a controlling interest (*Commonwealth Authorities and Compa-*

nies Act, 1997, s.34(1)). The directors of Commonwealth companies are responsible for the annual report and the company can obtain monies from the financial market. Category 4 agencies are Government entities not covered by the other three categories under separate legislation and having separate annual reporting requirements. Until the new legislation referred to above was introduced in 1997 entities were conventionally identified as being budget or non-budget (Burritt and Welch, 1997). Budget entities received an allocated annual amount of funds from government, whereas non-budget did not. This distinction is not simply related to the four categories of entity identified under s.516A of the *Environmental Protection and Biodiversity Conservation Act, 1999*.

Information on risk management, and ERM, was gathered for each category and for the total number of Commonwealth entities in the sample. Content analysis was used to identify disclosures in the annual reports relating to risk management and ERM. A maximum number of 100 annual reports each year were considered for inclusion in the sample. However, some organisations did not exist throughout the period, and some copies of annual reports were unavailable even though requests were made to organisations where individual reports were not accessible (see 'Unavailable' in Table 1). In total, available hard copy or web-based copies of three hundred and thirty six annual reports were examined for disclosures over the four-year period 1999-2002. The number of Commonwealth entities and reports examined by Category is presented in Table 1.

Table 1. Number of Commonwealth of Australia annual reports examined by category for risk management disclosures

<i>Category of Commonwealth Entity</i>	<i>Total Entities Selected</i>	<i>Total Entities with Reports Available, 1999-2002</i>	<i>Total Annual Reports Examined</i>
1. Department	14	12	48
2. Authority	7	7	28
3. Company	45	37	148
4. Other	34	28	112
Subtotal	100	84	336
Unavailable		16	64
Total	100	100	400

Risk management and ERM disclosures were identified for each entity and a hard copy made, identified by category entity, year of and page in the annual report. Each report was classified according to the scheme identified in Table 2. Classification was

also undertaken independently by a second coder. The simple classification scheme adopted meant that there were no areas of disagreement between the coders, hence, there was no need for any formal statistical measure of inter-rater reliability (see also Hackston and Milne, 1996, Milne and Adler, 1999).

Table 2. *Classification scheme for risk management disclosures in annual reports*

<i>Classification Score</i>	<i>Classification Criteria</i>
0	no report on risk management
1	risk management information disclosed, but no sub-heading
2	risk management information disclosed under a sub heading
3	environmental risk management disclosures made

4 ANALYSIS AND RESULTS

Descriptive statistics are used here to analyse the results of rankings by disclosure score for the four years in the four categories of Commonwealth public sector entities.

Latest disclosures by category

The first set of comparisons is outlined in Table 3. In the most recent annual reports, for 2002, 80 per cent of entities made risk management disclosures. The range was from 100 per cent of departments to only 71 per cent of Commonwealth Authorities making disclosures. For the same year 62 per cent of annual reports contained disclosures (the range being from 73 per cent for Departments to 52 per cent for Other Agencies). 10 per cent of entities, or 5 per cent of annual reports, in the sample made separate environmental risk disclosures, in 2002. With only one exception these disclosures were made by Company entities.

Table 3. *Percentage disclosures relating to the analysis of disclosures in the sample of Commonwealth public sector entities*

<i>Score</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
0	66.7	39.3	27.4	20.2
1	14.3	21.4	21.4	19.0
2	16.7	34.5	45.2	52.4
3	2.4	4.8	6.0	8.3
Total	100.0	100.0	100.0	100.0

Comparison between budget and non-budget entities

Budget and non-budget sector entities were identified from the Department of Finance classification provided on their web site⁵. There are eight non-budget and 76 budget entities in the sample and, hence, the comparisons are indicative at best. Increases are found in disclosure scores for budget, non-budget and total entities between 1999 and 2002. Likewise, there are increases in the number of budget (1999 3%: 2002 9%) and non-budget (1999 0% and 2002 12%) entities making risk management disclosures. Results show a difference in the sample scores between average disclosures by budget and non-budget entities for each of the four years (see Table 4). However, the difference is in an unexpected direction, with non-budget (commercial) entities having greater percentage levels of disclosure throughout.

Table 4. Comparison of average numeric scores relating to the analysis of risk management disclosures of Commonwealth companies and all other Commonwealth public sector entities

<i>Category of Commonwealth entity</i>	<i>1999</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
Budget	0.487	1.000	1.276	1.461
Non-budget	1.125	1.500	1.500	1.750
Total Average Scores	0.548	1.048	1.298	1.488

Temporal results

The percentage of disclosures in each of the four Score categories (see table 3) reveal a positive trend in the number of entities making risk management disclosures (Total: 1999 33%; 2002 80%). Non-disclosers fell from 66.7 per cent to 20.2 per cent of the sample between 1999 and 2002, while the percentage of entities disclosing their risk management practices under a separate sub-heading in the annual report increased from 16.7 per cent of the sample in 1999 to over half the sample in 2002. Table 3 shows that the small proportion of entities (2.4%) that disclosed environmental risk information in 1999 grew to 8.3 per cent by 2002.

In Table 5 the increase over time in disclosure scores for all Categories, except Commonwealth Authorities, and the total score is evident. With just seven entities and 28 annual reports available for the four-year period, Category 2 consists of the smallest Category in the sample. The apparent reduction in disclosures in 2001 reflects the removal of risk management disclosures by The Australian Rail Track Corporation. Figure 4 shows these results in graphical form. Departments of State demonstrate the most significant increase in disclosures over the four-year period. ERM disclosures have also increased in total over the period (1999 2%: 2002 8%).

Table 5. Average numeric scores relating to the analysis of risk management disclosures in Commonwealth public sector entities

Category of Commonwealth entity	1999	2000	2001	2002
1. Department of State	0.500	1.750	1.833	2.000
2. Commonwealth Authority	1.143	1.143	1.000	1.286
3. Commonwealth Company	0.676	1.054	1.324	1.514
4. Other Commonwealth Agency	0.250	0.714	1.107	1.286
Total Average Scores	0.548	1.048	1.298	1.488

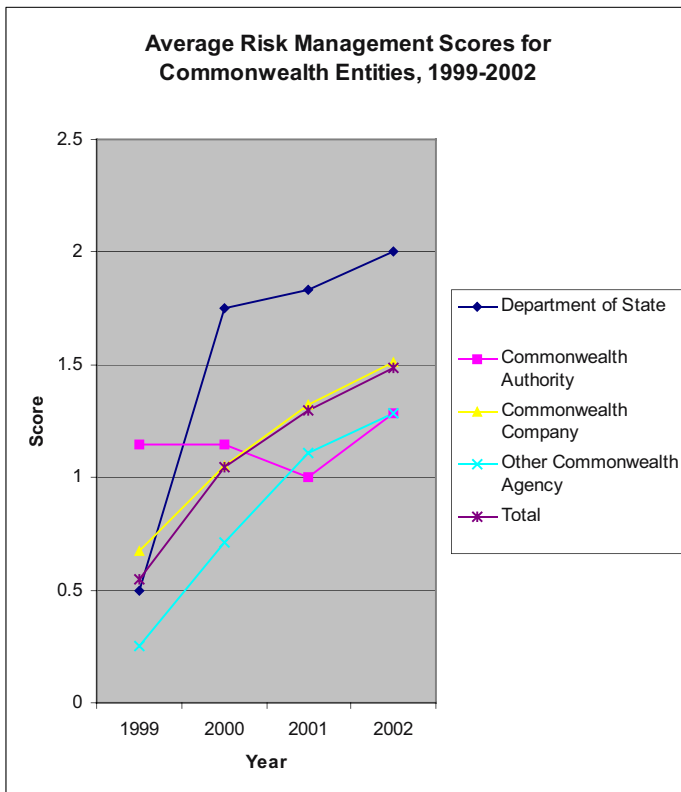


Figure 4. Average scores relating to the analysis of risk management disclosure in Commonwealth public sector entities in graphical form

5 CONCLUSION AND DISCUSSION

In relation to the first two research questions, based on the sample evidence, to an increasing extent risk management and ERM disclosures are being made by Commonwealth public sector entities, there being a reduction in non-disclosers from 66.7 per cent to 20.2 per cent in relation to risk management disclosures, and from 98 per cent to 92 per cent for separate ERM disclosures over the period 1999-2002. The evidence also indicates that, in relation to research question three, a difference between the risk management and ERM disclosures exists, although budget entities consistently disclosed less than non-budget entities.

Research questions four and five considered the changes in risk, and environmental risk, management disclosure over time. Increases in risk management and ERM are observed, in total, for budget and for non-budget entities, over the 1999-2002 period. However, Departments and Companies were responsible for the observed increases, with Authorities and Other Agencies making no ERM disclosures at all. In relation to all of these observations it must be recognized that these comments are based on the trends observable in the tables and the associated descriptive statistics. They only relate to the sample of organisations examined in the Australian public sector.

Risk management and ERM are becoming recognized as an integral part of good management practice. To be most effective, risk management needs to become part of the organisation's culture, integrated into its philosophy, practices and plans and communication processes rather than being practiced as a separate program (SA/SNZ, 1999a p. iii).

The purpose of this paper is to begin the exploration of an under-examined aspect of EMA, the link with external reporting. External communication forms an integral part of the process of risk management and ERM. Management accounting has expanded to incorporate strategic issues that engage external parties as well as the provision of information to management. In some ways the research is premature, as public sector organisations are still in the process of adopting risk management techniques and disclosure is likely to lag this adoption. However, the results do provide a base from which further studies can be undertaken. Such research will be able to examine: the detail of ERM as it is adopted over time; the determinants of current disclosure levels; and investigation of best practice cases. Figure 4 provides information about typical disclosures observed for each score level, as well as some of the ERM disclosures that reflect the presence of ERM practices and the potential for EMA practices.

Figure 5. Examples of representative disclosures at different score levels

**Classification Score 1 – risk management information disclosed, but no sub heading:
Australian Radiation Protection and Nuclear Safety Agency, 2000, p. 6.**

“...we have obtained NATA accreditation for the RF laboratory and the personal radiation monitoring service and have established a quality management and risk management culture throughout ARPANSA;”

**Classification Score 2 – risk management information disclosed under a sub-heading:
Sugar Research and Development Corporation Annual Report 2001, p.51.**

“Risk Management

In February 2001, the Audit Committee initiated a revision of SRDC’s risk profile using the Comcover Risk Assessor software. All SRDC staff participated in the risk assessment which resulted in the development of a revised risk register. This was used to develop the SRDC Risk Management Plan and was also used as the basis for revision of the SRDC Fraud Control Plan first developed in 1997. In June 2001, the Audit Committee reviewed both Plans and was satisfied that appropriate controls are in place to address key risks. The SRDC Board subsequently endorsed both plans as recommended by the Audit Committee. In 2000–01, SRDC completed and implemented its Business Process Management System (BPMS) which folds active quality assurance into daily management of SRDC. The BPMS is an essential tool in risk management in SRDC. All staff had an input in developing the BPMS and the Board is also involved in the revision of policies and procedures detailed in it to ensure minimisation of risk.”

**Classification Score 2 – risk management information disclosed under a sub-heading:
Australian National Audit Office Annual Report 2002, p.54.**

“Risk management

The ANAO adopts the Joint Standard AS/SNZ 4360:1999 in our approach to risk management. The ANAO regularly updates its Risk Management Plan and individual plans for each of the service groups, CMB and R&D branch to take account of any changes to our environment including revised business requirements and changes to our control environment. The plan underpins the ANAO’s corporate governance framework. The ANAO’s Audit Committee is responsible for overseeing the implementation of the plan. In summary, the ANAO approach to risk management identifies risks associated with each business objective and agreed business targets. Risks are considered first at the strategic level; in particular how they relate to our strategic and business planning processes. In considering these risks we address the following questions: is our overall vision and direction appropriate; do our products (including new products) meet client needs and expectations; are our resources (staff, financial, physical and information) appropriate (capability) and do we have sufficient (capacity) to deliver our products?.

”

**Classification Score 3 (environmental risk management information disclosed):
National Registration Authority for Agricultural and Veterinary Chemicals Annual Report 2000, p. 47, 74.**

“In 2001-02, NICNAS commenced negotiations on a MOU with the Environmental Risk Management Authority (ERMA) New Zealand, to establish a co-operative relationship

between the two agencies in relation to new and existing industrial chemicals that may also be hazardous substances. It is expected that both parties will sign the MOU in early 2002-03.”

“Accordance of NICNAS activities with ESD Principles

(a) decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

NICNAS undertakes risk assessment within an agreed policy framework and includes within the overall process of decision-making, the hazard assessment, dose-response relationships, exposure assessment and risk management options. Hazard assessment identifies the set of inherent properties that make a chemical capable of causing both short-term and long-term adverse effects to human health or the environment. Based on risk estimates, risk management strategies are recommended. When recommending risk management strategies and considering what constitutes acceptable risk, NICNAS operates within an agreed framework for the environmentally sound management of chemicals, based on the principles and policy of ESD and aligned with the United Nations Conference on Environment and Development (UNCED) Agenda 21 (Rio Declaration), which includes Chapter 19 on the *Environmentally Sound Management of Toxic Chemicals*. The economic and social benefit of risk reduction action is balanced with the economic, political and social costs of implementing the strategies. Risk management also involves monitoring, evaluating and reviewing the strategies recommended. *(b) if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.*

Caution is applied implicitly or explicitly while conducting risk assessments. In particular, where international chemicals policy negotiations may need to rely on precaution, this is applied in line with the principles of ESD and the UNCED Agenda 21, Principle 15 (precautionary approach).

(c) the principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations and (d) the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making.

The risk management controls recommended by NICNAS are aimed at allowing ongoing environmental integrity and biological diversity. NICNAS risk assessments integrate hazard assessment with any unique exposure or use patterns and also take into consideration the unique nature of Australia’s demography, the national ecosystems and fauna and flora. In this way NICNAS provides the information necessary that will allow informed and transparent decisions to be made including trade-offs between competing objectives of current utility and future adverse environmental effects.”

Classification Score 3 (environmental risk management information disclosed):

Airservices Australia Annual Report 2002, p. 25.

“The organisation upgraded its environmental risk management software in an effort to improve its capacity to link incident reporting to the risk assessment process and to provide greater flexibility for users. A new facility enabling air route changes to be assessed in accordance with the *Environment Protection and Biodiversity Act*

Figure 5. continued

1999 was used during the year. In 2001–02 Airservices Australia assessed 82 air traffic proposals for business risk and environmental impact. None were found to be environmentally ‘significant’, as defined by the Act.”

**Classification Score 3 (environmental risk management information disclosed):
CSIRO Annual Report 2002, p. 66.**

“Environmental risk management and review processes

Environmental risk management

CSIRO has introduced an Environmental Management System (EMS) to assist to minimize the impact of its business activities on the environment. CSIRO uses a risk management process whereby all project groups are required to identify potential environmental impacts, assess the risk and implement control strategies.

As part of the EMS, each Division is required to develop an annual Environmental Improvement Plan. These identify improvement strategies such as waste management strategies.

This year CSIRO has continued with the program of independent environmental audits. It has instigated a program to remove underground fuel storage tanks where possible and has reviewed the processes for managing and removing asbestos from sites. In conjunction with the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), radiation safety and environmental management has been reviewed and the CSIRO Radiation Safety manual updated.

CSIRO recently appointed a Corporate Biotechnology Coordinator and a Corporate Biotechnology Strategy Liaison Group to manage the health, safety and environmental considerations associated with genetic manipulation work.”

Further exploration of elements in the suggested comprehensive EMA framework, and their connection with ERM, its application and external communication, are required if developing linkages between ERM and comprehensive aspects of EMA are to be understood and encouraged.

NOTES

- 1 Australia has three levels of government – Commonwealth, State and Territory, and local. Commonwealth government relates to the whole of the continent of Australia. The Commonwealth of Australia is a Federation of self-governing States and Territories.
- 2 The term Commonwealth entity is used here to refer to organisations of the Commonwealth of Australia that are required to provide annual reports under the Environmental Protection and Biodiversity Act 1999, s.516A.
- 3 The need for standardization of risk management terminology has recently attracted the attention of the International Organization for Standardization (ISO/IEC, 2002). Some key terms include: Hazard or aspect – a hazard is a source of risk with the potential to cause loss or adverse impacts (e.g. storage of a toxic chemical). An aspect is an organisational activity, product or service that can interact with the environment.

- Incident or Event – an occurrence that can have an adverse impact (e.g. a leak from the chemical storage tank). Consequence or impact – any change to the environment whether adverse or beneficial that results from the organisation's activities, products or services (e.g. chemical spills into waterway and kills fish), and any change to the organisation arising from environment-related issues (e.g. fines, lost reputation because of poor environmental management).
- 4 Standards Australia advises that some information about best practice case studies in environmental risk management were being gathered, however, liquidation of one organisation has delayed the process, as have recent changes in personnel within Standards New Zealand (telephone conversations on 20 January and 2 April 2003 with Geoff Clarke, Project Leader on Risk Management at the Research and Information Department of Standards Australia).
 - 5 <http://www.finance.gov.au/>

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