With All The Good Intensions:
A Case Study of a Failure in Enterprise Risk Management

1. Introduction

"The Road To Ruin Is Paved With Good Intentions." (Anon)

In today's uncertain and unpredictable environment, business organisations are facing increasing risks, some even threatening their continual existence (Meulbroek, 2002). Numerous changes, such as, rapidly changing technology, climate change, globalisation and shorter product life cycles, have created an increasing degree of risk exposure for business organisations. Moreover, recent corporate scandals have instituted regulatory pressures to improve corporate governance and ERM by enhancing the effectiveness of internal controls (Miccolis and Shah, 2000; Ratnatunga and Alam, 2008; Lam and Kawamoto, 1997). While such environmental uncertainties do not mandate the adoption of risk management practices, they create societal pressure for the systematic evaluation of risk and adoption of good business practices.

The rational and calculative aspects of risk management serve well in dealing with traditional risks which are managed by individual functional managers. Different methodologies are also devised to deal with specific risks, such as, techniques to understand and deal with market risks, production, quality and safety risks. Such an approach has been described as reductionist and calculative (Bhimani, 2008; Ratnatunga and Alam, 2008; Collier et al., 2007; and Power, 2007a), not least in that it fails to see the interrelationship between risk areas and how risks in one area influence other organisational activities and thereby increase the total risk of an enterprise. As such, various researchers have suggested the need for an integrative approach to establish of Enterprise Risk Management (ERM) where all risk can be integrated (Taylor-Gooby and Zinn, 2006; COSO, 2004; Mikes, 2009).

It has been argued that the ERM is a process oriented approach where an appropriate structure should be installed to identify all risks and handle them in an integrated way (Miccolis et al.,

2001; Meulbroek, 2002; CAS, 2003; COSO, 2004). However, even though there has been an increased focus on integrative risk approaches most research in this area is largely prescriptive; i.e. despite the clear recommendation for aggregation and integration of risk approaches in the literature, empirical evidence on such an enterprise-wide approach to risk management, and its effectiveness, is still lacking. To fill this empirical gap, we initially set out to study in-depth a company which was a likely candidate to have installed an integrated approach to risk management. We found such a company, and show that it had an integrated ERM system that worked well in integrating standard operational risks in order to identify and mitigate risks; but that it became more difficult to maintain connectivity when the nature of risk was dynamic and emerging. These risks, if not managed, despite all good intensions, can threaten the very existence of the firm. The surprise finding in this paper was that the integrated ERM approach recommended in the literature could result in hidden risks with the potential to escalate and have a serious consequence on the organisation's viability.

In this study, we conduct an in-depth study of ERM processes of a company in a high-risk industry. This paper overviews the formal and informal information processes, the internal audit function and shows how the management accounting information system (MAIS) plays an integrative role in providing risk related information for maximising the value of the organisation. We show how the MAIS can be used to coordinate the management of risks that originate in different organizational sub-systems. This study will highlight the areas of risk which can be well managed and the areas where risk management can be difficult. Bhimani (2008) states that the relationships between management accounting and risk management have not been investigated adequately and we believe that this study bridges this gap in the literature.

The rest of the paper is organised as follows. In the next section, we introduce the theoretical underpinnings of the study. Next, we summarise the literature pertaining to ERM; the link between ERM and the MAIS; and the concept of 'systemic risk'. This is followed by the research questions asked; a description of the context of the case study and the justification of research methods adopted for the study. We then provide empirical evidence from the case study of the risk management approaches in the case study company, and show that it followed 'best practice' with an integrated approach to ERM. This leads to a discussion of the issue of connectivity when risks escalate, and how an integrated risk management system

copes (or does not cope) with such an escalation. The paper concludes with our observations and recommendations, and outlines implications for further studies.

2. Theoretical Underpinnings of the Study

In order to understand the notions of risk management strategies and how it is used, the paper draws upon institutional theories. Such theories are useful to understand why different organisations adopt social norms for legitimacy purposes. We shall also explore the concepts of organised uncertainty concepts to highlight how the concept of risk management has become almost a quasi-religious faith (Power, 2004).

Institutional theory helps to provide an understanding of how and why organisations behave as they do in society by examining their institutions. Loosely defined, institutional theory considers the processes by which structures, including schemas, rules, norms, and routines, become established as authoritative guidelines for social behaviour (Scott 2004). Neo-institutional theorists (see Greenwood et al. 2008, for a comprehensive review) share a common view that organisations tend to adopt an increasingly similar template of institutions over time, as they conform to their societal expectations. Conforming to society's expectations in particular is the manifestation of a desire to maintain societal legitimacy.

Borrowing from legitimacy theory, the increasing community perception that poor governance of corporations, and a lack of adequate risk mitigation strategies, leads to a significant risk to shareholder value, representing a major change in social norms, values and definitions (Suchman 1995). Man-made disasters including climate change (Turner & Pidgeon, 1997) and normal accidents (Perrow, 1984) are examples of risk management concepts that have entered standard societal vocabulary. Today, the use of risk management is increasingly featured as a marker of good corporate governance (for example, Drew & Kendrick, 2005). This is true to such an extent that some even consider that to ignore it has become in itself a source of risk for corporations (Power, 2007b), societal institutions (Rothstein et al, 2006) or the ecological balance of post-industrial modernisation (Shrivastava, 1995). This social-wide understanding of the lack of policies and procedures threatening corporate value is termed *rationalised myths*, and provides the basis of the emerging institutional context. This new set of accepted beliefs in society calls for actions by the Boards to install corporate governance and ERM policies and procedures in their organisations. The *legitimacy gap* (Sethi 1978) is the disparity between

business-as-usual − whereby there is no policy or procedural change − and society's expectations of organisations to implement real actions to protect themselves from a significant loss in shareholder value that could ultimately lead to the type of corporate collapses evidenced in the early 2000s. In narrowing down this legitimacy gap, the lens of neo-institutional theory can be applied here to understand how and why escalating social pressures to introduce actions on to protect organisations from potential failure, shape the increasingly similar pathways that Boards of Directors are taking to embed governance and risk management in their companies (Ratnatunga & Ariff, 2005).

The actors or agents of change (in addition to the Board) who mobilize resources to enable the institution to shape its response to escalating social pressures are termed *institutional entrepreneurs* (DiMaggio 1988; Pacheco et. al., 2010). Institutional theorists posit that the more complicated the field – the more complex the relational networks – the greater the variety of institutional structures adopted and the more likely the rationalised myths will be codified into formal regulations. It is worth noting, however, that although isomorphism tends to lean towards homogeneity, a variety of specifications still exist depending on the different types of organisations (Greenwood et al., 2008). Success or failure of an ERM system in one company does not necessarily mean that similar systems will not be tried in other institutions.
The second form, a phenomenon termed *decoupling* (Meyer & Rowan 1977) is when in practice, the real institution – structures and procedures − happening within an organisation may not match its external appearance. This incongruence between public imagery and actual actions form one of the theoretical underpinnings of this study, and we show how this decoupling became so significant in an organisation that it threatened its very existence.

3. Literature Review

The following review of the related literature summarises the development of best practise in ERM; how the MAIS provides the necessary links in this process; and how these very links, if integrated too tightly, could result in hidden risks that could threaten the long-term viability of the company.

3.1 Enterprise Risk Management (ERM)

Risk has traditionally been seen in terms of uncertainty of outcomes with unknown probability distributions (Knight, 1921). Following the classic definition of risk in economic terms by Knight, there have been many attempts to define risk and uncertainty. Risk is often seen as catastrophes and dangers in specific business areas rather than opportunities where such risks can be managed to achieve strategic objectives.

In responding to societal *rationalised myths* following the spectacular collapses in the early 2000s (Enron, WorldCom etc.) with regards to the perceived lack of governance and risk management procedures in large corporations; various regulatory requirements, especially the Section 404 requirements of the Sarbanes Oxley Act (SOA), resulting in a systematic approach to governance and risk management. This resulted in different researchers approaching risk from their own backgrounds, which led to different approaches to risk strategies. For example, while strategic management and finance researchers view risk in terms of unpredictability of business outcomes with loss of market share, stock returns and a threat of bankruptcy (Baird & Thomas, 1990, Knechel, 2002); organisational theorists see risk in terms of uncertainties in the contextual environment affecting business outcomes (Duncan 1972, Pfeffer & Salancik, 1978, Galbraith, 1977). Again, operations research and management science research approach risk from a systems perspectives (Lewis, 2003) and strategic choice studies relate managerial risk preferences with firms' risk exposure (Miles & Snow 1978). Effective risk management can be designed to include a wide ranging portfolio of risk strategies. Strategic risks are long term risks that have the potential of preventing an organisation from attaining its business objectives. Operational risks on the other hand, following Basel II (Basel Committee on Banking Supervision, 2001), are related to systems and process failures, which include poor communication and fraudulent behaviour. Financial risks normally emanate from volatilities related to currency, borrowings and interest rates; and can affect credit, liquidity and share market risk. Management of these risks can be approached either by mitigating individual risks via risk transfer mechanisms or by installing a risk identification and management system.

The traditional approach to risk identification and management is often known the 'silo' approach, where each risk is treated separately (Kleffner & McGannon, 2003). In some cases, such risks are not integrated with organisation processes and are externally managed by insuring for individual risks. Kleffner & McGannon (2003) viewed such traditional risk management as having a compliance focus; and that silo based risk management represented a

traditional hierarchy-based organisational structure where divisions acted separately and there was little coordination and support from top management. They stated that this silo approach to risk management develops a parochial and fragmented attitude and usually leads to inefficiencies in the organisation. Significant opportunities are missed by not using resources in a coordinated response in terms of attaining long term strategic objectives. If certain areas of business are viewed as risky and uncertain (such as volatility in earnings and significant losses in market shares or profits), ad-hoc responses are made to address these specific risks. Here, the predominant approach to risk was avoidance and mitigation of potential losses.

Wood (2007) viewed that risk management needs to be concerned with ensuring the achievement of strategic objectives; and took a broader view by integrating risk management with the balanced scorecard to form a wider control framework. Adopting a case approach, that study investigated how such a risk management improved strategic controls and communication in large UK retail stores. For a successful implementation of risk management strategies, that study shares a similar view with Barton et al., (2002), and highlights the importance of top management commitment and support. Mikes (2007) saw different patterns emerging in managing risk. Rather than viewing a single pattern, the author explored how different models of risk management co-existed in organisations. In general, two strands of risk management were found, one driven by shareholder value ('value-based' risk management) and the other depicting risk based internal control requirements (''control-based' risk management). These two risk management models also showed alternative logical approaches - calculative cultures versus management control systems, and there was a drive to combine and integrate risk management systems across the enterprise; giving rise to the notion of *Enterprise Risk Management (ERM*).

This enterprise-wide approach was also espoused in numerous regulatory requirements, such as, the Sarbanes Oxley Act (SOX) which requires risk management, corporate governance and reporting to be integrated. Such integration was to be achieved by aligning internal processes with risk management strategies where several interfaces between governance, strategic objectives and reporting can be addressed.

As such, the Committee of Sponsoring Organisations of the Treadway Commission (COSO) described ERM with such an integrated or 'enterprise' view, i.e. as encompassing all business

risks and opportunities. A more comprehensive definition of risk and risk management is provided by COSO (2004) as:

> *Enterprise risk management is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.*

Similarly, in 2003, the Casualty Actuarial Society (CAS, 2003) defined ERM as the discipline by which an organisation in any industry assesses, controls, exploits, finances, and monitors risks *from all sources* for the purpose of increasing the organisation's short and long-term value to its stakeholders.

Clearly, therefore, much of the literature indicates that 'best-practice' risk management should take an integrative ERM approach; as it views organisational activities and processes to be interconnected; and thus that it is futile to manage risk in an ad hoc or silo manner (Hopkin, 2012). As such, for the proper implementation of ERM, it was seen as important to understand how different areas of an organisation are exposed to different types of risks and how these risks can permeate other areas of the organisation. An enterprise risk approach is supposed to introduce a common language of risk communication, policies and procedures for handing risk and a procedure for risk oversight. The view was that such a system should, in theory, facilitate the analysis of events into risks and opportunities for attaining strategic objectives (CIMA, 2004; Collier, et.al, 2007; Ratnatunga & Alam, 2011).

Power (2004), however, warns of the danger that such an integrated approach (which is used to transform uncertainty into manageable risk objects), may itself result in 'the risk of managing everything'. Extending the institutional theory of legitimacy, the concept of 'organised uncertainty' is introduced; i.e. viewing ERM as only having to demonstrate to society that everything has been done to protect the organisation from possible risks.

> *'In many cases it is as if organisational agents, faced with the task of inventing a management practice, have chosen a pragmatic path of collecting data which is collectable, rather than that which is necessarily relevant. In this way, operational risk management in reality is a kind of displacement. The burden of managing unknowable risks … is replaced by an easier task which can be reported to seniors' (Power, 2004: p. 30).*

In warning of the dangers of an integrated approach, Power (2004) makes a distinction between *primary* and *secondary* risks. While primary risks are considered as real risks,

secondary risks are socially constructed views on risks. Power views that organisations invest on secondary risk procedures. He subsequently develops the idea of reputational risk where organisations tend to protect their reputation by investing in visible processes with auditable sets of practices and procedures. Even though primary risks need to addressed because of their capacity to seriously disrupt organisational activities; more attention is focused on secondary risk procedures, which are the more transparent and visible aspects of ERM. It is not enough simply to adopt risk strategies; organisations are expected to signal the adequacy of risk procedures (Scott, 2004, Power, 2007b). Power (2004) observes that the existing emphasis on integrated 'enterprise-wide' risk procedures tend to provide an artificial comfort that everything has been done to prevent risk. However, such an approach fails to challenge the uncertainties and ambiguities which require a more holistic approach [1] to see the interrelationships between different risk factors. Such risks if not attended can have a catastrophic and spiralling effect on the organisation.

Despite such concerns, ERM has now become an integral part of both senior executive and the Board of Director's portfolio; most corporate websites pay lip-service to it by claiming to have such systems and processes in place (Hopkin, 2012). Many writers now believe that organisational strategies can be achieved through sound ERM systems and the implementation of such systems depend on top management support including the Board of Directors (Barton et al., 2002 & 2001; Walker et al., 2002; Eick, 2003; Collier, et.al., 2007; Ratnatunga & Alam, 2011). Section 404 of SOX also highlights the importance of management responsibilities for internal control and organisational performance which include risk oversight (Moeller, 2004). The theory espoused in the above literature is that once risk management is integrated with the interfaces of organisational performance, it can provide a solid foundation for ensuring corporate governance and compliance requirements. This paper looks at a company that seemingly combined risk management approaches by setting up an 'integrated' ERM, i.e. installed an enterprise-wide approach for obtaining business objectives via the control framework of objectives, strategies, implementation, results and feedback (see Rhames et al., 2006, Miccolis & Shah, 2001); and integrated risk management with organisational performance. The hidden dangers of such an integrated approach are also discussed in the paper.

[1] Power (2004) appears to distinguish 'integrated' and 'holistic', as we do in the paper. An integrated ERM links all known secondary risks. A holistic ERM considers the primary and often hidden risks.

3.2 Management Accounting and ERM

In most organisations the compliance function is often seen by the Board as the predominant role of corporate governance and ERM. Ratnatunga and Alam (2011) argue, however, that the compliance role needs to be seen as not only satisfying regulatory requirements, but also installing a culture which is congruent for risk management and strategic performance. However, whilst most ERM systems work well in managing operational risks (as most organisations establish detailed systems to monitor production and operational activities) its links with strategy and the performance of the organisation in strategy implementation is not as well established (see CIMA, 2004; Schmidt & Brauer, 2006; Collier, et.al., 2007; Ratnatunga & Alam, 2011). Clearly the literature is in support of ERM integration, but little has been studied empirically as to how this integration can be facilitated.

The MAIS has been found to facilitate and support integrated organisational risk management processes in a few studies (Collier et al., 2007; Chorafas, 2007; Ratnatunga & Alam, 2008, Wood, 2009); and when combined with financial accounting ratios to give 'early warnings' of impending trouble (Morris, 1998; Ratnatunga, 2006; Hossari, 2006; Fitzgerald & Collins, 2006; Ratnatunga, 2008). Thus the view emanating in the literature is that the MAIS can help in ERM by being an *integrative surveillance and communication device* within the organisation for identifying, evaluating and controlling risks. As the Board of Directors is involved with the strategic direction of the company such integrative and control information is considered useful (Bhimani, 2008; Ratnatunga & Alam, 2008; Collier et al., 2007; Chorafas 2007). A clear message in the literature is that whilst management accounting information is used horizontally for the risk management of different functional areas (Hopwood, 1996); for an integrated ERP system, the MAIS should have links with organisational objectives (Bromwich, 1990; Lord, 1996; Ratnatunga & Alam, 2011), and support organisational risk strategies via its use in strategic decision making and performance evaluation (Collier et al., 2007; Ratnatunga and Alam, 2011)

However, the risks posed by this very integration of the ERM has been raised in terms of tight and loose 'coupling' of functions (Birnbaum, 1981; Lutz, 1982; March, 1987). A *tight coupling* is one where different functions and components are integrated; i.e. when one function or component is affected, other functions are also affected. Complex interactions can be linear where a change in one function produces predictable consequences for other

functions. On the other hand, a non-linear complexity may lead to unpredictable consequences for related functions or components, causing heightened risk and unpredictable effects. As a consequence, there have been calls to abandon the traditional integrative tools of management accounting that result in tight couplings, especially the budget[2], calling it 'evil' and imploring companies to move 'beyond budgeting' (Covaleski & Dirsmith, 1983; Covaleski, et.al., 1985; Wallander, 1999; Hope & Fraser, 2003a; Hope & Fraser, 2003b).

Thus in organisations that face complex environments and where a full range of consequences are either difficult to understand or information may not be available, the concept of *loose coupling* (Glassman, 1973; Weick, 1976; Gummer, 1982; Covaleski, & Dirsmith 1983; Covaleski, et.al., 1985; Bussigel, et.al., 1986; Orton & Weick, 1990) has been put forward to counter the problems of complexities and interactions between different organisational functions or activities. While the effects of tight coupling are complex and unpredictable, loose coupling arranges these organisational activities in a way where failed and risky activities can be isolated and rectified without affecting other parts in the organisation and therefore provides a protection against unplanned consequences.

In this paper we study in-depth a company that had a well managed, fully integrated and tightly coupled ERM system (as excepted in the isomorphism form of neo-institutional theory); and in which the MAIS played a key role in ensuring that risk management goals were integrated and aligned with achieving organisational objectives via its performance measurement system. The consequence of having such a tightly coupled system was its potential to cause the 'domino effect'; a surprise observation of this study.

3.3 The Domino Effect

The theory of accident causation and control, developed by Heinrich (1931) purports that all accidents: human, mechanical, process or corporate are the result of a chain of events. The chain of events consists of a series of sequential factors: each the result of a proceeding risk factor. These factors are described as dominoes, and the removal of any one of the risk factors can prevent the accident. This 'domino effect' is named after the circular arrangement of dominos in which if any one domino falls, all fall.

[2] The budget is a good example of a tight coupling. The purchases budget; production budget, expense budget and cash budget are all tightly linked to the sales budget.

In the corporate world the domino effect is also known as 'systemic risk' and refers to the scenario that a single disruption at a firm, say an oil spill in the Gulf of Mexico, causes significant environmental and social damage, which requires massive cash outflow to compensate those affected, which results in a "crisis of confidence" among investors, creating illiquid conditions in the marketplace. Systemic risk encompasses the risk that failure in one firm or one segment of the market would trigger failure in segments of or throughout the entire financial markets (Merna & Al-Thani, 2008; Antonioni et. al., 2009).

Normal Accident theory (Perrow, 1984) suggests that a combination of complexity and tight coupling can cause unexpected interactions and cascading effects in the organisation. Complexity is considered to be high when different organisational activities can interact in unexpected ways where it is not always possible to comprehend the nature of interaction. Perrow (1981, 1984, and 1994) suggests that accidents are inevitable or 'normal' when these two precursors of complexity and tight coupling are present. Although commercial organisations may not have physically integrated components and their functions can be decoupled, if systems and processes are coupled via an integrated ERM system, then the same logic of complexity and interrelationship can be applied. Here interrelationship can remain latent and undetected until a time when the full range of risk implications becomes visible, often too late for action.[3]

Even though the integration of all aspects of risks and opportunities are promoted by COSO (as discussed earlier), it will be shown in this paper that such an integrated ERM system does not offer guaranteed protection against the 'domino-effect', especially when there are 'tight couplings'. In fact, the COSO framework, being a process oriented approach, has been criticised as being too general and vague for preventing strategic risks (Steinberg, 2003). Funston (2004) found in his study that whilst procedural and recurring risks were easier to monitor and control, top executives found strategic risks were harder for companies to predict. Here, the complex nature of problems are difficult to anticipate and are an inevitable source of systemic risk.

[3] An airline information system is a good example of a 'tightly-coupled' system. In today's world of online bookings, payments and check-in; along with e-tickets and electronic baggage handling that are tightly integrated, the failure of one sub-system can ground the airline to a halt. This recently happened with Virgin Airlines in Australia, in which the failure of one minor hardware component in the reservation module grounded the airline for 3 days. In previous times, loosely coupled systems with paper tickets and manual check-in counters, the failure of the computerised reservation system did not prevent the rest of the airline from functioning.

A complex system has a number of constituent parts which can interact in unpredictable ways; and consequently a silo based traditional risk management system is often found to be inadequate to deal with the dynamic nature of problems. As such, we have already discussed that best-practice dictates an integrated system. However we argue that a tightly coupled integrated system combined with complexity can also lead to systemic failure. This is especially so when the integration is of secondary (or socially constructed views) of risk (Power, 2004). Complexity can be seen in terms of relational and cognitive complexities (Richardson et al., 2001; Allen 2000); where cognitive complexity arises because of information systems and relational complexity arises due to relationships between systems. As the quantity of information increases it gives raise to cognitive complexity and a large number of operative systems give rise to relational complexity.[4] The number of components makes it difficult to predict and ascertain the cause and effect relationship between such components, and could lead to the domino effect.

This interconnectedness makes it difficult to comprehend hidden cause and effect relationships between different areas of organisational activities, making risk anticipation and risk alleviation problematic. The COSO framework was designed to be hierarchically integrated with various parts within the organisation where strategic objectives can cascade down to various sub-units. Such a framework is supposed to involve managers at all levels to evaluate challenges and risks at their respective sub-units in line with certain set objectives. However, risks arising from multi-causal relationships may remain hidden and unnoticed until they emerge as major concerns for the organisation (Coomber 2006). Choo (2005& 2008) developed an incubator theory where he suggests that organisational problems remain hidden and insufficient attention is given as these problems do not emerge until a certain time. By the time these hidden problems come to surface they create major problems, sometimes affecting organisational viability.[5] Various approaches have been suggested to overcome the issues of interconnectedness such as, cross-functional groups, redundancy and organisational learning. This study looks at a company that took various precautions to mitigate the issues of interconnectedness.

[4] An airline information system is again a good example of both cognitive and relational complexity.

[5] The BP oil disaster in the Gulf of Mexico in 2006 is an extreme example of this. Even in 2012, there is still lingering concern as to BP's long-term viability.

4. Research Question and Research Method

From the above discussion it can be seen that neo-institutional theory advocates that in response to generally accepted shareholder value protection beliefs and norms within society, *isomorphism* (DiMaggio & Powell 1983) or the mimicry process of adopting similar policies and procedures across institutions should result in organisations striving towards an integrated approach to ERM; and that the MAIS would be a *integrative surveillance and communication device* to facilitate this integration. Much of the management accounting and ERM literature advocates the benefits of such integration. Such integration often results in the tight coupling of organisational functions. There is a concern, however, that such tight coupling could lead to certain risk relationships being left undetected in complex organisations. When these risks ultimately emerge, they could affect other functions in unexpected ways resulting in a catastrophic 'domino effect' of cascading risks. Neo-institutional theory also describes a phenomenon termed *decoupling* (Meyer & Rowan 1977).[6] This is the incongruence between public imagery of a company and its actual actions. When such decoupling between public imagery and actual actions becomes large, it can trigger events that cause the domino effect. The research objectives of this paper were based on the above theoretical underpinnings. We commenced the study in order to determine if a company in a high-risk industry with significant societal pressures would take an integrated approach to ERM due to isomorphism as suggested by institutional theory. We also wanted to determine if the MAIS played a role in such an integrative approach. As the study progressed, a third (surprising) research question emerged; i.e. could such an integrated approach result in tight couplings that actually *increased risk* in highly complex organisations?

In methodological terms, this study adopted an exploratory case research approach (Scapens 1990; Otley & Berry, 1994; Yin, 1989). Such an approach was justified as the study aimed to understand the perceptions of organisational members about the risk management systems in their own organisational setting. These actors or agents of change who mobilize resources to enable the institution to shape its response to escalating social pressures are called *institutional entrepreneurs* (DiMaggio 1988; Pacheco et al., 2010). The case study was not selected at random to represent a large group; as different organisations have different approaches to risk management. This study was designed to gain a more in-depth understanding, via the

[6] Not to be confused with 'tight' and 'loose' couplings in the systems literature.

institutional entrepreneurs, on how a specific range of risk management practices operated in an organisational setting.

The study was based on *Sigma Pharmaceuticals Limited*, a leading manufacturing company in Australia. It was founded by two Melbourne pharmacists in 1912 and its aim (at the time the research was initiated) was to be the leading Australian pharmaceutical manufacturer and marketer in Australia. The Sigma Company Limited was originally listed on the Australian Stock Exchange (ASX) in 1999. It changed its name to Sigma Pharmaceuticals Limited, hereafter 'Sigma', following the merger between it and Arrow Pharmaceuticals Limited, and re-listed on the ASX in late 2005. Following the merger, Sigma became one of the top 75 companies listed on the ASX. The business expanded rapidly to provide a comprehensive service and product offering to its customers. It had ownership of the two largest and most recognised pharmacy retail brands in Australia, Amcal and Guardian and the new Amcal Max brand, as well as strategic relationships with numerous independent pharmacists and medical practitioners. The reasons we found Sigma a good fit for our case study was due to four criteria we used for site selection: (1) *Industry Susceptible to High Risk and High Returns:* of a few possible industries, we chose a pharmaceuticals company as it faces a regulatory climate which has become complex, costly and with greater disclosure requirements on drug trials; (2) *Strong Commitment to Enterprise Risk Management*: this commitment is clearly demonstrated on Sigma's website which had its 'Risk Management and Audit Committee Charter' available for scrutiny for the general public; (3) *Significant Volatility in Share Price Performance:* in the 5 years leading to the global financial crisis in 2008, it has been one of the strongest performers on the Australia Stock Exchange with a more than 200% increase in its share price. Since then, the share price has shown significant volatility, demonstrating once again the risk-return relationship that the industry is susceptible to and (4) *High Reliance on Management Accounting Information.* The CEO was a qualified management accountant, and had been quoted in numerous press releases on the importance of cost control and organisation-wide performance management. This was also publicly disclosed on Sigma's website.

The main source of data collection was through interviews. The CEO was approached, and the reasons as to why the company was chosen for an in-depth case study were explained. The CEO then allowed the researchers open access to different levels of information and divisional managers. Given the level of access granted under the CEO's authority, the researchers found that they were freely able to undertake their investigation into the role of ERM and MAIS at

Sigma. The research was conducted through a series of semi-structured interviews with key informants. Face to face interviews included the CEO/managing director, the company secretary, the chief legal officer, the CFO, the corporate management accountant, the human resources manager, and other accountants. A total of fifteen interviews (formally and informally) were conducted. In addition to these interviews, other informal discussions were carried out with selective managers and employees representing different segments of the company. Most of the interviews lasted one hour to ninety minutes. The interviews were semi-structured using a standard set of questions. The interviewees were asked some open questions around the topic of risk management allowing them to express their understanding of how the risk management system operates. However, the process was conducted in a flexible manner to allow interesting topics to surface. The researchers found the participants to be keen to exchange their views on how they perceived the functioning of the risk management systems. The interviews were documented and confidentiality was given to all interviewees. In order to cross validate information generated through interviews, other information (such as annual reports, governance statement, constitution) was also collected.

5. Risk Management at Sigma

As discussed earlier, Sigma operates in a complex risk-laden environment subject to high returns but with high risk and, consequently, significant share price volatility. The industry has significant disclosure requirements around drug trials, increased transparency in pricing and marketing activities, and compliance with new financial and corporate governance laws. Simultaneously, it is an industry where product tampering is rife and the response by the manufacturer to such tampering can either enhance or diminish its reputation.

5.1 The Risk and Audit Committee

At the time we conducted our case study research, Sigma had established a comprehensive framework to identify, asses and manage risk across Sigma's operations, which included the setting up of a 'Risk Management and Audit Committee' (henceforth, R&A Committee). Even though the management of risk was often seen as the responsibility of the *Chief Risk Officer*, the executive team which includes the Board of Directors were increasingly seen to be collectively responsible. The Board at Sigma played an important role in the adoption and

implementation of risk strategies which included adoption of appropriate procedures to monitor and mitigate risks.

The company had a very small Board at the time the research was conducted. Many of the Board members were also in the R&A committee. From the interviews and the study of the published documents it was clear that the Board of Directors of Sigma governed on behalf and for the benefit of the company's stakeholders. The Board assumed ultimate responsibility for corporate governance, within which ERM falls, although it did not see itself as being directly responsible for ERM. This was seen as management's responsibility.

Senior management, on the other hand, was seen to "own" the ERM process, and a non-Board senior manager chaired the R&A Committee. This committee was responsible for designing and implementing a structured and disciplined approach to managing risk. There was a 'R&A Committee Charter' with sections covering (amongst others) external audit reports, internal control, financial reporting, analysts' briefings, internal audit reports, Therapeutic Goods Act matters, and other responsibilities. On closely examining the R&A Committee Charter, we found it to be more heavily oriented towards compliance issues rather than performance issues; both in the short and long-run.

In keeping with the R&A Committee Charter, both external and internal audits of Sigma's finances and controls were regularly conducted; and meetings between the Board and the external auditor were periodically held. There were monthly reporting to the Board on group activities, covering a wide range of Sigma policies and procedures and specific risk management activities in each business area. Further, the company had prepared a Delegation Manual; a comprehensive insurance program and a specialised TGA[7] compliance program including standard operating procedures.

It appeared that the primary objective of the R&A Committee was to ensure that the company did not damage its reputation by not complying (or inaccurately complying) with any matter related to its external regulation. This was not; however, what the CEO considered should be the main focus of ERM, believing instead that there should be a more long term performance

[7] Therapeutic Goods Act (TGA)

link with the company's strategies. Company Secretary and General Counsel had a different take on what constitute ERM and good governance:

> *My first responsibility is to keep Sigma "legal" in terms of corporate and commercial law. There are also the TGA and EPA[8] requirements which are mandatory.*

In terms of ERM, the CEO believed that most of what is undertaken as governance and risk management at Sigma is not subject to a regulatory requirement, but instead done because the company believes such actions 'add-value.' He believed that most often these value-additions arise in the area of how the company manages risks. The CEO stated that:

> *This means we have to identify our risks, assess them, insure against downside risk when possible, but also have a 'war chest' to take advantage of upside-risks when they arise. As our profit grows, our capacity to take risks also grows.*

5.2 Risk Drivers and the ERM process

It was clear from the discussions that the company had a number of risk drivers, the main risk drivers were the TGA, EPA, Unions, Consumer Associations (e.g. animal rights), Ethical Investment Funds and Equal Opportunity Laws (e.g. gender balance). Discussions with the Board and Senior Management indicated that risks were visualised in terms of impact, with a trade off between *likelihood* and *consequences*. Such visualisations were incorporated by the researchers into a 'Risk Ladder' as shown in Table 1.

On showing this chart to the senior managers at Sigma, there was general agreement that this fairly depicted the consensus of the company. Overall, it appeared to the researchers that Sigma, as a pharmaceutical company, had concentrated on innovation in product development, and when it comes to risk minimisation had progressively focussed on product safety and security. A manager commented:

> *I think we have pretty good systems when it comes to product safety issues and we have implemented a detailed risk strategy to secure drugs and chemicals. Over the years, we have a very good record for safeguarding drug related chemicals and other products. Internal checks have been in place so that product safety issues are not compromised.*

[8] Environmental Protection Act (EPA)

It was also apparent from the discussions with the R&A Committee members that they believed that the committee was managing both business and strategic risks. A member commented that:

> *As a pharmaceutical company we always thought that we are highly risky when it comes to dealing with chemicals. We had a very stable market share and we tried to become a dominant force in the market by acquiring and merging with other companies. I think our main risk is in our business and strategic decisions as our product and product safety issues are under control.*

On being shown the risk ladder (Table 1), the CEO stated that this should not give the impression that a fatality involving an employee is not as concerning as product tampering or losing market share, but that the impact of the risk emerging on the company's shareholders and other stakeholders would be more severe in the latter cases. Also, he said that "whilst severe financial fraud would have high consequences, actions such as minor misappropriations of cash would have relatively low consequences for Sigma in terms of ERM". A relevant quote from the CEO pertaining to this issue is:

> *There are events we cannot guard against. Even those that we can guard against, we have to ask if the risk is "reasonable". I guess we can guard against a low-flying aircraft hitting our corporate headquarters or terrorists taking over our factory. But we must assess the probabilities of these events occurring and guard against them appropriately. We won't be looking after our stakeholders interests if we expend money to safeguard ourselves against low probability risks. Theft of stock or cash is another matter. We safeguard these vigorously. The safety of our workers and consumers is another high probability issue we actively monitor.*

Table 1: Risk Ladder: Likelihood vs. Consequences

RISK DRIVER	LIKELI-HOOD	CONSE-QUENCES
Regulatory Risk		
Loss of TGA licence	Low	High
Change in Government Legislation (e.g. to PBS-Pharmaceutical Benefits Scheme)	Medium	High
Inability to Meet Reporting Deadlines (e.g. TGA, EPA, Audit, Earnings Announcements, etc.)	Medium	High
Negative EPA Ruling	Medium	Medium
Business Risk		
Competitive Moves	High	High
Changes in Consumer Behaviour	Low	High
Changes to Industry Structure (e.g. Competition from Supermarkets)	Medium	High
Loss of Market Share	Medium	High
Lack of Support from Pharmacy Support Group	Low	High
Poor Acquisition Strategy (Resulting in significant write-down of Asset values)	Medium	High
Takeover Threat	Medium	High
Patent Violation	Medium	Medium
Industrial Action	Medium	Medium
Product Tampering	Medium	High
Extortion	Low	Medium
Negative Publicity	Medium	High
Financial Risk		
Treasury Risk	Low	Medium
Lack of Counterparty and Credit Assessment	Low	Medium
Foreign Exchange Risk	Medium	Medium
Inability to Service Debt	Medium	High
Fall in Sales Revenue	Medium	High
Increase in Costs	Medium	Medium
Increased Cost of Capital	Medium	Medium
Poor Working Capital Management	Low	Medium
Poor Share Price Performance	Medium	High
Audit Concerns	Low	High
Internal Control Risk		
Financial Fraud	Low	High
Fatality Involving Employees	Low	High
Disengaged Workers	Low	Medium
Lack of Market Credibility	Low	High
Systemic Failure	Low	High

5.3 Role of Auditors and Consultants in ERM

As discussed earlier, internal and external auditors were also involved in ERM at Sigma. External auditors communicated to management any deficiencies in internal control over financial reporting identified during the course of their work. They communicated their findings to the Board and external parties using financial accounting and auditing standards and assurance techniques. Whenever external auditors uncover evidence that fraud may exist, they are required by their professional standards to bring the matter to the attention of the Board and ultimately to the shareholders; and this has happened in one instance at Sigma.

In the case of internal auditors at Sigma, whenever they uncovered evidence that fraud may exist, they were required to bring the matter to the attention of an appropriate level of management, often the CFO. However, at Sigma, the internal auditors' assurance reports were not limited to ensuring adequate financial controls within the transaction recording processes. These assurance reports included applicable conclusions and recommendations on strategic and ERM issues; and often included strategic action plans that required management agreement. Such assurance took different forms, as reflected in the following examples:

(a) The external auditors uncovered performance anomalies and/or control deficiencies during their examinations of Sigma's financial statements (or during their examination of their client's internal control over financial reporting) and reported to senior management and the Board.

(b) When risk owners self-reported upstream their assertions about the ERM process performance, the internal auditors attested to the accuracy of the assertions.

(c) Internal auditors directly evaluated ERM performance based on appropriate criteria and reported their conclusions to senior management and the Board of Directors.

From the above discussion it is clear that whilst the company's external and internal auditors took a *short term* performance/conformance focus, external consultants were principally used to evaluate the *long-term* focus, mainly on the long term performance of the company. Everyone interviewed stressed the importance of their specific ERM and governance responsibilities and roles as they endeavoured to more closely align their company's governance with its ERM processes. This approach to an enterprise-wide risk management,

involving the Board, the CFO, external and internal auditors and consultants had all the hall marks of an integrated and tightly coupled system. This was not unexpected to the researchers as it was the best-practice approach to risk management at the time (ISO, 2009).

5.4 Role of Management Accounting in Risk Identification and Assessment

The literature on ERM has developed many tools and techniques for *identifying* risk that can broadly be considered as management accounting. From this literature (see Collier, et.al, 2007 and the literature quoted therein) and the interview process, a 'risk identification chart' for Sigma (Table 2) was developed by the researchers and shown to the CEO, some Board members, senior management and those holding the position of management accountant. The CEO commented.

> *It is true that we try to assess risks in terms of opportunities and threats. This helps us to evaluate risk profile. However, it is not always possible to identify and evaluate all risks as some of the risk may be emerging.*

The combined responses of the CEO and the senior management are shown in Table 2, and indicated a fairly regular use of these methods at Sigma; at the time the interviews were conducted.

However, although these management accounting tools and techniques were used regularly by the CEO and the senior management in risk identification, those having the job title 'management accountant' were not called upon to provide any data or information in such risk-identification processes. The view of the management accountants can be summarised with the following quote:

> *Currently we have no formal processes that I am involved in. I know that Deloitte and the Risk and Audit Management Committee are involved in the area, but they have not asked me for any numbers. However, as the CFO is on that committee, he probably provides this information. I believe that there are some tools that could be used such as benchmarking in identifying risks. The GM (HR) does "incident analysis', but only on HR issues.*

Similarly, the literature has many tools and techniques for *assessing* risk that can broadly be considered as management accounting, and these are listed in Table 3. The researchers also showed this chart to some the CEO, Board members, senior management and those holding the position of management accountant; and the responses indicate a less regular use at Sigma of these assessing methods, which many of them have never done or never heard of. Here too,

the management accountants were only rarely called upon to provide data or information for risk assessment, and their collective view can be summarised with the following quote:

> *Some methods on the list are used, but not always, and not formally. Certainly we do information gathering; probability estimations, cost benefit analysis, DCF, FSA, and use strategic tools such as SWOT, Ansoff, 5-Forces, etc., but in an ad-hoc manner. Our concentration now in terms of risk is trying to ensure that we make correct CAPEX decisions. Life Cycle Costing looking for synergies using flexible manufacturing systems is particularly focused on.*

Table 2: The Use of Methods of Identifying Risk at Sigma

Methods of Identifying Risk:	**Done Regu-larly**	**Done Some-times**	**Never Done**	**Never Heard of**
Financial Statement Analysis	x			
Brainstorming	x			
Workshops	x			
Stakeholder Consultations		x		
Benchmarking	x			
Checklists	x			
Scenario Analysis		x		
Incident Investigation	x			
Auditing And Inspection	x			
Hazard And Operability Studies (HAZOP)	x			
Fish Bone (Breaking Down a Business Process into its Component Parts to Examine all the Risks to that Process)		x		
Questionnaires/Surveys		x		
Interviews	x			
(List developed from Collier, et.al, (2007)				

Even though management accounting information facilitates risk management at Sigma, reports with accounting information were mostly prepared only on a periodic basis, usually before the R&A Committee meeting. MAIS risk reports were sometimes prepared on an ad-hoc basis whenever certain risks were identified. An accountant commented:

> *Even though we try to be proactive in risk assessment, it is not always possible to predict all scenarios. Our risk reporting is done on a flexible basis.*

Table 3: The Use of Methods of Assessing Risk at Sigma

Methods of Assessing the Severity of Risks:	**Done Regu-larly**	**Done Some-times**	**Never Done**	**Never Heard of**
Information Gathering (e.g.. Market Survey, Research and Development)	x			
Scenario Planning		x		
Soft Systems Analysis				x
Computer Simulations (e.g.. Monte Carlo)			x	
Probability Distributions (e.g. Decision Trees)			x	
Fault Tree/Event Tree/ Root Cause Analysis		x		
Dependency Modelling				x
Failure Mode and Effect Analysis (FMEA)				x
Human Reliability Analysis				x
Cost-Benefit And Risk-Benefit Analysis	x			
Real Option Modelling			x	
Risk Assessment Software Packages			x	
Delphi Method			x	
Risk Map			x	
Hazard And Operability Studies (HAZOP)	x			
Statistical Inference (e.g. Measures of Central Tendency and Dispersion)			x	
CVP and Sensitivity Analyses	x			
DCF Techniques	x			
CAPM (Beta Risk)		x		
Financial Ratio Analysis (incl. Z-Scores)	x			
Strategic Analysis Tools (SWOT; PEST; GAP; BCG; Ansoff; 5-Forces)		x		
Shareholder Value (EVA; SVA)		x		
Likelihood Impact Matrix			x	
Flexible Budgets	x			
Working Capital Management	x			
(List developed from Collier, et.al, (2007)				

Evidence from research interviews also suggests that management accountants were not directly involved with assessment of risks even though management accounting information was used. This was partly explained by the fact that the CEO and other board members had accounting backgrounds and they tended to use their own management accounting analyses in

their decision processes. As expected from the literature (Hopwood, 1996), it was found that at Sigma, the more 'traditional' management accounting analyses, such as Cost-Benefit, Risk-Benefit, CVP and Sensitivity Analyses pertaining to risk were prepared in various functional areas as required; and reported upwards to higher levels of the organisation. The accountant commented:

> *We prepare standard risk reports on a regular basis; when a potential risk is identified we try to gather as much information as possible and prepare an in-depth risk report for that particular risk.*

The evidence we gathered suggests that although some management accounting information and analyses were used on a regular basis in ERM, these analyses were mostly communicated vertically and not horizontally. Therefore it was often difficult to see risk relationships that cut across the organisation and involved different functional areas. Therefore, whilst there was evidence that the MAIS was used as a surveillance and communication device to achieve ERM integration at the Board and senior management levels at Sigma, such facilitation was not present with regards MAIS information flows at the lower functional levels.

6. Risk Components and Connectivity

When commencing on this study, we initially aimed to explore the totality of risk management practices in a high risk industry. We wanted to determine if a company in a high-risk industry with significant societal pressures would take an integrated approach to risk management as espoused as 'best-practice 'in the literature (ISO,2009) by exploring the roles played by the Board and senior management, the company's auditors, consultants and the MAIS as a integrative and communicative device.

As discussed in the preceding section, we found evidence of an integrated ERM system at the higher levels of the organisation, and that the MAIS had an integrative role in such a system at those higher management levels. The MAIS provided early warning of potential operational risks to the Board and management, that if not attended could escalate to dangerous levels causing a high level of total risk.

At Sigma, the importance of constantly monitoring changes in the Risk Ladder (Table 1) permeated its integrated ERM strategies, as it recognised that there could suddenly be a change in the 'Likelihood' measure, and thus the probability of the resultant 'Consequence'

would be significantly enhanced. For example, in the area of foreign exchange risk, a relevant quote from the CFO is:

> *We obtain a 'risk report' from Deloittes pertaining to specific areas of risk. Then our risk management committee evaluates the approach to such risks. Let's take foreign operations. There are always risks associated with foreign currency transactions. We don't hedge all foreign transactions as that loses any upside return potential. So we hedge in "bands." A certain level of hedging is undertaken once the magnitude of foreign transactions exceeds a certain threshold or band. Similarly, we don't insure all risks as the upside potential is lost.*

The Company Secretary and General Counsel had this to say about the ERM approach:

> *The company has appointed Deloittes to study various areas of potential risk and report to this committee. These issues can range from supply chain and wholesaling issues; to enterprise risk management; to issues relating to the internal audit function. Deloitte then lists a suggested 'risk audit plan' for the coming year. The Risk and Audit Committee, along with Deloittes, then prioritises key area for resource allocation. We call this 'risk profiling'. Some areas are considered to be more important for action. Often the Risk and Audit Committee gets involved in management decision making.*

One of the Directors commented:

> *It is true that as a pharmaceutical company we have a strong tradition with innovation in science and product safely. As drugs are chemical and health related, we are under constant watch by various regulating agencies. As such we have developed elaborate systems of risk management in areas of product safely and operational issues such as safeguarding chemicals and health and hygiene issues. I think we have developed elaborate systems in these areas. We are now focusing more on risks that are strategic in nature and which arise from our business dealings.*

Sigma also considered reputation and public image risks. In addition to considering different types of risks which can be measured, the CEO stated that Sigma also considered the consequences of risks which might destroy its reputation and trust among its stakeholders. These risks were mainly in the areas of product safely, customer services and environmental concerns. Similar to the CEO's views, other interviewees also highlighted the importance of emergent risks which are strategic in nature. One of the directors commented:

> *Our risk management system is pretty good in terms identifying the major risk categories. We have a risk management strategy to handle risks once they are identified. We go through the root causes of any problem and that can lead to several strategies to mitigate that risk. However, I think we are lacking in making appropriate connections between different risks.*

This last comment, about the lack of connectivity between different risks, turned out to be prophetic in the case of Sigma. As we observed earlier in the paper, due to the complexity of

the organisation, it was possible that if such connectivity was not tracked, a low-probability driver could emerge and affect another low-probability driver and so on, and start the domino effect.

6.1 Risk Escalation at Sigma

It was evident that at Sigma, the company's Board and top management were very aware that a potential low-probability risk could suddenly emerge and very quickly escalate when combined with other risks, each individually small, but together cause a 'domino-effect'; i.e. the increase in likelihood of a particular risk driver could impact others, leading ultimately to catastrophic consequences for Sigma.[9] As such, most of the senior management we interviewed were of the view that the company's systematic and integrated approach to ERM, along with its MAIS 'Risk Ladder" (Table 1) would give early warnings of such emerging risks.

However despite all its best intensions, and as per the Scottish poem written by Robert Burns in 1785, that '*the best laid schemes of mice and men go often askew'*, Sigma's initial domino fell in an area not covered by the MAIS. The tight coupling of the MAIS to *future* oriented objectives and strategies and the performance KPIs relating to strategy implementation, could not cope with a risk that arose due to a *past* event.

In September 2009 (just after the initial phase of interviews was concluded), Sigma was a stock market 'darling' and confidently raised $300 million new capital. It was Australia's leading maker of prescription over-the-counter and generic medicine and was very strong in manufacturing, strong in brand management, and very strong in the generics market with their purchase of Arrow pharmaceuticals in 2005.

Six months later, in late February, 2010, Sigma shares went into a trading halt; and trading was suspended on the first of March, 2010 pending an announcement about the company's full year earnings. What happened? How did a company with a 'best-practice' ERM system get

[9] A classic example of a small risk escalating into catastrophic consequences was the O-ring failure in the Challenger space shuttle. This failure caused a breach in the joint it sealed, allowing pressurized hot gas from within to reach the outside and impinge upon the adjacent solid rocket booster attachment hardware and external fuel tank. The explosion of the fuel tank caused the disintegration of the entire space shuttle.

into a systemic risk spiral so quickly? Let us trace the issues as covered by the Risk Ladder (Table 1).

The first escalation in risk was the *Changes to Industry Structure* in terms of heavy competition in the generics market that was growing rapidly overall. Sigma had already recognised that this risk was of medium likelihood but with high consequences. The second escalation in risk was that in order to prevent the *Loss of Market Share* (which again had been recognised as being of medium likelihood but high in consequence) Sigma and all competitors went on a price war with heavy discounting that eroded profits.

These risks were management accounting related and picked up by the MAIS and the ERM system. In justifying the price war, the CEO, who was re-interviewed in the second phase of the study, said:

> *The expansion of the market is certainly something that helps us to grow, discounting is something that is necessary to some extent to ensure that there is support for your brand, but it does detract from profit but overall, I guess when you put these two together we are confident that the business will grow in terms of profitability.*

These risks were seen as manageable by Sigma and its ERM system; with forward looking information being provided by the MAIS. The CEO was of the view that Sigma's overall cash flows were strong and its customer base still very loyal. The first domino that fell, however, came from an area not covered by the MAIS and its future oriented analyses.

6.2 The Domino Effect at Sigma

The first domino was from the past, i.e. the compliance area of the financial accounting audit. It was noted that due to reduction in profitability, the billion dollars in goodwill in the balance sheet (that was booked when the generic maker Arrow was purchased via a leveraged buy-out in 2005) will have to be written down by a "material amount" (estimated by the market at that time at approximately 100 million dollars) because of increased market pressures, especially in generic medicine. Such an *Audit concern* was rated as having low likelihood by Sigma but with high consequences. When the level of the likelihood increased the consequences were disastrous, initiating the 'domino effect'. The impairment of the goodwill intangible asset resulted in a qualified audit statement. This in turn had a significant, almost catastrophic impact on Sigma's market credibility and share price. This incongruence between public

imagery of Sigma's earnings being at risk and actual actions by Sigma to boost its long-term earnings is termed *decoupling* in neo institutional theory (Meyer & Rowan, 1977).

Thus the next domino that fell in terms of the Risk ladder was Sigma's *Share Price Performance.* Being in a high-risk industry the likelihood of share price volatility was rated as medium, with high consequences; but the magnitude of the share price collapse (ultimately about 80%) due to an accounting reporting correction of a sunk cost was not even remotely predicted. The value of Sigma's equity was therefore reduced by 80%. Thus the decoupling between perception and reality became so significant that it threatened Sigma's very existence.

This then triggered the third domino, *Breach of Debt Covenants*. The leveraged buy-out of Arrow in 2005 had increased the company's debt-equity ratios, and the need to cover interest payments. This would not have been a problem if Sigma's market share and sales revenue increased, and thus interest payments can be met. The *Inability to Service Debt* was rated as medium, with high consequences in Sigma's Risk ladder (Table 1), but being forced into discussions with its banks about the breach of its lending covenants, was not covered by the risk ladder. Debt covenants are capital structure ratios (percentage of Debt to Equity) that must be maintained if banks are to lend to a company at a specific interest rate. If the debt ratio goes up because the value of equity has fallen, then the banks can either increase the interest rate or pull back the loans altogether. This would result in further downgrading of credit ratings and revised earnings forecasts. All of this resulted in a highly undervalued company which became an obvious takeover target. Consequently, Sigma's Pharmaceutical business was taken over by Aspen (South Africa) in late 2010.

Thus, although the monitoring by the Board, the management, the consultants and internal auditors of even small changes in the likelihood levels of the risk drivers were seen as an extremely important aspect of governance, Sigma's ERM system ultimately failed due to the 'domino effect' initiated by an area not seen to be overtly coupled to the MAIS (i.e. the past having no effect on future operations), but actually was tightly coupled covertly (i.e. a impairment of an intangible asset purchased in the past having a significant impact on the future operations of the company). As one of the Directors at Sigma commented:

> *Even if we are on top in several areas such as, internal controls, and regulatory risks, we are pretty vulnerable as certain emergent business and strategic risks can lead us to allocate resources and activities which have the potential to implicate the organisation as a whole. Some of these risks are triggered by external factors such as*

market conditions. Even a lucrative decision can turn into a disaster and affect the market value and reputation of the company.

This quote made in 2009 turned out to be prophetic for Sigma in 2010; a company in which the notions found in *accident theories* were observed (see also Power, 2007b; Hubbard, 2009). As discussed before, *normal accident theory* suggests that a combination of complexity and tight coupling can cause unexpected interactions and cascading effects in the organisation. In the case of Sigma a non-linear complexity lead to disastrous consequences in related functions or components. Was this avoidable? Weick (1976) suggests that in organisations that face complex environments and where a full range of consequences are either difficult to understand or information may not be available, that 'loose coupling' may counter connectivity problems between different organisational functions or activities. As Sigma's ERP was tightly coupled, it was not possible to test this hypothesis in the case study company; and is, therefore, an area for further research.

7. Further Exploration and Implication of Findings

This paper focused on the ERM processes in a high-risk industry. Considering the literature and the empirical findings of best-practice from other studies (see Collier, 2007 and the literature quoted therein) we expected to study a company that viewed risk management not from a silo perspective but instead from an integrated ERM perspective, with the MAIS playing a communication and information role. To a large extent, we found this to be the case at Sigma, especially at the Board and senior managerial levels. It is expected that in high-risk industries ERM is seen as comprising dynamic and integrated processes which are expected to help achieve performance by linking the organisation to its environment.

Much of the literature indicates that although the Board clearly 'owns' the corporate governance process, it is not directly responsible for ERM, which is seen as management's responsibility. This was the culture prevalent at Sigma, which even empowered its shop-floor employees to consider it their responsibility. The generalisation we can draw from this is that Boards should go beyond the minimum compliance requirements of the governance legislation affecting them, and assume ultimate responsibility for corporate governance within which ERM falls. Senior management (who "own" the ERM process) should then be responsible for designing and implementing a structured and disciplined approach to managing risks. Under senior management's supervision, risk owners should develop, implement, perform, and

monitor risk management capabilities and activities. This approach is in keeping with the conventional wisdom in the literature, which suggests that there must be effective communication channels linking the 'risk owners' (Crockford, 1986; Dorfman, 2007; ISO, 2009). This integrated approach to ERM was seen as critical to successful ERM at Sigma, and was most likely the mimicking of best practice in the industry as expected under the isomorphism form of neo-institutional theory.

The best-practice literature also states that ERM policies must be communicated to all stakeholders. This specifically follows legitimacy theory. Therefore, we investigated if Sigma had effectively communicated its integrated risk management policies to stakeholders. In terms of its external stakeholders the answer must be a somewhat qualified "yes", as Sigma had a good record of very effectively communicating with its shareholders and financial analysts, which resulted in phenomenal share price growth, especially in the period 2000-2008. However, this dissemination of information and media announcements were made during Sigma's growth years, and all of the information related to "good news" stories. Whenever there was bad news, the company's response was more muted. For example, the Australian Competition and Consumer Commission (ACCC) blocked Sigma's attempt to buy Australian Pharmaceutical Industries. One can find very little comment from Sigma as to the reasons why. Again, in 2008, ACCC opposed a joint-bid by Sigma and another company Metcash for the company Symbion's distribution arm. These stories got very heavy coverage by the media, but very guarded announcements on the Sigma website. This withholding of bad-news stories was of concern to Sigma's stakeholders, and resulted in a decoupling effect at Sigma (when in practice an institution does not match its external appearance) in the years after the GFC. The consequence of this decoupling was a dramatic collapse of its share price as a result of a financial accounting adjustment of a past event.

In our investigation it was found that Sigma did *not* have in place formal processes to gather information about the expectations of its wider group of stakeholders. This, along with Sigma's tendency to downplay bad-news, was the reason for the 'qualified-yes' given by us in terms of external reporting at Sigma. With regards to information flows to internal stakeholders, however, the communication flows were robust and highly integrated, as the company has recognised that many of the ERM and governance framework responsibilities overlap, and that one process affects the other. This has resulted in tight coupling at the senior management levels, with common memberships of the Board and R&A Committee, and the

MAIS playing an important role as an integrative and communicative devise. We also established that there was good formal communication between the Board, R&A Committee and the senior management at Sigma, again with the MAIS being used as a an integrative and communicative devise. However, true integration is only possible via effective co-ordination and communication to *all employees*, and here Sigma's approach is less conventional. Many interviewed commented on the informality of information flows, indicating some degree of 'loose coupling' with those on the shop-floor. The generalisation we can draw from this is that effective ERM communication flows should both be formal and informal.

However, whilst these formal and informal communication flows were adequate to monitor, assess and control secondary (or socially constructed views on) risks; as complexities grew there was more pressure on the Board to be involved with all aspects of risk management, especially primary (or real, often hidden) risks. We raised the question as to whether the Board was competent enough to see how risk cuts through different functional areas. The evidence here indicate that although the institutional actors considered the company to have best-practice ERM processes in place, in reality it was 'organised uncertainty', i.e. viewing ERM as only having to demonstrate to society that everything has been done to protect the organisation from possible risks. What was in place at Sigma was a calculative culture in organisational risk management rather than trying to identify and manage the real risks. It is clear that the tight coupling of the ERM system facilitation by the MAIS made the institutional actors have a quasi-religious (delusional) faith that the company was well protected (Power, 2004).

Institutional theory helps us to understand why organisations behave as they do in society by examining their institutions. Institutional influence can come in different forms. Certain influences are required by the regulating institutions. In the case of Sigma, the company was required to follow the requirements of TGA and EPA. As a pharmaceutical company Sigma needed to follow the requirements of Therapeutic Goods Administration (TGA). Apart from such requirements the company also adopted policies subscribed by Environmental Protection Agency and customer associations (e.g., animal rights). Clearly we can conclude that that Sigma found it useful to adopt institutional practices to legitimise its position in the market. It is evident from the literature that it is not sufficient just to adopt institutional practices they are expected to communicate to significant stakeholders. Transparency of such practices needed to co-exist with the objectives of risk management. The company was seen to be actively involved with communicating 'good stores' and 'growth news' to stakeholders. However,

such response was found to be muted whenever there was bad news. At Sigma, legislation prescribed financial accounting and governance reporting requirements, and these were very effectively complied with regards to *ex-post* information. The best-practice literature also states that ERM policies must be communicated to all stakeholders. This specifically follows legitimacy theory. Sigma did *not* have in place formal processes to gather information about the expectations of its wider group of stakeholders. This, along with Sigma's tendency to downplay bad-news, was the reason for the 'qualified-yes' given by us in terms of external reporting at Sigma.

Institutional theory helps us to understand why organisations behave as they do in society by examining their institutions. Institutional influence can come in different forms. Certain influences are required by the regulating institutions. In the case of Sigma, the company was required to follow the requirements of TGA and EPA. As a pharmaceutical company Sigma needed to follow the requirements of Therapeutic Goods Administration (TGA). Apart from such requirements the company also adopted policies subscribed by Environmental Protection Agency and customer associations (e.g., animal rights). Clearly we can conclude that that Sigma found it useful to adopt institutional practices to legitimise its position in the market. It is evident from the literature that it is not sufficient just to adopt institutional practices they are expected to communicate to significant stakeholders. Transparency of such practices needed to co-exist with the objectives of risk management. The company was seen to be actively involved with communicating 'good stores' and 'growth news' to stakeholders. However, such response was found to be muted whenever there was bad news. At Sigma, legislation prescribed financial accounting and governance reporting requirements, and these were very effectively complied with regards to *ex-post* information. The best-practice literature also states that ERM policies must be communicated to all stakeholders. This specifically follows legitimacy theory. Sigma did *not* have in place formal processes to gather information about the expectations of its wider group of stakeholders. This, along with Sigma's tendency to downplay bad-news, was the reason for the 'qualified-yes' given by us in terms of external reporting at Sigma.

Institutional theory also suggests that organisations adopt and conform to best practices. It was evident from the case analysis that the company adopted established practices, such as, flexible budgets, financial ration analysis (Z scores), sensitivity analysis, and other techniques. Such techniques were found to be prevalent in the risk management literature (Collier et al.,

2007). The 'real' risk of concern to the researchers was the sheer number of low-probability but high-consequence drivers in the Risk Ladder (Table 1). The company has a sound policy of identifying and reporting each class of risks. Much of the literature indicates that although the Board clearly 'owns' the corporate governance process, it is not directly responsible for ERM, which is seen as management's responsibility. This was the culture prevalent at Sigma, which even empowered its shop-floor employees to consider it their responsibility. The generalisation we can draw from this is that, the boards should go beyond the minimum compliance requirements of the governance legislation affecting them, and assume ultimate responsibility for corporate governance within which ERM falls. Senior management (who "own" the ERM process) should then be responsible for designing and implementing a structured and disciplined approach to managing risks. Under senior management's supervision, risk owners should develop, implement, perform, and monitor risk management capabilities and activities. This approach is in keeping with the conventional wisdom in the literature, which suggests that there must be effective communication channels linking the 'risk owners' (Crockford, 1986; Dorfman, 2007; ISO, 2009). This integrated approach to ERM was seen as critical to successful ERM at Sigma, and was most likely the mimicking of best practice in the industry as expected under the isomorphism form of neo-institutional theory. However, due to the complexity of the organisation, it was possible that collectively, if the low-probability drivers were not tracked, one of them could emerge and start the domino effect. And this is what happened. Had the ERM system been more loosely coupled, it is more likely that such a delusional faith in the system would not have prevailed, and the institutional actors would have been more alerted to the hidden risks that may suddenly emerge.[10]

8. Summary, Contribution and Areas for Further Study

We initially set out with intension of studying in-depth the isomorphism (mimicry) effect of institutional theory in the application of best practise ERM in a high-risk industry. What we found confirmed out expectations. However, an unexpected surprise finding was that these very best-practices had resulted in a tightly coupled organisation in which unexpected risks suddenly emerged that put the organisation at significant peril.

[10] The fate of the Titanic is a prime example of such a delusion. The 'unsinkable' tag was so believed, that the hidden risk of an iceberg being able to sink the ship was not contemplated.

At Sigma, it was seen that legislation prescribed financial accounting and governance reporting requirements, and these were very effectively complied with regards to *ex-post* information. The company also used management accounting information, tools and techniques at the Board and senior levels for effective *ex-ante* risk identification and assessment. However, the risk connectivity between these two information systems was not recognised and had disastrous consequences for Sigma due to the Domino effect. The recommendation we can draw from this is that organisations should put into place more processes to link the compliance based reporting and traditional management accounting within the various long and short-term performance-conformance dimensions.

Finally it was seen that a combination of complexity and tight coupling can cause unexpected interactions and unexpected consequences in ways where it is not always possible to comprehend the nature of interaction. When one function or component is affected other functions are also affected, resulting in systemic risk or the domino effect. A surprise finding of the Sigma case was that the best-practice of integrated ERP systems (ISO, 2009) could in fact *increase* the possibility of systemic risk if the couplings are tight. Hence, the study gives some support to the concept of loose coupling (Weick, 1976; Orton & Weick, 1990) where failed and risky activities are isolated and rectified without affecting other parts in the organisation and therefore providing some protection against unplanned consequences. The recommendation we can draw from this is that some aspects of loose coupling and 'fail-safe' be considered in ERM systems.

The findings of this study show interesting results on how risk management operates in an organisational context and how the MAIS is involved with the process. The research findings are from an in-depth case study which provides valuable insights but these results need to be considered with caution as the results cannot be easily generalised. However, this study has made a significant contribution to our understanding of risk management approaches, not least how a particular company approached risk management in a highly volatile and competitive environment subject to external regulation. One of our critical findings was the importance of recognising 'connectivity' and the cascading effects of risk from one area to other functional areas. Future studies can take a number of leads. Firstly, a further study can be undertaken to reveal the quality of management accounting information used by the Board of Directors and how accounting information is used both horizontally and vertically. It would be interesting to explore the organisational context and internal circumstances on the use of management

accounting information. Secondly, a further study can progress by adopting multiple case studies. Such a study can determine if isomorphism tends to lean towards homogeneity or if there are significant variations among different companies in their response to societal pressures for installing risk management systems. Thirdly, we would like researchers to investigate whether there is any evidence that loose couplings will reduce the likelihood of a risk suddenly emerging to cause the domino effect. We were surprised to see the cascading of risk in different risk areas which appeared to be individually either well managed or under control at Sigma. These emerging risks have the potential of rapidly permeating all areas of an organisation.

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