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Risk and performance management: Two sides of the same coin?

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Risk and performance management: Two sides of the same coin?

Academic research and practice literature show that risk and performance management are converging towards a common set of characteristics. On this basis, they are increasingly considered ‘two sides of the same coin’ (Van der Stede, 2009). But what is meant by ‘risk management’ and ‘performance management’? How can they be related? What are the implications of different approaches? This chapter reviews academic research, as well as a growing body of practice literature, to outline and discuss ways in which risk and performance management instruments and processes can be linked. The chapter starts by illustrating recent changes in the way in which risk and performance management are conceptualised. It then synthesizes existing literature to outline four different ways in which risk and performance issues can be addressed in an integrated way.

Performance management

Since the late 1980s, organisations have been engaged in rethinking their control systems. As stated by Eccles, ‘new strategies and competitive realities demand new measurement systems’ (Eccles, 1991; p. 131). A growing criticism was levelled against traditional measurement frameworks, deemed to be past-oriented and unable to satisfactorily reflect how performances are affected by changing business environments (Johnson and Kaplan, 1987). The way in which management control issues (e.g. how to ensure the achievement of organisational objectives) are addressed changed with changes in the context in which organisations operate (Otley, 2003). Several examples can be made: the shift from vertical integration to outsourcing, process reengineering and value chain management; the use of non-financial performance measures to complement financial controls; the growing relevance of corporate governance and external control to ensure alignment between the interests of senior managers and business’ owners; budgeting and planning problems as the uncertainty in some business environments increases.

Each of these themes can be related to one or more ‘new’ management techniques. The escalating emphasis on business processes, particularly under the banner of business process re-engineering (BPR) (Hammer and Champy, 1993), draws attention to process-focused instruments such as Activity Based Costing (ABC) and Activity Based Management (ABM) (Friedman and Lyne, 1995). Strategic Management Accounting (SMA) draws attention to the analysis of data about

business context and competition to monitor the alignment between internal operations and customer requirements (Bromwich and Bhimani, 1989). The use of non-financial measures is linked to the rise in importance of the Balanced Scorecard (BSC) (Kaplan and Norton, 1992, 1996, 2001). The focus on ensuring that senior managers act in the interests of shareholders led, especially in the United States, to performance measures such as Stern Stewart's Economic Value Added[®] (EVA[®]). The decline of traditional budgeting processes under conditions of increased uncertainty stimulated the Beyond Budgeting movement (Hope and Fraser, 2003), and discussion of other ways to incorporate uncertainty and non-controllable factors in budgeting processes (see Van der Stede and Palermo, 2011; Becker et al., 2016).

As stated by Otley: 'there has been more management accounting innovation over the past two decades than in the previous fifty years' (Otley, 2008: 230). These innovations support the view that managers may well be responsible for some elements of strategy, management control and operational controls. As a consequence, management control research has started to pay greater attention to neglected elements of strategy and operations¹. This shift of focus has been categorised under the general banner of performance management (Otley, 1999, 2001, 2003; 2008; Ferreira and Otley, 2009; Broadbent and Laughlin, 2009). The use of the term performance management stresses that management accounting is only one part of the ways in which it is possible to design and use information for organisational control. Performance management provides 'an umbrella under which we can study the more formal processes that organisations use in attempting to implement their strategic intent' (Otley, 2001, p. 250). The category of performance management underscores key characteristics of innovative management control techniques that flourished in the 1990s: the focus on the achievement of corporate strategy; the organisation-wide scope with emphasis on organisational interdependencies and operational responsibilities of line managers; the attention dedicated to detect weak signals from the environment and provide a more timely and long-term oriented view of the business. In short, the term performance management emphasises enterprise-wide control systems that look beyond the ex post measurement of performance and provide a future-oriented view of the business.

The framework developed by Otley (1999), and subsequently refined by Ferreira and Otley (2009), provides more details on the elements that characterise performance management. The authors state clearly that they do not try to develop a 'well-articulated theory', but rather aim to identify key

¹ The seminal work by Anthony (1965) separated out the activities of 'management control' from the wider activities of 'strategic planning' and the more detailed and technically diverse activities of 'operational control'.

issues that are relevant to many different organisations. The focus of the framework and its extensions, as claimed by the authors, is 'to provide a descriptive tool that may be used to amass evidence upon which further analysis can be based' (Ferreira and Otley, 2009: p. 266). The authors view performance management as a set of evolving formal and informal mechanisms, processes, systems and networks, which can be used by organisations for different aims: 1) conveying the key objectives elicited by management; 2) assisting strategic processes and ongoing management through analysis, planning, measurement, rewarding; 3) supporting and facilitating organisational learning and change.

This framework and its extensions (Ferreira and Otley, 2009) have already been discussed, as noted by Scapens (2009). Drawing on a longitudinal case study, Collier (2005) focuses the interaction between formal, systems-based controls and social controls. Specifically, the author shows the marginalisation of traditional management accounting and non-financial performance measurement techniques in a multinational packaging equipment supplier, whilst recognising the importance of belief and boundary systems. Broadbent and Laughlin (2009) expand the analysis of contextual and cultural factors, which are relatively underexplored in the Ferreira and Otley's framework. The authors argue that a range of contextual factors underpin different specifications of performance management. As a result, a performance management system can be positioned in a continuum, where we have functional systems directed to specific outcomes on the one end or more participatory systems, where objectives and indicators are discursively agreed, on the other.

To summarise, the literature reviewed in this section suggests that performance management is essentially concerned with defining, controlling and managing the achievement of expected outcomes as well as the means used to achieve these results. The focus is placed at the organisational rather than individual level in order to understand the functioning of enterprise-wide control systems that go beyond the ex post measurement of performance and financial outcomes.

Risk management

Risk calculation and quantification is not new in for profit companies (e.g. Gallagher, 1956). It was initially associated with the insurance-buying function, and, later, with specific processes such as labour safety or information systems security (Meulbroek, 2002; Power, 2007). The 1990s,

however, witnessed a major shift in risk management practice. The concept of risk became more broadly defined, including a wide set of events that could affect the achievement of corporate objectives: corporate reputation, regulatory compliance, operational activities and strategic decisions (DeLoach, 2004; Nocco and Stulz, 2006; Power, 2007; Woods, 2007). Risk management is today viewed from a broader perspective (Spira and Page, 2003; Holt, 2004; Woods, 2007). It focuses upon achieving control over corporate strategy (Dickinson, 2001; DeLoach, 2004; CIMA, 2005; Nocco and Stulz, 2006; Woods, 2007); it aims to include all potential threats and opportunities (Beasley et al., 2006); it emphasises an integrated approach, improving senior managers ability to oversee the risks portfolio (Sobel and Reding, 2004); it is cascaded down throughout the whole organisation via line management (Beasley et al., 2006; Woods, 2007).

The recent years also witnessed a change in risk measurement. On the one hand, since the early 1990s risk has been studied, analysed and calculated as volatility in financial returns, based on mathematical mean-variance analysis (Power, 2007). As a result, different risk measures have been developed and, rapidly, became a common measurement framework for financial (and, more recently, non-financial) institutions. Risk measures such as Value at Risk (VaR), originally calculated for internal risk reporting purposes in financial institutions, started to become diffused among for profit companies both for internal and external risk reporting purposes (Jorion, 1997; Woods et al., 2004). On the other hand, the practice literature discusses so called key risk indicators (KRIs) (e.g. Davies and Haubenstock, 2002; Lam, 2006; Scandizzo, 2005; Beasley et al., 2010). A KRI is defined as a measure that can be used to monitor either the level of risk in an organisation, or the quality of controls around that risk. Different categories of KRIs can be devised. For example, Davies and Haubenstock (2002) distinguish between loss measures (e.g. actual out of pocket costs), process measures (e.g. quality of operations) and internal/external environmental measures (e.g. policy limits).

In the last decade, professional organisations played a major role in defining the core elements of the ‘new’ risk management. These effort span across different disciplines and professionals: risk managers (e.g. IRM), management accountants (e.g. CIMA, ICAEW), internal auditors (IIA), consultancy firms (e.g. Deloitte, 1997; EY, 2005; PWC, 2009), insurance managers (AIRMIC). A well-known guidance on enterprise-wide risk management – the ERM Integrated Framework published in 2004 by the COSO – has been elaborated with the support of different accounting and auditing professional associations (see COSO, 2004; Hayne and Free, 2014).

Such a growing body of practice documents share similar concerns with value creation and the achievement of corporate objectives. In general, risk management is conceived as a process about the risks that might affect an entity's objectives (COSO, 2004). As stated by CIMA (2005), risk management is the 'process of understanding and managing the risks that the entity is inevitably subject to in attempting to achieve its corporate objectives' (CIMA, 2005: 53). These documents also provide frameworks that exemplify the different steps of the risk management process. Figure 1 provides an illustration of the framework proposed by the Institute of Risk Management (IRM). This is an illustrative example of the main components of a typical 'new' risk management process. The overall process (IRM, 2002: 5-11) is divided into four main steps: risk analysis and evaluation, risk reporting, risk treatment, risk monitoring. Risk analysis aims at identifying, describing and estimating risks; risk evaluation instead is used to make decisions about the significance of risks to the organisation and whether each specific risk should be accepted or treated. Risk reporting is concerned with the communication at different organisational levels (Board, business units, individuals, external stakeholders) of information about the risk management process. Risk treatment is the process of selecting and implementing measures to address risks (e.g. risk transfer, avoidance). Finally, the monitoring process should provide assurance that there are appropriate controls in place and procedures are understood and followed.

[Insert Figure 1 about here]

Several instruments can become part of the risk management process outlined in Figure 1: risk maps and registers; SWOT and PESTLE analysis, statistical modelling, one-to-one interviews and workshops, risk committees. As expressed by some scholars (Holt, 2004; Power, 2007; Miller et al., 2008), these are the more or less standardised set of risk practices that are expected to be found in any organisations. As put by Holt (2004):

'Most risk management begins in the drafting of a risk register – a matrix of risk types or families, probabilities and impacts focused at distinct levels: division; organisation; sector; domestic economy; global economy. Its compilation can be approached either from a board level or from an operational level, or a combination of both [...] The matrix is used to determine gross risks (the probability of an event occurring coupled to the extent of its impact), from which important or targeted risks can be identified. Those of greatest potential in terms of exposure and opportunity can be quantified using statistical models. Once identified, these can be managed through either mitigation strategies [...] or avoidance strategies [...] specific to each risk.' (Holt, 2004: 254)

To summarise, the 1990s witnessed a shift of risk management towards a growing concern with value proposition and the achievement of corporate objectives. Risk management is viewed as a

central part of an organisation's strategic management: a process that ensures that organisations address the risks linked to their activities with the goal of achieving sustained performance across different business areas.

Risk and performance management

It is possible to identify four different streams of the literature that address the relationship between risk and performance management. The following sections describe these streams, their contributions to our understanding of the relationship between risk and performance and their limitations.

The 'levers of control' framework

The first stream of research relates to the work of Robert Simons (1991, 1995). Simons studied the design and functioning of organisational controls with a 10-year long research programme that culminated into the 1995 book 'Levers of control: How managers use innovative control systems to drive strategic renewal'. The author identifies four distinct uses of control systems. Diagnostic systems monitor critical performance variables and lead to corrective actions following a deviation from standard. Interactive systems are formal controls that managers use to become regularly involved in the decision activities of subordinates and that become the basis for continual exchange between top managers and lower level of management as well as among organisational members. Belief systems communicate core values of an organisation; they use culture, norms and values to drive action. Finally, boundary systems inhibit managers to undertake inappropriate activities.

Simons' work on the levers of control contributes to risk management from the viewpoint of management control research (Otley, 2010). Boundary systems, in particular, are represented as 'the risks to be avoided in organisations' (Simons, 1995: 85). Practically, boundaries are represented by standards of ethical conduct (e.g. codes of business conduct that prohibit improper activities), and also strategic systems ensuring that people avoid opportunities that could diminish the business' competitive positions. As put by Simons:

‘a large computer company, for example, uses its strategic planning process to segregate its product and market opportunities into what managers call green space and red space. Green space is the acceptable domain for new initiatives. Red space represents the products and markets in which senior managers have decided they do not want to pursue new opportunities, although the organisation could compete in those products and markets given its competencies’ (Simons, 1995: 86).

Simons, in subsequent work (Simons, 1999), explicitly states that his research on the levers of control can be framed as addressing risk management issues: ‘the levers, simply stated, are the mechanisms managers can adjust to control risk as a company pursues its strategy’ (Simons, 1999: 92). An important implication is that mechanisms of integration between risk and performance management need not entail an examination of formal risk management systems. The way in which performance management instruments (or, drawing on Simons’ work, ‘levers of control’) are used helps to uncover different risk management dimensions. The case of Johnson & Johnson, a leading company in the health care sector, is frequently recalled by Simons as an example.

‘Again, Johnson & Johnson provides an illustration of a company that uses an effective risk-controlling device. Its managers use their profit-planning and long-range-planning system in a highly interactive way to continually assess opportunities and threats. As they constantly revise projections, managers are forced to confront three questions: What has changed? Why? And, what are we going to do about it? Through such an interactive process, Johnson & Johnson’s managers have successfully navigated the shoals of the changing health care industry and have managed to stay, year after year, on the shortlist of America’s most admired companies.’ (Simons, 1999: 94)

Simons’ work has been extensively investigated in the last decade (see, for example, Bisbee and Otley, 2004; Widener, 2007; Tessier and Otley, 2012). However, the idea that different uses of management control systems can lead to risk management has not been explored so far, with limited exceptions (CIMA, 2010). This is not to say that risk is a marginal element in research on the levers of control framework. Widener (2007), for instance, suggests that two types of strategic elements – strategic uncertainties and strategic risk – drive the importance and role of control systems. But risk is considered as an antecedent of different uses of management control systems, rather a focus of management through the levers of control.

To summarise, Simons addresses risk management issues in his work on the levers of control. An important implication is that one need not to examine formal risk management systems to study the relationship between risk and performance management. The way in which management control processes and instruments (i.e. the levers of controls) are used can be indicative of ways to manage risk and performance in an integrated way.

Enterprise-wide Risk Management (ERM)

A second body of the literature (e.g. Mikes, 2009, 2011; Woods, 2009; Arena et al., 2010; CIMA, 2010; Tekathen and Dechow, 2013; Palermo, 2014) offers a diametrically opposite perspective of Simons' work. Instead of looking at the potentially important role to be played by management control systems for risk management, they draw attention to new formal risk management systems for management control. These studies focus their attention primarily on enterprise-wide risk management (ERM), which represents an emergent theme in the literature, with implications for research in strategy, accounting and governance (Bhimani, 2009; Soin and Collier, 2013).

Research on ERM focuses on different contexts (e.g. public and private sector) and uses different theoretical perspectives (e.g. contingency theory, institutional theory). For example, Woods (2009) adopts a contingency theoretical frame to study risk management in a public institutional context. The author explores risk management as a dimension of corporate governance and suggests that, even though basic structures of risk management are common across large organisations, specific contingencies can shape risk management control systems. Mikes (2009), based on a field study of two financial institutions, argues that organisations might exhibit distinct calculative styles underpinning different risk management mixes. In so doing, Mikes' work extends the boundaries of contingency-based concepts of control practices. Arena et al. (2010) investigate organisational variations of ERM through a longitudinal multiple case study based on three companies operating in non-financial sectors. The study highlights how ERM in practice reveals distinct trajectories within the three organisations as it encounters different logics, experts and rationalities. This includes the hybridization of risk and control practice, as exemplified by the claim of the rise of a 'new hybrid ERM/budget style' (Arena et al., 2010: p. 14) in one of the organisations. Tekathen and Dechow (2013) examine the design and use of COSO-ERM in a German top-tier corporation. The company's manifestation of COSO-ERM includes tools that mobilise people in unexpected ways. For instance, the authors shed light on an information system that supports the aggregation and reporting of risk information. Based on the type of entrance for single risks, the system automatically aggregates risks based on pre-defined risk categories and the organisational structure of the company. But not all fields are mandatory, leading to ambiguity about what counts as a risk and uncertainty about the resulting aggregated risks. Finally, Palermo (2014) explores the adoption of a formal organisation-wide risk management framework in a public sector organisation. Drawing

on new institutional theory, the study reveals how the use of the new framework depends on risk managers' relational skills, knowledge of business activities and prior professional experience.

Despite differences in approaches, theories and context, there are two common themes in studies such as these. First, the authors tried to gain a sense of how risk management was working in concrete organisational settings, and examine how the operation of enterprise-wide risk controls affect performance management. Despite these studies are primarily devoted to a management accounting audience, there are few references to traditional accounting issues such as the use of risk-adjusted returns for capital allocation. The researchers have instead focused on the processes, systems and controls around risk management. An important implication of this literature is that risk 'has broken out of the finance function' (CIMA, 2010: p. 11). Second, all these studies call for further investigation on the relationship between risk and performance management. The core message is that, when studying the dynamics of ERM, researchers need to consider the interactions between risk and other management control and information systems (Mikes, 2009; Arena et al., 2010). For instance, the study by Mikes suggests that 'the interface between accounting and risk controls is riddled with possibilities and tensions' (Mikes, 2009: p. 23).

To summarise, management accounting research is starting to place more and more attention to the analysis of the transformative role of enterprise-wide risk management processes on management control activities. It is recognised that this topic can constitute a fertile ground for future research.

Risk and control

A third stream of the literature examines the development of risk management and governance processes, with a particular focus on organisations operating in the UK since the publication of policy documents such as the Turnbull Report and its adoption into the Combined Code on Corporate Governance (Collier and Berry, 2002; Collier et al., 2007; Woods et al., 2008; Collier, 2008). A related theme consists in the exploration of the role of management accountants in risk management processes (Collier et al., 2007; Collier and Berry, 2008).

The main findings have been summarised into a book entitled 'Risk and management accounting: Best practice guidelines for enterprise-wide internal control procedures' (Collier et al., 2007). This research provides insights into the relationship between risk, management accounting and corporate

governance. First, risk management in the sample of organisations studied was observed to arise from institutional and internal processes rather than a greater perceived riskiness of the environment in which organisations operate. Second, the researchers found that heuristic methods of risk management, especially subjective judgement based on experience, were used much more than procedural and systems-based approaches. This contrasts with the ‘unspoken assumption’ (Corvellec, 2009: 286) in much risk management research that risk management is best associated with formal processes and instruments. Third, management accountants, contrary to professional claims (e.g. Pollara, 2008), had a marginal role in relation to risk management in the majority of organisations.

This body of the academic literature raises questions about the relative pre-eminence of processes to manage risks over management controls and performance management processes. For instance, drawing on Simons’ work, Collier (2008) argues that a risk-based approach to control is consistent with the deployment of boundary and belief systems and an interactive use of controls. For instance, boundary systems determine the risks facing an organisation; belief systems are supported by the definition of expectations around organisational risk appetite and risk culture (see also Power et al., 2013, on the role of risk culture). It is shown that it is possible to find forms of risk-based approaches to control (e.g. the Just in Time environment described by Collier and Berry, 2002), where existing controls are specifically related to the assessment of business risks.

To summarise, this stream of research has important implications for research on the relationship between risk and performance management. It shows that risk management does not necessarily originate from a riskier world (economic and strategic calculation), but rather from institutional and internal processes; managers prefer to use heuristic methods rather than formal risk management calculations; management accountants are found to play a marginal role in risk management. Overall, a risk-based approach to control could be a way of leveraging existing management controls and performance management processes as a driver for integrated risk and performance management.

The practice view

A growing body of the practice literature examines models and mechanisms that link risk and performance management (e.g. Scholey, 2006; Beasley et al., 2006; Woods, 2007; Van der Stede, 2009; Van der Stede and Palermo, 2011). The underlying theme is that risk and performance could and should be linked one to each other as they present complementarities that can be leveraged to achieve higher organisational performance. Common expressions are that risk and performance are ‘two sides of the same coin’ (e.g. Van der Stede, 2009) or that risk and performance ‘go hand in hand’ (e.g. Scholey, 2006).

The issue has been addressed conceptually with the notion of ‘enterprise governance’ (Van der Stede, 2009). Enterprise governance is a conceptual framework that puts reliable scrutiny and sustainable performance under one umbrella, addressing how organisations can align both items in the short and long term. The idea is to reverse the perverse tendencies – under-scrutiny in periods of good fortune and over-scrutiny in periods of declining demand – that cause performance and risk management to become misaligned. Practice articles also describe new instruments that can be used to balance organisational attention between risk and performance issues. The case of ‘risk scorecards’ can be pointed out. A number of contributions (IMA, 2006; Calandro and Lane, 2006; Scholey, 2006; Beasley et al., 2006; Woods, 2007) describe how the structure of the Balanced Scorecard can be used to complement key performance measures with a set of key risk indicators. Risk scorecards can provide a single point of access to critical risk and performance information that reside in disparate data sources. They may, therefore, represent the one instrument that raises the level of managers’ risk awareness, providing an integrated framework for risk and performance measurement and reporting.

The case of ‘risk scorecards’ also provides a bridge between practice and academic literature. It is recognised that the management of risk has not been strongly featured into the literature on the BSC² (Kaplan and Norton, 1992, 1996, 2001). But it is also argued that the BSC framework could provide a valid infrastructure to manage strategy risks (see Kaplan, 2009; Kaplan et al., 2009). A risk scorecard can be devised based on an entity’s strategy map. The risk scorecard first identifies for each strategic objective the primary risk events that would prevent the objective from being achieved; then, it presents for each risk event a selection of metrics that would be used as early

² The sole exception is constituted by the discussion of risk management as an internal process in the 2001 book, ‘Strategy maps’ (Kaplan and Norton, 2001: 73-77).

warning indicators of when the risk event might be occurring. Finally, a rising trend in risk metrics, or even a single observation above a pre-set control limit, would generate a management alert requiring immediate attention.

To summarise, bearing in mind that professional literature offers a consultative approach to the problem at stake, practice contributions provide insights into ways of integrating risk and performance. In general, a strong emphasis is placed on the use of existing performance management infrastructures as a platform for new risk/performance management integrated instruments.

Discussion and conclusions

Academic research and practice literature show that risk and performance management are converging towards a common set of characteristics. Risk management shows a growing concern with value propositions, performance and achievement of corporate objectives. Performance management looks beyond the ex post measurement of performance to the management of performance providing a future-oriented view of the business. On this basis, risk and performance management can be seen as ‘two sides of the same coin.’

This chapter has reviewed and synthesized four streams of the literature, different in their focus and audience, which help to delineate what being ‘two sides of the same coin’ may mean in practice. Bearing in mind the risk of over-simplification, Table 1 provides a synthetic overview of the literature reviewed. First, it is possible to make a distinction based on the starting point of investigation. On the one hand, there are studies that use performance management as a primarily focus of investigation; they provide insights into how it is possible to leverage performance management processes for risk management. On the other hand, there are studies that focus attention on risk management; research here builds on the analysis of risk management processes or risk-based controls to investigate how they may affect and complement performance management.

Second, it is possible to differentiate the four streams of the literature according to their focus on new or existing processes and procedures. On the one hand, there is research that investigates how new instruments and processes can contribute to enhance knowledge on the relation between risk and performance management (e.g. risk scorecards on the performance side; ERM on the risk side).

On the other hand, there are contributions that show how different uses of existing risk and performance management processes can become a source for integrated risk and performance management. Research here does not look specifically to the presence of new tools, but rather it investigates how different uses of existing tools can have an effect on the way in which risk and performance are managed as ‘two sides of the same coin.’

[Insert Table 1 about here]

By providing an overview of the different streams of research, Table 1 sheds light on two elements for further reflection. First, we enter into a recent field of research. Most of the contributions have been made within the last decade. Even the ‘Levers of Control’ framework, which has been extensively investigated since the mid-1990s, has never been explicitly tested in relation to the ability of different uses of control systems to help organisations to manage risks (see Collier, 2008; Otley, 2010). Second, the different research streams suggest contrasting views on how the problem of managing risk and performance as ‘two sides of the same coin’ can be addressed. For example, does linking risk and performance management require (or benefits from) the formalisation of new instruments and processes? Or can organisations simply leverage existing processes and tools? Is risk management relatively pre-eminent over performance management or vice versa? Further work can be beneficial to enhance knowledge of the ways in which risk and performance management processes and instruments can be related. Moreover, further work may help to confirm or challenge the argument presented in this chapter, namely that risk and performance management are converging towards a common ground.

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Appendix

		Starting point of investigation	
		Performance	Risk
Focus on the presence of new formal processes	L o w	Levers of control (mid 1990s): uses of management control systems for effective risk management	Risk-based control (late 2000s): a risk-based approach to management control helps to leverage existing risk controls and mental models as a driver for performance management
	H i g h	Practice literature (mid 2000s): risk and performance management can be integrated via new risk and performance management infrastructures	Enterprise-wide risk management (late 2000s): new processes such as ERM processes shape existing management control systems

Table 1: Overview of research on risk and performance management

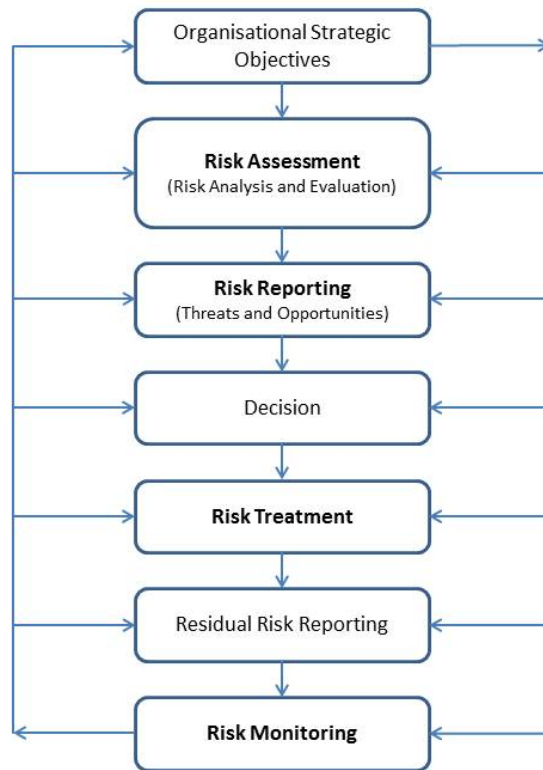


Figure 1: Risk management process (adapted from IRM, 2002: 4)