The Effects of Perceived Business Uncertainty, External Consultants and Risk Management on Organisational Outcomes

Abstract

Purpose – The purpose of this paper is to investigate the relations between perceived business uncertainty (PBU), use of external risk management (RM) consultants, formalisation of RM, magnitude of RM methods and perceived organisational outcomes.

Design/methodology/approach – This paper is based on a questionnaire survey of members of the Chartered Institute of Management Accountants in the UK. Using AMOS 17.0, the paper tests the strength of the direct and indirect effects among the variables and explores the fit of the overall path model.

Findings – The results indicate significant and positive associations exist between the extent of PBU and the level of RM formalisation, as well as between the level of RM formalisation and the magnitude of RM methods adopted. The use of external RM consultants is also found to have a significant and positive impact on the magnitude of RM methods adopted. Finally, both the extent of RM formalisation and the magnitude of RM methods adopted are seen to be significantly associated with overall improvement in organisational outcomes.

Research limitations/implications – The study uses perceptual measures of the level of business uncertainty, usage of RM and organisational outcomes. Further, the respondents are members of a management accounting professional body and we do not incorporate the views of other managers, such as risk managers, who are also important to the governance process

Originality/value – This study provides empirical evidence on the impact of RM design and usage on improvements in organisational outcomes. It contributes to the risk management literature where empirical research is needed in order to be comparable with the traditional management control system literature.

Keywords Perceived business uncertainty, Use of external consultants, Risk management, Organisational outcomes

Paper type Research paper

1. Introduction

Risk management (RM) has gained substantial prominence in recent years and is explicitly on the agenda of governing boards and directors. It is viewed as a critical facet of an organisation's control system where timely identification, assessment and management of the portfolio of risks faced by an entity are linked with the achievement of its goals and objectives (Beasley *et al.*, 2005; Mikes, 2009; Woods, 2009). Further, there has been increasing pressure for RM to move from a traditional, narrow and silo-based approach to a more holistic, organisation-wide system of risk management, also commonly referred to as enterprise risk management (ERM). [1] Recent evidence indicates that many firms have adopted ERM (Beasley *et al.*, 2005; Gates and Hexter, 2005) and that there is also a growth in the appointment of Chief Risk Officers (CROs) (Liebenberg and Hoyt, 2003; Pagach and Warr, 2008). These trends signal the increasing investments that are being made by organisations in establishing formal RM systems for managing the growing range of risks in an increasingly volatile and dynamic business environment (Chin and Chang, 2009; Frigo and Anderson, 2009). Nevertheless, there is scant evidence on the impact of the design and utilisation of RM on organisational outcomes. A better understanding of this association is critical for ensuring effective and efficient use of scarce organisational resources.

Our literature review indicates that while an emerging body of research has concentrated on understanding the key drivers of RM uptake, where factors such as firm size, CEO and CFO support for ERM and industry and financial characteristics, such as firm earnings and stock price volatility, have been found to be critical determinants (Beasley *et al.*, 2005; Liebenberg and Hoyt, 2003; Pagach and Warr, 2008), evidence on the uptake of RM on organisational outcomes remains unclear. Prior studies on the impact of management control

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[1] In this study, we use the terms risk management (RM) and enterprise risk management (ERM) synonymously.

systems indicates that distinct features of a management control system, such as formalisation, design and intensity of usage, affect organisational outcomes (Chenhall, 2003; Dawes *et al.*, 2007; Nahm *et al.*, 2003; Simons, 1991). While RM is increasingly viewed as a fundamental component of an organisation's management control system (Mikes, 2009), evidence in relation to the design and use of RM and their implications for organisational outcomes remains unclear.

The overall objective of our study is to address this void in the literature. In doing so, we draw upon the strand of management control studies that are premised on organisational theory (Chenhall, 2003; Dent, 1987; Hopwood, 1987; Simons, 1990) with the underlying premise that external environmental factors are significant predictors of internal organisational design including structures and processes (Covaleski *et al*., 1998; Govindarajan, 1985; Lawrence and Lorsch, 1967; Waterhouse and Tiessen, 1978). The conceptual framework of this study is as shown in Figure 1.

--- Insert Fig. 1 about here ---

We focus on perceived business uncertainty (PBU) which refers to perceptions of environmental uncertainty, business competition and industry risks as a key driver of three major aspects of RM.[2] The first aspect is the use of external consultants on RM where such consultants are often seen as expert boundary spanners who possess knowledge superior to the firm (Dawes *et al*, 2007). The second and third aspects relate to the extent of RM formalisation policies and processes, and the magnitude of RM methods adopted, respectively. Formalisation of organisational policies and procedures in general provides

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[2] Although the term perceived environmental uncertainty is more popularly utilized in the literature, we adopt the term perceived business uncertainty to reflect the slightly narrower set of uncertainties inherent to entities in business environments e.g. mainly competitive and industry-related risks as conceptualised and measured in this study.

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greater standardisation and aids coordination of activities. The magnitude of RM on the other hand refers to both the types of RM methods and the extent of their use. RM methods may range from simple subjective, heuristic based methods (e.g. intuition and hindsight) to more complex methods that are quantitative-based (e.g. stochastic modelling and statistical analysis). Following previous arguments that an organisation's environment is a key determinant of its structure (Covaleski *et al*., 1998; Govindarajan, 1985; Waterhouse and Tiessen, 1978), we argue that increasing PBU will drive higher levels of usage of external RM consultants, as well as the RM formalisation and the magnitude of RM methods adopted. It is also argued that the greater the use of all three aspects of RM, the better the organisational outcomes.

The present study involves data from a questionnaire survey of 242 respondents from a cross-sectional firm-base and who were members of the Chartered Institute of Management Accountants (CIMA). Data analysis based on a path analytic model assessed the various relationships among the respondents' PBU; the use of external RM consultancy services, the level of formalisation of risk policies and procedures, the magnitude of RM methods utilised, and improvement in organisational outcomes as a result of RM usage. The results suggest direct positive associations exist between PBU and the extent of RM formalisation, and also between the use of external RM consultants and the magnitude of RM methods. Additionally, both the extent of RM formalisation and the magnitude of RM methods have strong positive impacts on perceived organisational outcomes such as corporate planning, resource allocation, stakeholder relationship and communication within the organisation. Unlike prior studies that have elected to study the impact of MCS on performance from a managerial or an economic perspective, this study takes up a broader concept of organisational performance as they reflect the interests of a wider range of stakeholders and organisational capabilities. This view is aligned with the resource-based view of a firm which contends that the basis for a

competitive advantage for a firm lies primarily in the application of the bundle of valuable resources at the firm's disposal (Barney, 1991; Wernerfelt 1984). These resources include a wide variety of tangible and intangible capabilities and management processes such as effective corporate and resource planning, stakeholder management, strong firm culture and shared vision with goal clarity. Likewise, McGivern and Tvorik (1997) in their extensive literature review of determinants of organisational performance (measured in financial terms i.e. economic rates of returns) identify various organisational factors related to management processes such as organisational capabilities and learning, and organisational resources as significant predictors of performance. Thus, the impact of RM on the selected management processes i.e. organisational outcomes in this study is warranted given their effect on organisational performance ultimately.

The contributions of this study to the extant literature are two-fold. First, this study provides empirical evidence on the antecedents and outcomes of the design and use of RM where such evidence is scant. In particular, it adopts a path model which allows the current study to concurrently examine the various inter-relationships between external environmental factors, the design and use of RM and their impact on organisational outcomes. In doing so, this study illumines the larger body of literature relating to organisational controls by providing a more in-depth understanding of the drivers and outcomes of RM which in turn will inform both resource allocation and policy making by organisations, policy makers and regulators including professional bodies (COSO, 2004; Kennedy Information Services, 2006). For example, Mikes (2009) contends that ERM echoes the ambitions of other recent management control practices such as activity-based management and the balanced scorecard. Yet there is little evidence on how different aspects of RM impacts organisational outcomes. Second, the present study provides an empirical assessment of the impact of using external RM consultants on the magnitude of RM methods utilised and its subsequent effect

on organisational outcomes. Such evidence is timely given the phenomenal growth in the number of professional consultants being employed in the area of corporate governance over the last decade (Creplet *et al.*, 2001; Kennedy Information Services, 2006), and the growing expectations on their role in imparting knowledge and adding value to the firm (Dawes *et al.*, 2007; Richter and Niewiem, 2009). Given the negligible evidence on the effects of the use of external management consultancy on RM and organisational outcomes, further empirical study in this area provides much needed insight for both practitioners and academics.

The remainder of this paper is arranged as follows. In the following section, we provide the background for this study through a review of the relevant literature and a discussion on the conceptual framework for this study. This is followed by a discussion on the hypotheses development, and a delineation of the research method and results of the data analysis in the subsequent two sections. In the fifth and final section, we present the conclusions and limitations of the study, including some suggestions for future research.

2. Background

2.1 Risk Conceptualisations

Risk is typically defined in terms of the possibility of danger, loss, injury or other adverse consequences. The distinction between risk and uncertainty is typically made in accounting and finance texts. According to Knight (1921), risk was not knowing what future events will happen, but having the ability to estimate the odds, while uncertainty related to not even knowing the odds. This distinction dates back to Knight's classic work – "Risk, uncertainty and profit", published in 1921. While the first (i.e. risk) was calculable, the second (i.e. uncertainty) was subjective. The recent global standard on risk management *ISO 31000 Risk management – Principles and Guidelines*, however, defines risk as "effect of uncertainty on objectives". An effect is a deviation from the expected, it can be positive or negative, and it

can involve potential events as well as consequences. Risks can also be classified in various ways, for instance, operational, financial, environmental, technological, and reputation, etc. The conceptualisation of risks within organisations has been often in reference to the existence of internal or external events; in relation to information about those events (i.e. is it visible); in relation to managerial perceptions about events and information (i.e. how is it perceived, a matter of construction or interpretation); and in terms of how organisations establish tacit, informal to explicit and formal ways of dealing with it. The RM process, by which risks are identified, assessed, monitored and reported, has existed for many years, but has often been studied in reference to specialist areas such as occupational health and safety, credit risk, insurance and hedging of foreign currency and interest rates. More recently, research attention has focused on an ERM approach i.e. conceptualising risks from an organisation-wide perspective.

Further, our literature review also indicates that much of the research efforts to date have centred on the nature and determinants of ERM such as the work undertaken by Colquitt *et al.* (1999), Kleffner *et al.* (2003), Liebenberg and Hoyt (2003), Beasley *et al.* (2005) and Pagach and Warr (2008). Colquitt *et al.* (1999) based on a survey of 1,931 US firms suggest that the use of an integrated RM system was more common in certain industries e.g. insurance and finance companies. Kleffner *et al.* (2003) explored the implementation of ERM in Canadian firms and, based on survey data from 118 firms, identified industry to be a significant factor in ERM implementation. The study by Liebenberg and Hoyt (2003), using data from 26 paired samples from the pool of all US firms that announced the appointment of a CRO between 1997 and 2001, found more highly leveraged firms tended to implement ERM. More recently, Beasley *et al.* (2005) based on survey data from 123 US and international firms found that ERM implementation is significantly related to CEO and CFO support for ERM, firm size and industry affiliation i.e. banking, education and insurance.

Finally, Pagach and Warr (2008) found positive associations between firm size, leverage, higher institutional holdings and firms in financial and utilities industries, and ERM adoption. Further, they also found a negative association between the number of segments and ERM adoption.

However, there are at least two inherent limitations in prior studies in terms of elucidating the association between RM and organisational outcomes. First, the conceptualisation of RM has been rather simple. For example, both Liebenberg and Hoyt (2003) and Pagach and Warr (2008) used a fairly crude measure for ERM adoption, where the appointment of a CRO is considered to reflect the adoption of ERM by the firm. Beasley *et al*. (2005), by contrast, used a 5-point scale, representing different stages of ERM implementation: full implementation, partial implementation, in the planning process of implementation, thinking/assessing the possibility of implementing ERM, and do not intend to implement ERM, for assessing the extent of ERM adoption. The second limitation is that many of these studies did not proceed to assess the impact of ERM adoption on organisational outcomes.

2.2 Conceptual framework

According to organisational theories based on environmental determinism (Lawrence and Lorsch, 1967), organisations are open systems whereby factors external to an organisation, such as environmental uncertainty, industry demands, and technological advancements, potentially affect the various sub-systems of the organisation (Tosi *et al*., 1994). The organisation's environment is viewed as a primary determinant of its structure and early research by Burns and Stalker (1961) and Lawrence and Lorsch (1967) and Thompson (1967) provide empirical support for the importance of environmental factors in shaping an organisation's structure and performance. Using this line of reasoning, a number of accounting researchers have likewise examined and found support for the impact of factors

such as perceived environmental uncertainty, business strategy and technology to be key determinants of the effectiveness of management accounting and control features such as budgetary participation, reliance on accounting-based performance measures and budgetary slack (Chenhall, 2003; Fisher, 1998; Govindarajan, 1985). Studies to date on the relations among external environmental factors, RM and organisational outcomes are scant. Woods' (2009) recent case study of a public sector organisation's RM control system advocates the need for a larger scaled, survey-based, study to further our understanding of the design of RM systems. Such an approach has the potential to inform and generalise on the factors promoting the efficacy of organisational-level RM systems in relation to the contextual setting of the firm.

As noted previously, Figure 1 depicts the conceptual framework for this study where the focus is on three major facets of an organisation's RM system: the use of external RM consultants, degree of RM formalisation, and the magnitude (i.e. extent and nature) of RM methods adopted. The formalisation and use of RM methods in turn are expected to have positive effects on organisational outcomes. In the following section, the development of hypotheses for this study is discussed.

3. Hypotheses development

3.1 Perceived business uncertainty

The focal external or independent variable in this study is PBU. Business uncertainty is part of the larger environmental uncertainty which generally relates to unpredictability in the actions of an organisation's major stakeholders such as customers, suppliers, competitors and regulatory groups. The impact of environmental uncertainty on organisations has been largely studied based on *perceptions* held by managers of the level of uncertainty inherent in their environment rather than *actual* uncertainty. As argued by Weick (1969), organisational

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members form an image of the environment, they enact, and "*respond to the enacted environment rather than to the objective environment*" (Gordon and Narayanan, 1984, p. 34). Similarly, Downey *et al.* (1975) contend that physical attributes of the environment are not necessarily effective as criteria of environmental uncertainty and what matters is how managers see the specific attributes and how they interact together and respond to it.

In a similar vein, in this study we focus on PBU which encompasses the perceived risks and uncertainties inherent in a business environment including industry risks, firm-specific risks, competitors and general environmental uncertainty. We contend that as PBU increases, organisations will engage in information and decision making processes and structures that will help reduce uncertainty and provide a sense of stability and security that relevant risks and related factors have been considered in decision-making. In the first three sub-sections below, we develop hypotheses linking PBU and the use of external consultants, formalisation and magnitude of RM methods.

3.2 Perceived business uncertainty and use of external RM consultants

Greiner and Metzger (1983, p. 7) describe management consulting as "an advisory service contracted for and provided to organisations by specially trained and qualified persons who assist, in an objective and independent manner, the client organisation to identify management problems, analyse such problems, recommend solutions to these problems, and help when requested, in the implementation of solutions". As such, external or professional consultants are generally acknowledged for their specialist knowledge and expertise (Gummesson, 1991). They are seen to have breadth of experience in problem identification, generation of alternate solutions and in developing new procedures and systems in a given area (Sharma, 1997; Dawes *et al.*, 2007). Richter and Niewiem (2009) for instance, based on 86 interviews of client decision makers, find that gaining functional and industry specific

knowledge was a key driver of hiring consultants. As PBU increases, it is likely that there will be a lack of information and lower certainty of outcomes of specific decisions made by organisations. As such, it can be argued that since external consultants tend to hold specialist industry experience and know-how that is hard to access, there will be greater motivation for organisations to hire RM consultants. Based on the above discussion, the first hypothesis of this study is as follows:

H$_1$. There is a positive relation between the extent of PBU and the use of external RM consultants

3.3 Perceived business uncertainty and risk management formalisation

Traditionally, formalisation is viewed as a facet of organisational structure, and related to the degree to which an organisation relies on rules and standard operating procedures to direct the behaviour of employees (Cyert and March, 1992; Dawes *et al*., 2007). For the purposes of this study, we define RM formalisation as the extent to which "RM policies and processes are formalised and undertaken in a transparent and systematic manner". As such, RM formalisation can be seen to involve a more systematic process of risk identification, evaluation and treatment, including the use of appropriate internal controls, as well as the timely sharing of such knowledge across and within an organisation. Having formal and transparent policies and procedures promotes common knowledge among employees on what ought to be "the right or wrong action" in a given circumstance. It is thus argued that formalisation is likely to fulfil both a control and a coordination function (Vlaar *et al*., 2006). While traditionally it is thought that more formalised controls are likely to work better in more stable, and less uncertain situations (Chenhall, 2003; Flamholtz et al., 1985), recent literature suggest that in fact formal controls play an important role in more dynamic environments (Davilla et al., 2009).

The role of formal versus informal controls has been of interest for some time to MCS researchers (Chenhall, 2003; Flamholtz et al., 1985), with empirical evidence suggesting that more traditional formal controls using a command and control approach work best in low PBU. More recently, however, it is argued that both formal and informal (e.g. clan-based, organic) controls work together to provide relevant and timely information in situations of uncertainty (Davilla et al., 2009). Simons' (1987; 1991; 1994) studies advanced the notion that the style of use of controls, particularly an interactive style, is relevant for organisational learning and innovation. Subsequent studies revealed that formalisation of controls may lead to innovation, product development and entrepreneurship (Adler and Borys, 1996; Ahrens and Chapman, 2004; Bonner, 2005). For example, Adler and Borys, (1996) distinguish enabling bureaucracies from coercive bureaucracies and argue that enabling bureaucracies "enhance the users' capabilities and leverage their skills and intelligence," while coercive bureaucracies aim to fool-proof and deskill rationale. Thus, with increasing uncertainty, more formal controls can facilitate sense-making and provide a stable frame of reference to understand the rapidly evolving environment (Davila *et al*., 2009).

In this study we argue that as PBU increases, organisations will increasingly face information that is volatile and will, therefore, not be able to assign probabilities with any degree of confidence with regard to how environmental factors will affect the firm (Duncan, 1972; Gordon and Narayanan, 1984). In such circumstances, we believe that organisations will attempt to formalise RM as formalisation facilitates the processing of information and data that is open to volatility in a more systematic and careful manner. For example, Chenhall and Morris (1986) found that as perceived environmental uncertainty increased, managers viewed information that was broader in scope (e.g. non-financial, future-oriented) and timely to be more useful. Greater formalisation also allows knowledge of key risks and their impacts to be shared formally and widely across organisations. Emerging within the literature is the

concept of dynamic risk management where organisations are seen to be able to manage uncertainty as decisions are implemented through use of appropriate and timely risk identification and analysis. For instance, Fehle and Tsyplakov (2005, p.3) presented empirical support for "an infinite-horizon, continuous model of a firm that can dynamically adjust the use and maturity of risk management instruments whose purpose is to reduce product price uncertainty and thereby mitigate financial distress losses and reduce taxes". In other words, with changing conditions, the continual use of risk management practices aligned with the new conditions foster better management of organisational outcomes. Based on the above discussion, the second hypothesis of this study is thus as follows:

H$_2$. There is a positive relation between the extent of PBU and the extent of RM formalisation

3.4 Perceived business uncertainty and magnitude of risk management methods

The magnitude of RM refers to both the nature (simple to complex) and extent (the quantity and frequency of use) of RM methods. Simple heuristic-based methods are often preferred for the basic reasons of ease of use, low costs and practicality. For example, experience, intuition, hindsight, and brainstorming are methods that individuals may relate to easily. However, more sophisticated methods that are more technical in nature, such as stochastic modelling or theuse of risk management software, require more in-depth and thorough analysis based on available information and assumptions made. With increasing PBU, the identification and assessment of organisational risks becomes increasingly complex. With the expansion of the type of RM methods and the extent of usage of such methods, organisations are likely to better capture and mitigate their risks. As such, the third hypothesis of this study is as follows:

H$_3$. There is a positive relation between the extent of PBU and the magnitude of RM methods adopted.

3.5 Use of external risk management consultants, risk management formalisation and magnitude of risk management

The next two hypotheses pertain to the impact that external RM consultants may have on RM formalisation and magnitude. We predict that as organisations use the services provided by external RM consultants, there is a greater propensity for them to incorporate and formalise the specialist knowledge and procedures within the organisation's formal systems. According to source credibility theory (Hovland *et al*., 1953), individuals are more likely to be persuaded when the source presents itself as credible.[3] Similarly, Beaulieu (2001, p. 85) defines source credibility as that quality that determines "whether sources of information inspire belief in their representations". Consequently, the more an organisation utilises external consultants, the stronger their influence on the firm is likely to be, and the more formalised the recommendations are likely to become. For instance, Dawes *et al*. (2007) found that external IT consultant participation had a positive effect on organisational learning, suggesting that firms learn through hiring outside consultants. Such learning in turn becomes formally stored in policies and procedures. Further, Richter and Niewiem (2009), based on interviews of executives, conclude that clients tend to establish very close relationships with the external consultants involved in the implementation of projects, as well as in the initial conceptual development phase. Thus, external RM consultants can be expected to have influence over the formalisation of a broad range of RM procedures such as risk identification and assessment and shared communication of such knowledge.

Based on a similar line of reasoning, we predict the greater the use of external RM consultants (including auditors), the larger the use of different types of research methods, particularly the uptake of more technical methods. External RM consultants, who tend to be

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[3] Source credibility theory can be further divided into three models: the factor model, the functional model, and the constructivist model. For further discussion, review Hovland et al. (1953).

experts in RM methodologies, also tend to have in-depth understanding of industry specific idiosyncrasies. As such, they are more likely to promote more holistic approaches to RM. This includes the use of both basic and more technical-based RM methods more intensively. Accordingly, the fourth hypothesis set is:

H4. There is a positive relation between the use of external RM consultants and
   (a) the extent of RM formalisation, and
   (b) the magnitude of RM methods adopted.

3.6 Risk management formalisation, magnitude of risk and perceived organisational outcomes

As discussed earlier, for the purposes of this study RM formalisation refers to the extent to which "RM policies and processes are undertaken in a transparent and systematic manner". This involves having an effective risk management policy and formal procedures for identifying, assessing and sharing knowledge about risks faced by an organisation. We predict formalisation to have a positive impact on both the magnitude of RM methods as well as on perceived organisational outcomes. In relation to magnitude of RM methods, it can vary in the level of sophistication and intensity of usage of such methods. According to Adler and Borys (1996), in an enabling bureaucracy, formalisation of controls function to make clear the rationale for decisions undertaken and a uniform set of procedures and metrics are adopted. Rules and policies are set in relation to a wider context so that employees understand the broader environmental imperatives. For the present study, increasing formalisation signals the existence of a more systematic approach to RM where relevant policies and procedures for identifying and sharing risk knowledge are encouraged. Consequently, this would also mean using a broader range of RM methods more intensively. For example, the use of both subjective and more advanced quantitative-based RM methods becomes attractive as such risk assessments are more holistic. Furthermore, as much as subjective styles of RM e.g. brain storming or professional judgement are easy to implement,

as formalisation increases use of quantitative methods can become more appealing as such metrics can be readily standardised and shared more easily throughout the organisation.

Likewise, we expect a positive association between formalisation and organisational outcomes as well. In this study, the focal variable is managers' perceived organisational outcomes, by which we mean managers' assessment of firm performance on a wide range of outcomes including corporate planning, resource allocation, relationships with various stakeholders (e.g. suppliers and shareholders) and communication within the organisation. Adler and Borys (1996) contend that formalisation may lead to positive attitudes by employees by increasing role clarity and reducing role conflict or ambiguity. Based on role stress theory (Kahn *et al*., 1964), they argue that formalisation creates greater visibility and understanding of job roles, and this reduces work-related tension and improves task coordination. For example, in this study, increasing formalisation can improve employee confidence in carrying out their duties as formal procedures are in place for identifying and prioritising risks. Greater formalisation will also make clear the types of risks that have been identified as critical, and make visible the ways to systematically mitigate such risks, which in turn, is likely to aid in the recognition and uptake of opportunities, communication within the organisation, and channelling of resources in more efficient and effective ways. Prior studies by Nahm *et al*. (2003), for instance, suggest that formalisation has direct implications for decision-making and the level of communication in time-based manufacturing practices. Likewise Hossain (2003) concludes in his study on the implementation of a national telecommunications plan in a developing economy (i.e. Thailand) that formalisation is a critical step to achieving a successful plan of action.

In summary, we argue that since formalisation necessitates standardisation of processes, the use of more technical-based RM methods will be fostered as they allow rules and policies surrounding RM to be quantified and standardised more easily. Furthermore, with greater RM

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formalisation, there will be better coordination across the organisations' subunits in terms of risk identification, evaluation and treatment. Consequently, this is likely to lead to better organisational outcomes. Therefore, based on the preceding discussion, we hypothesise:

H5. There is a positive relation between the extent of RM formalisation and
    (a) the magnitude of RM methods, and
    (b) perceived organisational outcomes.

3.7 Magnitude of risk management methods and perceived organisational outcomes

Mu *et al*. (2009) note that risk management strategies targeted at specific risk factors such as technological, organisational and marketing contribute both individually and interactively in affecting the performance of new product development. They argue that "risk management should take a comprehensive and integrated approach rather than focusing on any single factor" (Mu *et al*., 2009, p. 177-178). Thus, a combination of both simple and sophisticated RM methods and more extensive use of the various methods are more likely to yield better identification and assessment of the risks to be monitored and managed. In doing so, better organisational outcomes, such as channelling resources to those areas deemed as being of high priority, recognition and uptake of opportunities and managing organisational change, becomes possible. Further, the widerthe variety of RM methods adopted, and the more intensely or frequently such methods are undertaken, the greater the opportunities to identify, link and integrate risks across the organisation, leading to a more holistic understanding of the threats to firm reputation and enabling managers to report and communicate the risk profile of a firm across the organisation. Increasing the magnitude of RM methods used also has implications for improving external (e.g. suppliers) and internal (e.g. employees) stakeholder relationships as methods such as SWOT analysis and risk registers can more clearly identify and track problems and issues that entail high levels of risks. Thus, based on the above discussion, we propose the sixth and final hypothesis as follows:

H₆. There is a positive relation between the magnitude of RM methods adopted and perceived organisational outcomes.

4. Research method

4.1 Data collection and sample

Data collection[4] was undertaken through a questionnaire survey distributed to 2,000 members of CIMA. The full list provided by CIMA comprised 5,000 members based in the United Kingdom who had been members for more than 3 years and had the word 'accountant' in their job title. We randomly selected 2 from every 5. Experienced management accountants were chosen as survey participants because they are in a senior position which often requires their involvement in the oversight of any system reviews and changes. As such, they are expected to have a good understanding of the processes involved in RM and the various techniques and methods adopted in managing risks.

Of the 2,000 questionnaires sent out, a total of 259 responses were received, providing a response rate of 13 percent[5]. Seventeen of the returned questionnaires were discarded due to incomplete responses. This study is thus based on a final sample of 242 responses, providing a usable response rate of 12 percent. Table 1 provides details about the sample of the study classified by industry type and ownership structure. Of those responses, 61% are part of a group of companies, and 39% are stand-alone companies. Of those which are part of a group of companies, 28% are parent companies and the remaining 72% are subsidiary companies. Several steps were taken to address the issue of non-response bias. First, to help ascertain the reasons for non-response, we contacted 15 non-respondents directly by telephone. The most common reason given for not responding to the questionnaire was "I have been too busy". Others stated that their organisations had policies which prevented them from responding and

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[4] Data collected on variables incorporated in this paper were part of a larger set of data collected by a CIMA funded risk management project. Unlike this paper, the project focused on the impacts of risk management on internal controls and the roles of management accountants.
[5] Low response rates have been encountered in many survey studies, for instance, Abdel-Maksoud *et al*. (2010), Beattie and Prat (2003), MacDonald (2003).

one non-respondent stated that he did not feel the questionnaire was relevant to his role. Second, we compared the characteristics (e.g. age, CIMA membership duration) of respondents with non-respondents and found no significant differences between the two groups. Third, we entered the responses in batches as we received them; this provides a good proxy for time of response. We ran a Mann-Whitney test to compare the first 25% responses with the last 25% responses and found no significant differences between them.

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4.2 Measurement of variables

The survey instrument was developed based on Collier and Berry (2002). As part of the questionnaire development process, six interviews were conducted with managers responsible for risk management and the CEO of the Association of Insurance and Risk Managers (AIRMIC), a professional association of risk managers with 800 individual members representing over 450 companies in the UK and internationally. The initial questionnaire was pre-tested for comprehension with ten respondents including risk managers and academics. The initial questionnaire was later modified based on comments from the ten respondents.

The variables incorporated in this study are (a) PBU, (b) use of external RM consultant, (c) RM formalisation, (d) magnitude of RM methods, and (e) perceived organisational outcomes. With the exception of use of external RM consultants,[6] multiple items were utilized to measure each variable. Perceived business uncertainty (PBU) was assessed using four items relating to the overall degree of uncertainty in the industry sector, the level of competition, the degree of risks faced by the organisation as well as that faced by the firm's industry sector. The response scale is a five-point scale ranging from very low (1) to very

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[6] The use of single-item instrument for a variable has been encountered in many survey studies, for instance, Elsayed and Hoque (2010), Wanous et al. (1997).

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high (5). Use of external RM consultants was measured using one item developed for this study. Using a five-point scale ranging from very low (1) to very high (5), respondents rated the extent to which auditors or external RM consultants were used by their organisation to manage risk. Formalisation of RM was measured using eight items where respondents were asked about the extent to which they agreed with whether or not the organisation had a range of processes to support risk management. These included questions about risk management policy and procedures, internal control of risk, embeddedness in culture, and risk reporting, using a five-point scale ranging from strongly disagree (1) to strongly agree (5). Magnitude of RM methods was assessed using four items with a five-point scale ranging from very low (1) to very high (5). The questions asked the extent to which various methods, from informal ones such as experience and brainstorming, to formal ones such as stochastic modelling and RM software; and the extent to which such methods were effective in helping the organisation to manage risk. Perceived organisational outcomes were assessed using eight items which included aspects of planning, reporting, relationships with stakeholders, etc. The question asked respondents to rate the degree of organisational improvement brought about as a consequence of RM, and a five-point scale ranging from no improvement (1) to significant improvement (5) was adopted.

Each variable was tested for reliability and validity using Cronbachs' alpha and factor analysis. Several items were deleted due to low internal consistency or lack of discriminant validity. The final set of items is shown in Appendix A. Table 2 shows the results for factor loadings, item-to-total correlation and Cronbachs' alpha. With the exception of the variable magnitude of RM methods, all of the Cronbachs' alpha coefficients were above the minimum recommended standard of 0.7 (Hair *et al*., 2006; Nunnnally and Berstein, 1994; Pallant 2001). Given that magnitude of RM methods is an exploratory factor, a Cronbach's alpha of 0.629 can be considered acceptable (Nunnally, 1978). The item-to-total correlation

coefficients and factor loadings were found to be above the minimum recommended standards of 0.3 and 0.4, respectively (Pallant, 2001). As suggested by Hair *et al*. (2006), validity and reliability of the measurement models were assessed using multiple fit indices. With the exception of χ^2/df and RMSEA for magnitude of RM methods, all indices met the recommended fit levels. Hair *et al*. (2006) argue that it is not practical to apply a single set of cut-off rules to all measurement models. As such, the measurement model for magnitude of RM method is considered acceptable as it shows reasonably good fit on other criteria. Overall, the indices in Table 3 imply that the variables incorporated in this study provide good fit for the observed items. Following the assessment of measurement models, a summated scale or composite measure was created for each measurement model. According to Hair *et al*. (2006), the application of composite measure[7] in applied and managerial research has increased. The composite measures were later used in the theoretical model testing. Table 4 shows the construct reliability and the square root average variance extracted of the variables. The construct reliability for each variable is above the 0.7 threshold (Hair *et al*., 2006). Additionally, in each case the square root of average variance extracted exceeds the respective correlations (e.g. the diagonal elements are greater than the off-diagonal elements in the corresponding rows and columns) between variables (Fornell and Larcker, 1981). These results suggest satisfactory reliability and attest to adequate validity. After the reliability and validity of the measures were determined, items measuring each variable were summed to form a scale representing the related factor.

--- Insert Table 2 about here ---

--- Insert Table 3 about here ---

--- Insert Table 4 about here ---

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[7] For discussion on advantages of using composite measures, see Hair *et al*. (2006, p.135-136).

4.3 Analysis

The model was tested using AMOS[8] (Analysis of MOment Structures) 17.0. The advantage of using AMOS is that an overall model fit is produced as well as modification indices for suggested model improvements. Additionally, it has a unique graphical interface, and was specifically designed to make SEM (structural equation modelling) easier and convenient to use. We used maximum likelihood (ML) to estimate the parameters. This method is an iterative process in which a set of parameters is estimated and a fit function is calculated. Using this first estimate, a second estimate is made in order to make the fit function smaller. The process is repeated until the fit function cannot be made any smaller, and the model is converged on a final set of parameter estimates.

We first tested the hypothesised theoretical model and then revised the model based on constraining parameters with small *t* statistics or relaxing parameters with large modification indices in order to build a model that better fits the empirical data. While constraining parameter enables detection of potential errors of commission (i.e. including unnecessary relationships), relaxing parameter reveals errors of omission (i.e. excluding relationships that might have theoretical and practical significance) (Keith, 2006). Nonetheless, the revision of the model has to make theoretical sense (Hair *et al*., 2006).

5. Results and discussions

Table 4 reports the mean scores, standard deviations, and correlations for all the variables incorporated into this study. The high means for PBU and RM formalisation indicated respondents perceived there was a high level of business uncertainty and suggested the existence of established RM policies that were formally embedded within organisations in general. On the other hand, the low means for use of external RM consultants and magnitude

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[8] AMOS is a more recent software tool distributed by SPSS Inc. which, because of its user-friendly graphical interface, has become popular as an easier way of specifying structural model.

of RM methods and perceived organisational outcomes indicated low application of existing RM methods among the respondents, and that most of the respondents believed that there had not been much consequential improvement in organisational outcomes.

To test the conceptual framework in Figure 1, we first explore the overall model and the strength of the direct and indirect effects among variables, and then revised the hypothesised model by constraining parameters with small t statistics or relaxing parameters with large modification indices. In Figure 2 and Table 5, we report the results of the conceptual model corresponding to Figure 1. Various recommendations have been proposed for fit-indices. A model is considered to have a good model-data fit if the ratio of χ^2 to degree of freedom (χ^2/df) is less than 3, the p value is above .05, the root mean square error of approximation (RMSEA) is less than .08, the root mean square residual (RMR) is below .10, the comparative fit index (CFI) and goodness-of-fit index (GFI) are above .90, the adjusted goodness-of-fit index (AGFI) is above .80 and the closer the value of normed fit index (NFI) to 1, the better the fit (Byrne, 1998; Chin and Todd, 1995; Hu and Bentler, 1995).

--- Insert Figure 2 about here ---

--- Insert Table 5 about here ---

Hypotheses H1, H2 and H3 predicted that PBU would be associated positively with the use of external consultants, RM formalisation and magnitude of RM methods. Table 4 shows that PBU is significantly correlated with only RM formalisation ($r = .129$, $p = .049$). There is no significant correlation between PBU and use of external consultants ($r = .081$, $p = .220$) or PBU and magnitude of RM methods ($r = .061$, $p = .351$). The results potentially negate two of the hypotheses in the conceptual model; that PBU would influence the use of external RM consultants and magnitude of RM methods. An examination of the model results in Figure 2

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and Table 5 indicate that the path from PBU to RM formalisation was marginally significant (β = .120, p = .064), providing support for H$_2$. However, contrary to H$_1$ and H$_3$, the paths between PBU and both use of external RM consultants (β = .081, p = .217) and magnitude of RM methods (β = -.023, p = .674) were insignificant. The results provide support for H$_2$, but no support for H$_1$ and H$_3$. Given the overall lack of support for these two paths, they were later removed from the revised model as shown in Figure 3.

Hypotheses H$_{4a}$ and H$_{4b}$ predicted that the use of external consultant(S) would be associated positively with RM formalisation and magnitude of RM methods. Table 4 shows a highly significant correlation between use of external RM consultants and magnitude of RM methods (r = .306, p = .001) but an insignificant correlation between use of external RM consultants and RM formalisation (r = .115, p = .080). The path model results in Figure 2 and Table 5 provide findings consistent with the correlation analysis. The path from use of external RM consultants to magnitude of RM methods was positive and significant (β = .251, p = .001), but the path from use of external RM consultants to RM formalisation was positive but insignificant (β = .105, p = .105). Thus, only H$_{4b}$ is supported. While the highly significant path between use of external RM consultants and magnitude of RM methods was retained, the insignificant path between the use of external RM consultants and RM formalisation was later removed from the revised model as shown in Figure 3.

Hypotheses H$_{5a}$ and H$_{5b}$ predicted that RM formalisation would be positively related to magnitude of RM methods and perceived organisational outcomes. Consistent with these predictions, Table 4 shows that the correlations between RM formalisation and both magnitude of RM methods (r = .521, p = .001) and perceived organisational outcomes (r = .510, p = .001) were highly significant. Similarly, an examination of the path model results in Figure 2 and Table 5 indicated significant links between RM formalisation and magnitude of

RM methods (β = .495, p = .001); and between RM formalisation and perceived organisational outcomes (β = .388, p = .001). Thus, H5a and H5b are supported.

Hypothesis H6 predicted a positive relationship between magnitude of RM methods and perceived organisational outcomes. Consistent with this prediction, Table 4 shows a highly significant correlation between these two factors (r = .437, p = .001). Additionally, the path model results in Figure 2 and Table 5 show a positive and significant link between magnitude of RM methods and perceived organisational outcome (β = .234, p = .001). Thus, H6 is supported.

While the initial model appears to fit the data well, there are insignificant paths. Combined with the results for the individual hypotheses described above, we revised the model by removing the insignificant paths one by one starting with the path with the smallest t statistic. In Table 6, we report the results of the revised model shown in Figure 3. The revised model appears to fit the data well. All of the indices are in line with recommended benchmarks (Byrne, 1998; Chin and Todd, 1995; Hu and Bentler, 1995) for acceptable fit. The path coefficients reported in Table 6 provide evidence on the hypotheses and the remaining paths in the revised model are all significant. In particular, the p value for the path from PBU to RM formalisation is now significant at the .05 level.

Comparing[9] the revised model to the hypothesised model, the revised model has a larger df and a larger χ^2. Additionally, other fit indices for comparing competing models (e.g. AIC and BIC) and various parsimony fit indexes (e.g. PGFI and PNFI) appeared to favour the revised model. Thus, we accept the revised model as it is a more parsimonious model (Hair et $al.$, 2006; Keith, 2006). To ensure that that model results are robust, we run the model by splitting the sample into two subgroups based on size as measured by (a) company turnover in UK pounds and (b) number of employees. For size by company turnover in dollar, the

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[9] In evaluating competing models, parsimony fit indexes relate model fit to model complexity. A parsimony fit measure is improved either by a better fit or by a simpler model. A simpler model is one with fewer estimated parameters paths (Hair et $al.$, 2006).

respondents were categorised as Group 1 if company turnover in dollar is less than £50 million; or as Group 2 if company turnover in dollar is more than £50 million. For size by number of employees, the respondents were categorised as Group 1 if number of employees is less than 1,000 people; or Group 2 if number of employees is more than 1,000 people. The results show the statistical inferences unchanged for the subgroups.

--- Insert Figure 3 about here ---

--- Insert Table 6 about here ---

These results in Figure 3 and Table 6 show that while PBU enhances RM formalisation, the use of external RM consultants enforces the magnitude of RM methods adopted. This finding suggests that PBU is a significant motivator for formalisation of RM and in turn leads to organisational willingness to improve their RM processes. However, as many organisations do not have internal RM expertise, knowledge and expertise from external consultants appears to be a key driver in increasing the magnitude of RM methods.

In addition, the revised model supports both direct and indirect effects between risk formalisation and organisational outcomes. However, magnitude of RM methods has only a direct affect on organisational outcomes. Table 7 shows the direct and indirect effects of RM formalisation on organisational outcomes. The significance of this indirect effect was assessed using the techniques suggested by Baron and Kenny (1986), Goodman (1960) and Sobel (1982). Table 8 reports the indirect effect of magnitude of RM methods on RM formalisation and organisational outputs. The Z values for Sobel test, Aroian test and Goodman test are all greater than 3.389 and are statistically significant ($p < .05$).

--- Insert Table 7 about here ---

--- Insert Table 8 about here ---

Overall, the results of this study largely support the hypothesised model. PBU is positively linked to RM formalisation ($\beta = .129$, $p = .048$) and use of external RM consultants' services is positively linked to magnitude of RM methods adopted ($\beta = .253$, $p = .001$). While the magnitude of RM methods has a direct affect on perceived organisation outcomes ($\beta = .232$, $p = .001$), RM formalisation has both direct ($\beta = .389$, $p = .001$) and indirect ($\beta = .116$, $p = .001$) affects on perceived organisational outcomes. With RM formalisation having a very strong positive effect on the magnitude of RM methods, the indirect test suggests that as PBU increases, there will be greater pressure on management to formalise policies and processes, which in turn will induce a more extensive use of various risk methods, leading to better organisational outcomes. The findings thus provide empirical support for the mediating role of magnitude of RM methods in the link between RM formalisation and improvements in organisational outcomes.

6. Conclusion, limitations and future research

Environmental factors have been long regarded as critical determinants of organisational control systems. Accordingly, the present study extends prior findings, such as those provided by Woods (2009) and Mu *et al.* (2009), by providing further empirical evidence on the effects of two external factors (i.e. business uncertainty and use of external management consultants) on the formalisation and magnitude of RM which in turn affect organisational outcomes. Managers' PBU are found to have a direct and positive effect on the level of RM formalisation of organisations' policies and procedures. The use of standardised procedures and rules is likely to enhance communication of the meaning of risk and foster a shared understanding of the appropriate responses among employees which in turn has implications

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for perceived organisational outcomes. The findings of this study provide empirical support for the importance of RM formalisation for both the magnitude of RM methods utilised and for fostering better organisational outcomes. Another key finding of this study relates to the significant impact that external RM consultants have on the magnitude of RM methods. This is not surprising, as Dawes (2003) notes, external experts tend to have a strong impact on management practices and outcomes. The findings also indicate that consultants (including auditors) in this area tend to drive the uptake of both the simple as well as sophisticated methods of RM and the extent of their use.

More surprisingly, however, consultants were not found to have a significant impact on RM formalisation, suggesting that besides business uncertainty other factors such as leadership may also impact the extent to which RM may become formalised. There is an opportunity for further research to investigate the drivers of RM formalisation and how formal approaches to RM are (or are not) compatible with existing management controls.

Finally, our findings also support the proposition that both RM formalisation and the magnitude of RM methods has a positive impact on perceived organisational outcomes. The push for greater awareness and adoption of an ERM-wide approach is thus likely to yield significant benefits in terms of improving corporate planning, stakeholder relationships and overall performance. Management researchers have found positive associations between formalisation and organisational outcomes, such as commercialisation performance (Chin and Chang, 2009), knowledge sharing (Panteli and Sockalingam, 2005) and organisational performance (Labroukos *et al*., 1995). Our study further supports the role played by RM methods as a mediating variable in higher levels of formalisation which will increase the magnitude of RM methods, leading to better organisational outcomes. In summary, our study reveals how increasing business uncertainty promotes greater RM formalisation and external consultants appear to drive the extent and intensity of RM methods.

Nevertheless, the results of this study need to be interpreted with caution, taking into consideration a number of limitations. First, while there are multiple environmental factors that potentially affect the use of RM, the present study examined only two facets. Future studies may further enquire into the effects of technology and regulatory pressures on the design of RM systems. Second, the measurements for all variables are based on the perceptions of respondents who were management accountants with varying involvement in risk management. As such, their observations may be open to bias. However, when asked 'what proportion of your work time is spent dealing with risk management', the majority of respondents (72 percent) stated that they spent less than 20 percent of their time dealing with risk management. The third limitation of this study is that the measurement of use of external consultants was based on a single-item question. Future studies may look into assessing the impact of RM consultancy services derived from different sources, for instance, industry specialists, general professional service firms, and external auditors, as well as the length of tenure. A fourth limitation of this study is that the final dependent variable, organisational outcomes, is an aggregate measure of several different dimensions of organisational outcomes, and as such other variables such as RM method and formalisation may have different effects on the various dimensions, Although the uni-dimensionality test for the variable indicated an acceptable Cronbach's alpha of 0.88, studies in the future may specifically test these and other dimensions of organisational outcomes in relation to the formalisation and magnitude of RM. Finally, the inherent limitations of a survey method present caveats for the findings. There is much potential for future studies to adopt more intensive case-study type methodologies to better understand the drivers and outcomes of RM systems.

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Figure 1. The conceptual framework
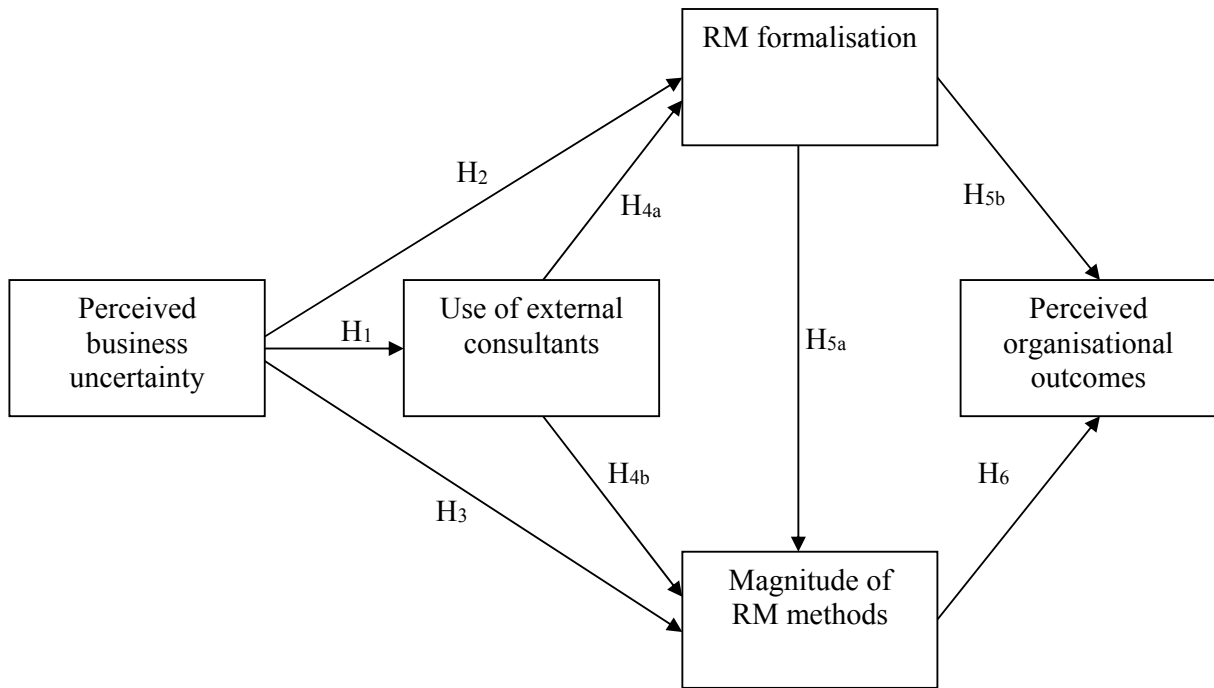
Figure 2. The hypothesised model
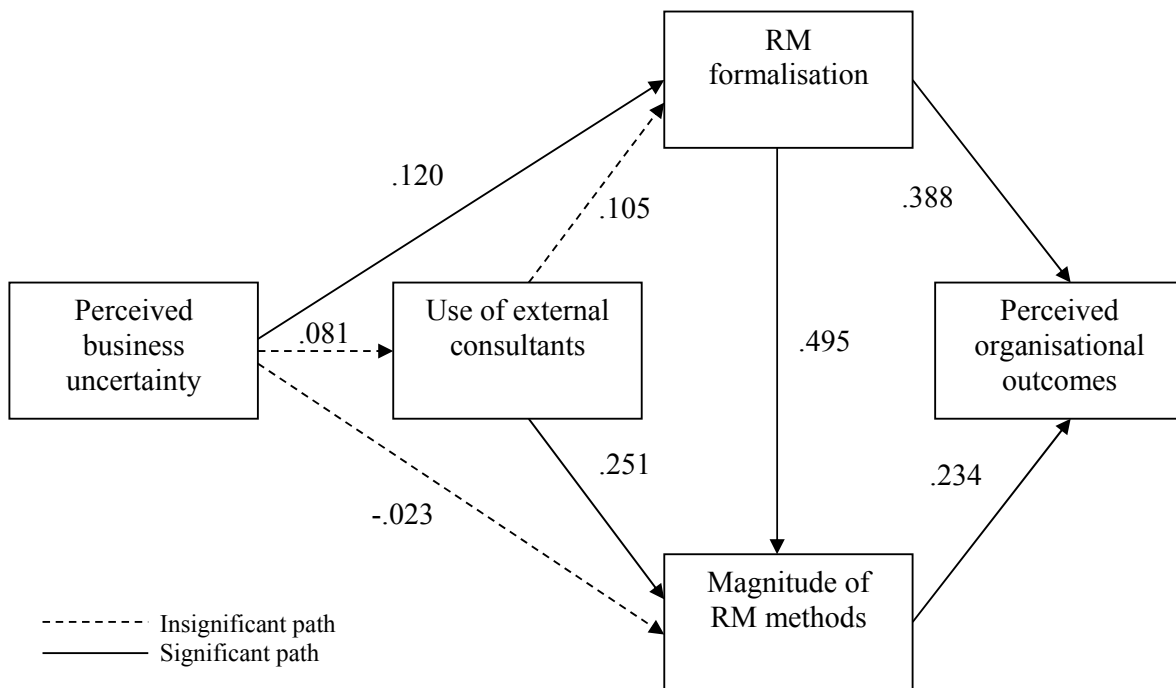
Figure 3. The revised model
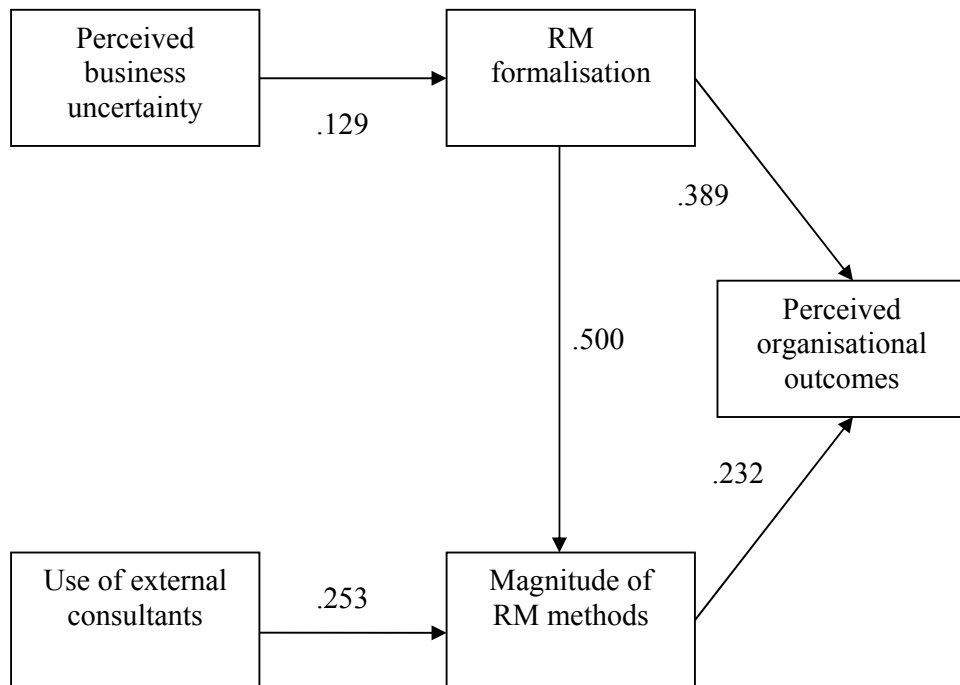
Table 1
Sample profile

Industry type	Ownership structure (%)					Total
	Listed PLC	Unlisted PLC	Limited company	Not for profit	Public sector	
Manufacturer/construction	31	38	48	0	2	30
Retail/distribution	22	23	14	0	0	13
Finance/insurance	9	23	8	0	0	7
Services	22	0	20	38	27	22
Others	15	15	10	63	71	28
Total	31	6	36	4	23	100

Table 2

Cronbachs' alpha, factor loading and item-total correlation

Items	Perceived business uncertainty	RM formalisation	Magnitude of RM methods	Perceived organisational outcomes	Item-Total Correlation
PBU1	.497				.331
PBU2	.806				.659
PBU3	.822				.509
PBU4	.820				.562
FRM1		.695			.694
FRM2		.701			.613
FRM3		.504			.526
FRM4		.711			.673
FRM5		.672			.698
FRM6		.749			.632
FRM7		.778			.701
FRM8		.675			.723
MRM1			.461		.416
MRM2			.389		.425
MRM3			.638		.382
MRM4			.749		.416
OUT1				.673	.628
OUT2				.756	.684
OUT3				.758	.708
OUT4				.691	.582
OUT5				.653	.600
OUT6				.700	.670
OUT7				.737	.671
OUT8				.701	.675
$\propto$	.703	.886	.629	.884	

Extraction method: Principal component analysis

Rotation method: Varimax with Kaiser normalisation

Table 3
Measurement model

Fit index	Recommended level of fit	Perceived business uncertainty	RM formalisation	Magnitude of RM methods	Organisational outcomes
χ^2/df	< 3.00	.153	2.508	6.793	1.311
GFI	> .90	1.000	.965	.975	.980
CFI	> .90	1.000	.976	.890	.994
RMSEA	< .08	.001	.080	.158	.037
RMR	< .08	.004	.029	.070	.026
TLI	≈ 1.00	1.016	,951	.669	.989

Table 4
Descriptive statistics, reliability, average variance extracted and correlations.

Variable	M	SD	CR	1	2	3	4	5
1. Perceived business uncertainty	3.444	.699	.961	**.688**				
2. Use of external RM consultants	2.962	1.258	-	.081	**-**			
3. RM formalisation	3.357	.697	.989	.129*	.115	**.707**		
4. Magnitude of RM methods	2.645	.810	.906	.061	.306**	.521**	**.544**	
5. Organisational outcomes	2.749	.745	.986	.089	.140*	.510**	.437**	**.699**

Significant at: * $p < 0.05$, ** $p < 0.01$ (2-tailed)
M: Mean, SD: Standard deviation, CR: Construct reliability.
The mean and standard deviation reported are for summated scales calculated for each variable.
Bold-faced diagonal elements are the square roots of the AVE statistics. Off-diagonal elements are the correlations between the variables.

Table 5
Results for hypothesised model

Dependent variable (R^2)	Independent variable	Hypothesis	Direction of hypothesis	Std. coefficient	p
Use of external consultants	PBU	H_1	+	.081	.217
RM formalisation	PBU	H_2	+	.120	.064
Magnitude of RM method	PBU	H_3	+	-.023	.674
RM formalisation	Use of external RM consultants	H_{4a}	+	.105	.105
Magnitude of RM method	Use of external RM consultants	H_{4b}	+	.251	.001
Magnitude of RM methods	RM formalisation	H_{5a}	+	.495	.001
Organisational outcomes	RM formalisation	H_{5b}	+	.388	.001
Organisational outcomes	Magnitude of RM methods	H_6	+	.234	.001

Fit index	Recommended level of fit	Research model
χ^2/df	< 3.00	.190
p	> .05	.827
RMSEA	< .08	.001
RMR	< .10	.007
CFI	> .90	1.000
GFI	> .90	.999
AGFI	> .80	.995
NFI	≈ 1.00	.998
AIC	Smaller value is better	26.380
BIC	Smaller value is better	71.299
PGFI	Higher value is preferred	.133
PNFI	Higher value is preferred	.200

Table 6

Results for revised model

Dependent variable (R^2)	Independent variable	Hypothesis	Direction of hypothesis	Std. coefficient	p
Use of external RM consultants	PBU	H_1	+	Path removed	
RM formalisation	PBU	H_2	+	.129**	.048
Magnitude of RM method	PBU	H_3	+	Path removed	
RM formalisation	Use of external RM consultants	H_{4a}	+	Path removed	
Magnitude of RM method	Use of external RM consultants	H_{4b}	+	.253***	.001
Magnitude of RM methods	RM formalisation	H_{5a}	+	.500***	.001
Organisational outcomes	RM formalisation	H_{5b}	+	.389***	.001
Organisational outcomes	Magnitude of RM methods	H_6	+	.232***	.001

Fit index	Recommended level of fit	Revised model
χ^2/df	< 3.00	.938
p	> .05	.455
RMSEA	< .08	.000
RMR	< .10	.041
CFI	> .90	1.000
GFI	> .90	.992
AGFI	> .80	.976
NFI	≈ 1.00	.975
AIC	Smaller value is better	24.691
BIC	Smaller value is better	59.245
PGFI	Higher value is preferred	.331
PNFI	Higher value is preferred	.487

Table 7
Direct and indirect effects of RM formalisation on perceived organisational outcomes

Paths	Total effect	Direct effect	Indirect effect
RM formalisation → Magnitude of RM methods	.500	.500	---
Magnitude of RM methods → Perceived organisational outcomes	.232	.232	---
RM formalisation → Perceived organisational outcomes	.505	.389	.116

Table 8
Mediation effect of magnitude of RM method

Test	Z-values	Std. error	p
Sobel test	3.389	.0363	.0007
Aroian test	3.372	.0365	.0007
Goodman test	3.407	.0361	.0007

Appendix A
Measurement items

Items	Questions

What is the degree of:

PBU1   Competitive intensity in your industry/sector?

PBU2   Uncertainty in your industry/sector environment?

PBU3   Risk faced by your organisation?

PBU4   Risk faced within your industry/sector?

To what extent:

RMC1   Auditors or external consultants are used by your organisation to manage risk?

To what extent do you agree/disagree with the following statements:

FRM1   Your organisation has an effective risk management policy

FRM2   Risks are well understood throughout your organisation

FRM3   Your organisation regularly reviews internal controls

FRM4   Risk management is embedded in your organisation's culture

FRM5   Formal procedures are in place for reporting risks

FRM6   The level of internal control is appropriate for the risks faced

FRM7   Your organisation is effective at prioritising risks

FRM8   Changes to risks are assessed and reported on an ongoing basis

To what extent are the following methods used by your organisation to manage risk:

MRM1   Brainstorming, scenario analysis, PEST or SWOT analysis

MRM2   Interviews, surveys, questionnaires

MRM3   Stochastic modelling, statistical analysis

MRM4   Monitoring risks using a risk register or written reports

To what degree has risk management improved performance or outcomes in your organisation's:

OUT1   Resource allocation and utilisation

OUT2   Management reporting

OUT3   Communication within organisation

OUT4   Relationships with suppliers

OUT5   Management of organisational change

OUT6   Reputation

OUT7   Recognition and uptake of opportunities

OUT8   Employee confidence in carrying out their duties