Uncertainty, MCS and firm performance:

towards an integrated business risk focused framework

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Abstract

Uncertainty is the core variable in any contingency theoretical framework (Chapman, 1997; Donaldson, 2001). Many reviews however have claimed that the accounting literature lacks a comprehensive framework for analysis of the relationship between uncertainty and MCS (Otley, 1980; Dent, 1990; Chapman, 1997; Langfield-Smith, 1997, Chenhall, 2003). Central to this study is the specification of uncertainty as it has been applied in contingency-based MCS research. This study argues that uncertainty, whilst well specified in terms of sources and types, it is under (not sufficiently) specified in terms of determining the degrees of uncertainty. This limitation is argued to impact on the explanatory and predictive capacity of an MCS based contingency theory (Schoonhoven, 1981). A theoretical framework is developed drawing insights from Otley (1999) and Kaufman (1992) that adopts a business risk view of uncertainty to explain or predict MCS fit/misfit with firm objectives, strategies and operational activities. It is postulated that the degree of change in business risk will signal and influence the level of required changes in MCS design and/or use and go toward addressing the under-specification of 'degrees of uncertainty'. The level, extent and form of actual changes are dependent on firm capacity, defined as the available and accessible human and non-human resources, to realize the required changes. In doing so, along with considering the equilibrium/fit issues raised by Hartman and Moers (1999), the framework provides a potential basis for reviewing the apparent inconsistencies of past MCS research, and for positioning those studies argued to be narrow and/or of incomparable research design (Otley, 1981; Chapman, 1997). More importantly, a methodology for identifying external and internal drivers of uncertainty from a business risk perspective is presented. Additionally, through such identification a potentially proactive signalling mechanism for changes to MCS design and/or use is provided. The analytical findings of this paper will be of interest to managers, industry professionals, practitioners and academics alike.

Key words:
Contingency, theoretical framework, MCS, business risk, uncertainty, resource constraints.

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Introduction

Many positive gains have been made in management accounting research over the past two decades (Chapman, 2005). These gains are reflected in the contingency-based (Chenhall, 2003) management accounting research (Chapman, 1997 and 2005; Langfield-Smith, 1997; Chenhall, 2003; Chenhall and Chapman, 2006). According to Chenhall and Chapman (2006), *Contingency-based research in the area of management control systems (MCS) comprise a substantial and diverse body of research.* However, despite these gains and the body of research that has been developed, questions are still raised as to whether the contingency framework employed in management accounting research, particularly as it relates to management control systems (MCSs), utilises a contingency-based framework (Chenhall, 2003) or a contingency theory based framework. Chenhall (2003) suggest that the quality of this research might be improved through drawing on support from other theories.

Schoonhoven (1981) questioned whether or not contingency theory, as utilised by Galbraith (1973) constituted, a positive theory in the sense that it had explanatory and/or predictive power. Whilst Hartmann and Moers (1999) found problems with Schoonhoven's (1981) findings, they also raised concerns about hypotheses construction and choice in a number of studies. Hartmann and Moers (1999) cited a number of studies where the hypotheses did not predict the variable interaction being tested, with a number of researchers avoiding this issue by electing to state only the null hypotheses. Gerdin and Greeve (2004) return to issues that were raised by Otley (1981) concerning the comparability of studies. Gerdin and Greeve (2004) focused on the different forms of 'fit' found in contingency-based studies whilst Otley's (1981) observations extended to management accounting research a little more

generally. When you add the observations of Donaldson (2001) and Luft and Shields (2003) concerning the need for contingency research to explore non-linear interactions in more depth it does not appear that the issues raised by Otley (1981), Chapman (1997) and Langfield-Smith (1997) have been overcome.

Whilst the appeal of contingency-based management accounting research is evidenced in the growing body of this type of research (Chapman, 1997; Chenhall, 2003; Gerdin and Greve, 2004; Chenhall and Chapman, 2006), the preceding issues arising about that research raise a number of questions. In particular, the issues of contingency theory based research versus contingency-based research and the capacity to compare and/or contrast study findings question the foundations of the framework employed – the theory fundamentals. A potential symptom of a weakness, or incomplete specification of the theory fundamentals of a management accounting contingency framework might be reflected in a more recent change in what is considered to be the central theoretical consideration of contingency theory. Galbraith (1973), Miles and Snow (1978), Chapman (1997) and Hartmann (2000) identified the notion, or phenomenon of uncertainty as being central to driving contingency-based management accounting research. Whilst Donaldson (2001) identified uncertainty as being at the core of contingency theory he and Chenhall and Chapman (2006) also identify the notion of fit as being the central concept in contingency theory.

Where should an examination of the fundamentals of contingency theory commence? Should it be with the examination of uncertainty, or fit? If the view of Samuelson (1999) and Hartmann (2000) that the design, operation and review of a firm's MCS is contingent upon the uncertainty faced by a firm is accepted, then the starting point for an examination of contingency theory fundamentals would commence with an examination of the phenomenon

of uncertainty. That is, if uncertainty drives the design, function, operation and review of a firm's MCS, then fit has *ex post* significance in reviewing the design, function and operation of the MCS in supporting firm performance. In these terms, whilst fit is central to the design and review of the MCS in supporting firm performance, it forms a basis for qualifying and/or quantifying MCS design, function and operation and not of driving the design, function, and operation of a firm's MCS. For the purposes of this paper, this is the view of fit that has been adopted.

With the starting point of uncertainty established, the fundamental aim of this paper is to attempt to unravel the facets and levels of uncertainty in order to develop an improved understanding of MCS contingency-based management accounting research. In doing so, the primary objective of this paper is to provide the beginnings of a framework, which will assist contingency-based researchers through providing some structure in examining different levels of firm relationships-driven uncertainty. A secondary objective is to contribute to the development of contingency-based research in the area of management control in the field of management accounting research.

To achieve the aim and objectives of this paper, an analytical approach has been adopted. To facilitate analysis and framework development in this paper, the insights provided from another accounting-based contingency model developed in the audit research literature, the audit risk model (Libby, Artman and Willingham, 1985; Friedlob and Schliefer, 1999) are explored. The rationale for looking to the 'audit risk model' (ARM) for insight is three-fold. Firstly, it is a contingency-based model and, *albeit* potentially naïve, there appears to be at least a superficial compatibility with contingency-based management accounting research in that both claim a contingency relationship and the areas of research both come under the

broad umbrella of accounting. Secondly, the ARM research provides a basis for both qualifying and quantifying uncertainty at differing levels. Apart from providing a basis for specifying and/or determining fit, this has the potential to improve the dimensional definition of, at least, some of the facets of uncertainty experienced by a firm. In doing so, it could provide an increased potential for an improved capacity for comparison of research findings within and/or across firms, if not then for contrasting those research findings. Thirdly, and possibly the most naïve rationale, intuitively within the context of a firm's operational setting there exists a direct link between uncertainty and risk, particularly in the context of this paper and that risk which might be termed business risk. While firm goals might not be explicitly influenced by a firm's business risk exposure, intuitively the objectives, strategies and operational activities of the firm, which facilitate achievement of those goals, would be expected to be identified and constructed on the basis of what might constitute achieving an 'acceptable degree of firm business risk' (AcFBR) exposure for the firm's shareholders and internal stakeholders.

There is a perceived potential additional benefit to the above approach adopted in this paper. Chenhall (2003) argued for a multiple theory approach to be undertaken within a contingency-based framework. Through attaching the notion of business risk in defining uncertainty, the potential exists for improved definition of the different risk/uncertainty driven relationships that could exist both externally and internally to the firm. Better understanding of the number and levels of those relationships that potentially shape a firm's objective and strategy development could assist in identifying an appropriate supporting relationship-focused theory for explaining or predicting the impact of uncertainty on the firm. In doing so, it assists in determining the design, function, operation and review of a firm's MCS, in facilitating optimal firm performance, reporting and review. In a sense of a review function,

the MCS could also function as the signalling mechanism for ‘change in degree of total firm business risk’ (ΔFBR), which in turn has implications for the ‘objectives, strategies and operational activities of the firm’ (OSOA).

The structure of this paper takes the following form. In the next section the facets of uncertainty, namely: types; sources; and, degrees of uncertainty which have emerged from the management accounting literature, with some reference to the organisational and management literature, are explored and an external/internal firm operating environment classification of them is attempted in Figure 1. The sociology and economic contingency literature are not considered here. The purpose of this paper is to examine the accounting based facets of uncertainty. In the following section the notion of firm business risk, based on auditing and financial accounting research, is explored to assess the potential for this form of uncertainty to add dimension to the facets of uncertainty explored in the preceding section. The facets of uncertainty are then merged with the facets of firm business risk in the following section and the mix discussed. Building on the analysis provided in this section and the preceding sections, some complex concepts are expounded on in the following section. Following on from this, an explanatory come predictive framework for the design, implementation and review of a firm’s MCS, employing firm business risk as the driver of uncertainty, is attempted in the next section. The framework is then assessed in terms of its potential to overcome some of the issues such as: explanatory and predictive power; cross-study comparability; and, Chenhall’s (2203) identified need for alternative theory support. The paper ends with some concluding remarks.

The analysis contained in this paper should be of particular interest to novice contingency-based researchers, it should also be of interest to contingency-based researchers, practicing management accountants, and managers.

Exploring the Facets of Uncertainty

This paper is an exploration, it is not one resulting in total discovery. While the search of contingency-based research does touch on organisational, management and management accounting literature, it does not claim to be exhaustive. The framework developed in this paper should be seen as a living framework that may have the potential to evolve. To this end, the framework that is developed in this paper should be seen as only the makings of a skeleton framework, as it relates to the facets of uncertainty as viewed in the accounting related contingency-based literature. Evolution of this framework would involve the strengthening of its bones and the adding of flesh to those bones. Furthermore, due to a focus on the phenomenon uncertainty, it should not be seen as competing with the contingency models of the type developed by Langfield-Smith (1997 and 2005). It is not about identifying and defining the different types of objectives and underlying strategies employed by firms in managing uncertainty. It is about gaining a better understanding of the types, sources and degrees of uncertainty so that a fuller consideration is made when a firm is choosing and defining its objectives, strategies and operating activities. In doing so, improve understanding of what is required to be incorporated in a MCS in order that it assists in informing management regarding the implementation, performance and review of the 'objectives, strategies and operational activities of the firm' (OSOA).

Earlier scholars have stressed the importance of uncertainty as the core concept in a contingency theoretical framework (Galbraith, 1973; Miles and Snow, 1978; Chapman, 1997;

Hartmann, 2000). Uncertainty is defined by Galbraith (1973: 3) as being an information deficit, that is, *"... the difference between the amount of information required to perform the task and the amount of information already possessed by the organization ...."*. Galbraith (1973: 4) establishes uncertainty as the determinants in designing firm information systems:

> *The greater the task uncertainty, the greater the amount of information that must be processed among decision makers during task execution in order to achieve a given level of performance .*

Miles and Snow (1978: 254) label uncertainty as *"... the primary variable linking a great number of organizational characteristics to conditions in the environment."* In terms of the preceding comments, Galbraith (1973) identifies the need to consider types of uncertainty whilst Miles and Snow (1978) identify the need to also consider the sources of uncertainty. Samuelson (1999) observed that uncertainty manifested itself as the changing conditions that affect the controlled processes of a firm. Samuelson (1999) infers the additional need to also consider the differing degrees of uncertainty. Samuelson (1999) goes on to say that, as a consequence, as uncertainty rises or reduces, a firm's strategies, activities, processes and the control systems attached to them will be influenced accordingly (i.e. based on a continuum of degrees of uncertainty). From this, it could be inferred that firms facing different types, sources and degrees of uncertainty will choose to pursue different strategies, activities and processes resulting in potentially different configurations and functions of control systems being adopted by different firms. Accordingly, three facets of uncertainty will be explored here, the types, sources and degrees of uncertainty.

Types of uncertainty

In the literature, types of uncertainty have been identified as including: dynamism and heterogeneity (Gordon and Miller, 1976); complexity and variability (Amigoni, 1978); predictability (Waterhouse and Tiessen, 1978); and ambiguity (Ouchi, 1979; Daft and

Macintosh, 1981), to name some. Khandwalla (1977) suggested a taxonomy of environmental uncertainties that included: turbulence (risky, unpredictable, fluctuating, and ambiguous); hostility (stressful, dominating, and restrictive); diversity (variety in products, inputs, and customers); and complexity (rapidly changing technology). In one sense, the different types of uncertainty could be argued to be a range of symptoms of the potential sources, for the existence or not, of uncertainty. That is, dynamism might suite a well-established market leading innovator, whereas it might give rise to an increased threat of market competition for other firms. Similar arguments might be made for each of the other identified types of uncertainty.

For the purposes of this paper, types of uncertainties are categorized under two broad sub-categories, change and complexity (see Figure 1). Arguably, types of uncertainty such as risky, stressful, dominating, and restrictive may be considered to represent degrees of uncertainty (see Figure 5, column 3).

Sources of uncertainty

The common sources of uncertainty examined in the literature include: structure (Burns and Stalker, 1961); production technology (Woodward, 1965, Perrow, 1967; Brownell, 1987); goals/strategy (Perrow, 1961; Chandler, 1966); and, product market competition (Miles and Snow, 1978; Simons, 1990, 1991, 1994 and 1995). Hambrick (1981) recognized uncertainty and strategy as the *critical contingencies* faced by organisations, and recommends classifying these contingencies based on their impacts on three organizational processes: inputs; throughput; and outputs. Input-related uncertainty is caused by variations or changes in supply, demand and production technology of the inputs the firm uses for the production of its outputs. For example, a scarcity of raw material or personnel presents a pressure on input

processes. Throughput-related uncertainty, on the other hand, denotes uncertainty in association with changes and complexity of the production technology and processes adopted, such as pressures on costs and efficiency. While output-related uncertainty includes the factors that create complexity and changes in the market for firm outputs such as changes in market demand, entry of a low-cost competitor, or the introduction of new product attributes from competitors (also refer to Pugh and Hickson (1976) in terms of firm outputs and operating variability and diversity as sources of uncertainty).

Johansson, Nilsson, Nilsson and Samuelson (1997 - quoted in Samuelson, 1999) suggested categorising uncertainty by eight primary sources:

- Production technology: changes in the technology used for production
- Production attributes: uncertainty related to the technology built into the products
- Supply of input goods: availability and technology used to produce inputs required in production
- Labour disputes
- Competitor's behaviour: unpredictability in the behaviour of competitors, both existing and prospective. For example, an entry of a low-cost competitor could bring in new technology of producing and of distributing the products, thus causing a period of turbulence for the rest of the industry (Samuelson, 1999: 9)
- Input prices: change, complexity related to the prices of materials, personnel and supporting processes used in production
- Demand: the changes in volumes and prices of firm products due to competition forces on the market. It could be caused by (i) weather conditions, (ii) regulations, and/or (iii) new products
- Public rules and regulations: uncertainty related to changes in rules, taxes and levies

Selznick (1948) identified that certain commitments and obligations towards a firm's personnel and the environment could become sources of uncertainty, particularly when those commitments and obligation came into conflict with formal firm goals and objectives. Berman, Wicks, Kotha and Jones (1999) identify stakeholder relationships as a potential source of uncertainty depending on how a firm manages these stakeholder relationships and for what purpose. The sources of those relationships include employees, the natural environment, community, customers and investors. More recently, Chenhall (2003: 128) classified *external environment, technology (traditional and contemporary), organizational structure, size, strategy and national culture* as being contextual variables. This poses a question, is it the existence of a relationship that is the source of uncertainty or the context within which the relationship exists that gives rise to uncertainty? Possibly this is a 'chicken and egg' type question that is more about the comfort zones of the proposer of the question. However, without the existence of a relationship (explicit, implicit, physical, non-physical or otherwise) it is difficult to perceive how a contextual setting might be established.

In respect of employees, a potential source of uncertainty relates to worker welfare (Pfeffer, 1994; Huselid, 1995; Youndt, Snell, Dean and Lepak, 1996; Berman et al., 1999) and the potential for absenteeism, low work morale, lack of effort and satisfaction to impact on firm performance and competitive advantage. Moreover, employees' identification with the firm, as reflected in interpersonal trust, loyalty and a strong corporate culture, is believed to be a rescue for firms in a world of uncertainty, instability and intense competition (Berggren and Jordahl, 2006; Fukuyama, 1995; Fussell, Harrison-Rexrode, Kennan and Hazleton, 2006; Rabindra and Conger, 1993). The natural environment is also identified as a potential source of uncertainty. It is argued that environmentally friendly, proactive, committed and compliant

firms perform better (Dechant, Altman, Downing and Keeney, 1994; Hart, 1995; Shrivastava, 1995; Russo and Fouts, 1997). Customer/product safety is argued to be a potential source of uncertainty. Studies have consistently shown that market prices drop significantly around events such as product recalls, and events of corporate irresponsibility and illegal behaviour (e.g. Davidson and Worrell, 1988; Bromiley and Marcus, 1989; Frooman, 1997). It is apparent that investors expect customers to respond to firms' actions such as product recalls by taking actions that directly influence firms' profitability as well as business and community reputation (Waddock and Graves, 1997; Altman, 1998; Berman et al., 1999). It is also arguable that pursuing customer/product safety goals does not only avoid the risks of litigation or lost reputation, but also renders responsible firms a competitive advantage over other firms that behave irresponsibly, thus helping to increase sales and profitability.

An issue that arises from the above classification of the types and sources of uncertainty relates to the type of uncertainty and what or who might give rise to that uncertainty. This issues does possess the potential to confuse the novice as well as the comparison and contrasting of research findings. For example, labour disputes within either a firm's internal operating environment or its external operating environment, can be sources of uncertainty that affect a change in both the type(s) and the degree(s) of uncertainty a firm is exposed to. In terms of labour disputes in the external environment, the degree(s) and type(s) of uncertainty exposure may or may not also be affected by the closeness of the relationship between the firm and the external operating environment source of the labour dispute. A labour dispute affecting a critical supplier could have a similar degree of affect as a labour dispute affecting a shipping port in a foreign country that is a major market for the firm. Maybe it would be better to consider the significance of relationships in the value/supply chain as well as the proximity of the relationships?

However, sources of uncertainty such as the natural environment, taxation and regulation more clearly originate from a firm's external operating environment. Problematic for a firm is the variation in the degree of uncertainty as reflected in a firm's capacity to control its internal sources of uncertainty versus its external operating environment sources of uncertainty. Ewusi-Mensah (1981) suggested classifying environmental variables into controllable elements and uncontrollable elements. Separating the sources and types of uncertainty by firm internal and external environmental boundaries might assist in moving toward Ewusi-Mensah's suggested controllable-uncontrollable dichotomy (or continuum) of control. In doings so, it highlights the need to consider that facet of uncertainty, that is degrees of uncertainty (Samuelson, 1999).

Degrees of uncertainty

Understanding the sources and types of uncertainty that a firm potentially faces is important. The consideration that sources and types of uncertainty emanating from a firm's external operating environment relationships are potentially less controllable than those sources and types of uncertainty emanating from relationships existing within the firms internal operating environment is important to note. However, the relative strength and importance to the firm of all of those relationships aside for the moment, if the degree of uncertainty attaching to each of those relationships is not known or able to be estimated, potential firm MCS design, function and operation issues could exist. Without knowing the degree of uncertainty attaching to a firm's relationships, it would be difficult to assess whether or not the firm's MCS is efficient and effective in monitoring and informing management on the performance of those relationships and the firm strategies and processes to which they are related. This arguably goes directly to the notion of fit and its measurement. This represents a turning

point from understanding that while there are multiple types and sources of uncertainty, it is the singular and/or cumulative degree associated with a range of uncertainties that may confront a firm that go to influencing a firm's business path and the design, function and operation of the MCS developed to assist in managing that business path. In conjunction with a firm's owners' and decision makers' propensity for risk, the degree of uncertainty that a firm perceives it is confronted with will influence the determination of firm goals, objectives, strategies and operational activities. In doing so, the degree of uncertainty/risk perceived will also influence the design, function, operation and review of the firm's MCS. Furthermore, while two or a number of firms may face the same range of sources and types of uncertainties/risks, if the owners and managers have differing risk perceptions then firm MCS design, function and operation will potentially differ (e.g., Simons, 1991, 1995 and 1997).

Controllability is arguably one of the important, if not the most important, dimension of uncertainty as it relates to a firm's capacity to manage its uncertainty/risk exposure. A firm would have the incentive to choose to manage the uncertainty that it perceives as having some control/influence over. For example, while the demand for a firm's products could be partly influenced by a firm's efforts in marketing campaigns, in introducing new product attributes, or reduced prices, such uncertainty as regulations, rules and taxes are often out of a firm's control. In addition, firms also have the incentive to focus its resources in areas where highest return could be attained, (e.g., investing in a particular competitive advantage – Simons, (1990)). Consequently, identifying uncertainty against the controllability criteria helps firms in optimizing resource allocation to minimize the degree of environmental uncertainty it faces. However, as indicated in the section discussing types of uncertainty, the literature does not clearly distinguish between types and degrees of uncertainty. Thus, degree as a facet of uncertainty is considered worthwhile pursuing in its own right for the purpose of this paper.

Particularly given the Schoonhoven (1981) issues with explanatory and predictive power of contingency theory. The term 'degrees' infers some form of qualification and/or quantification (measurement), an element that can only promote explanation and/or prediction in empirical research. The significance is heightened in terms of contingency theory and the role of the notion of fit, the determination of which is central/pivotal to assessing MCS design, function and operation.

Given the relative lack of information about degrees of uncertainty, particularly in the management accounting MCS related research literature, it might go to explaining some of the difficulties in comparing and contrasting past research findings. For example, similar size and market positioned firms operating in different industries potentially face different degrees of uncertainty particular to the industry in which each operates (e.g., mining versus the power industry). The industry-specific driven level of uncertainty has the potential to cause firms in those different industries to adopt a different range of strategies, or similar strategies but having differing control implications. Thus, if not differing MCS designs, potentially differing levels of MCS function and operation.

As stated earlier, in this paper, the facets (sources and types) of uncertainty can be broadly grouped into two categories, those driven by the environment external to the firm and those driven by the environment internal to the firm. Figure 1 broadly summarises the sources and types of uncertainty identified above in terms of those two broad categories.

Facets of Uncertainty Driven by the Environment External to the Firm	
Sources of uncertainty	**Types of uncertainty**
Stakeholder relationship quality	**Change**
Information sufficiency/deficiency	Predictability
Change	Dynamism
Resource dependency	Turbulence
Technology:	Fluctuation
- of competitors' products	
- of information system developed on the market	**Complexity**
- possible changes/innovation in technology	Security/Assurance
Product market competition	Variability
- Competitor's behaviour	Diversity
- Demand	Variety
Input prices	Dependency/Reliance
Public rules, regulation and legislation	Heterogeneity
National culture	Ambiguity
Ownership	Interdependency
Management	Sophistication
National/local labour disputes	
Natural environment	Stress
National/global market	Domination
Natural environment	Prevalence/Currency
	Controllability
	Restrictive/Constraints
Facets of Uncertainty Driven by the Environment Internal to the Firm	
Sources of uncertainty	**Types of uncertainty**
Information sufficiency/deficiency	**Change**
Organizational structure	Predictability
Production technology/attributes of:	Dynamism
- Inputs	Turbulence
- Throughput	Fluctuation
- Output	
Production constraints	**Complexity**
Production technology	Security/Assurance
Supply of input goods and other resources/resource capacity	Variability
Firm labour disputes	Diversity
Firm culture	Variety
Employees and management' experience and knowledge	Dependency/Reliance
Firm obligations and commitments	Heterogeneity
- Goals, objectives, strategies	Ambiguity
- Service ethos/Customer/Product safety	Interdependency
- Goal conflict	Sophistication
- Ethics	
Reputation and self-image	Stress
Size	Domination
	Prevalence/Currency
	Controllability
	Restrictive/Constraints

Some Sources and Types of External and Internal Firm Uncertainty
Figure 1

Figure 1 is considered to be informative to the extent that it highlights that while some sources of uncertainty are particular to either the external environment (e.g., regulation, taxation, the natural environment, supply, demand, competitor behaviour, and community) or

the internal environment (e.g., employee welfare, production constraints, experience, knowledge, and information sufficiency) others have the capacity to transcend both the external and internal firm operating environments (e.g., resource dependency or constraints, labour disputes, management, stakeholder relationships and controllability). Furthermore, the various types, or symptoms of uncertainty, can be evident in both broad environmental categories of uncertainty and be associated with all sources of uncertainty.

Figure 1 also acts to highlight the lack of information concerning degrees of uncertainty. In doing so, it potentially highlights an under-specification of the facets of uncertainty. An under-specification that may contribute to those claims about contingency theory concering its capacity to explain and/or predict (Schoonhoven, 1981), or give rise to the difficulties that have been encountered in comparing and/or contrasting study findings (Otley, 1980; Chapman, 1997; Langfield-Smith, 1997). It is conceivable that if a basis for qualifying and/or quantifying degrees of uncertainty existed, then a basis would potentially exist for explaining and/or predicting firm MCS design, function and operation. This could particularly be the case in terms of how the MCS might be designed, function and operate in informing firm management, and related stakeholders, on the performance of the individual strategies a firm chooses to adopt. In doing so, provide a collective basis of assessing strategy choice, performance and contribution to firm goals and objectives achievement. However, to compare and/or contrast MCS study findings within firms and across firms may not be achievable unless common and/or compatible bases for qualifying and/or quantifying degrees of uncertainty were achieved otherwise there is the potential for comparing and/or contrasting ‘apples and oranges’ to arise.

Chenhall (2003) noted that management accounting research was not afforded the secondary and database sources of information that financial accounting research is. Data sources that provide common measures that allow for firm comparisons as well as the use of multiple firms in a single study. However, auditors have developed a contingency model that is widely used (Leung, Coram, Cooper, Cosserat and Gill, 2004) in the control and planning of audits to minimise audit risk, the audit risk model (ARM). The notion of business risk management Amit and Wernerfelt, 1990) and the selection of risk in contingency studies is not new (Baird and Thomas, 1985; Jemison, 1987; Nidumolu, 1996; Barki, Rivard and Talbot, 2001). Whilst it is acknowledged that other such contingency models may exist, the ARM was considered worthy of examination due to its concern with firm internal control and that the model was developed and applied in an accounting related field. Through employment of the notion of business risk, this model applies a common concept of degrees of risk/uncertainty to all cases examined. Elements of the audit risk literature are now consulted in order to gain further insight into the facets of uncertainty, which might be influenced by the notion of firm business risk. In doing so, examine the potential application of business risk to contingency-based research.

Exploring the Facets of Firm Business Risk

Research relating to the ARM deals directly with business risk implications for the audit firm. The ARM model is typically employed by auditors to determine the level of detection risk (DR) associated with providing an opinion on a client firm's external financial statements. The DR value, ranging from Very Low to Very High is then used to assist the auditor in determining the audit approach. That is the types and number of auditing procedures required to be performed (i.e., undertaken or carried out) in order to achieve the maximum acceptable Low degree or level of audit risk (AR). The auditor requires a defined Low degree of audit

risk in providing an unqualified audit opinion on a client firm's external financial statements when in fact it should be a qualified opinion. However, the assessment of DR is contingent (Libby, Artman and Willingham, 1985; Friedlob and Schliefer, 1999) upon an assessment of the efficiency, effectiveness, construct and operation of the client firm's internal system of control (referred to as control risk) in managing the external and internal operating environment risks (referred to as inherent risk) in sustaining the viability of the firm (also referred to as the notion of 'going concern'). The ARM research and literature highlights the importance of a firms MCS as both a means of capturing and reporting information about the risks confronting a firm and as a mechanism/framework for managing that risk (Leung *et al*, 2004; Schelluck, Topple, Jubb, Rittenberg and Schwieger, 2004; Gay and Simnet, 2005).

Risk is a widely used term (Schelluch *et al*., 2004), however, in this paper it is the risk associated with running a business (hereafter referred to as business risk) that is the focus. Schelluch *et al*., (2004: 94) define business risk as being:

> *Those risks that result from significant conditions, events, circumstances or actions that could adversely affect the entity's ability to achieve its objectives and execute its strategies.*

This definition is supported by Bell, Marrs, Solomon and Thomas (1997), and might be expressed as follows:

> *Expected loss = Probability of occurrence* x *Value associated with loss*
> (Schelluch *et al*., 2004: 106)

However, this presents a negative assessment of risk that is not necessarily consistent with a firm's management's view of risk, and who may view risk in the following ways (Schelluch *et al*., 2004: 106):

- *As a' continuum' incorporating both risks and opportunities*
- *In terms of 'pay-offs' or 'losses', recognising either positive or negative outcomes*
- *In terms of 'probabilities' of occurrences and consequences.*

Leading to the following definition of risk (Schelluch *et al*., 2004: 106):

> *A concept used to express uncertainty about events and/or their outcomes that could have a material effect on the organisation.*

This definition, in capturing both the positive and negative aspects of risk, also identifies risk as an indicator of the degree of uncertainty. Uncertainty identified as being the primary driver of contingent behaviour in the organisation, management and management accounting contingency related research literature (Galbraith, 1973; Otley, 1980 and 1994; Libby, Artman and Willingham, 1985; Chapman, 1997 and 2005; Langfield-Smith, 1997 and 2005; Friedlob and Schliefer ,1999).

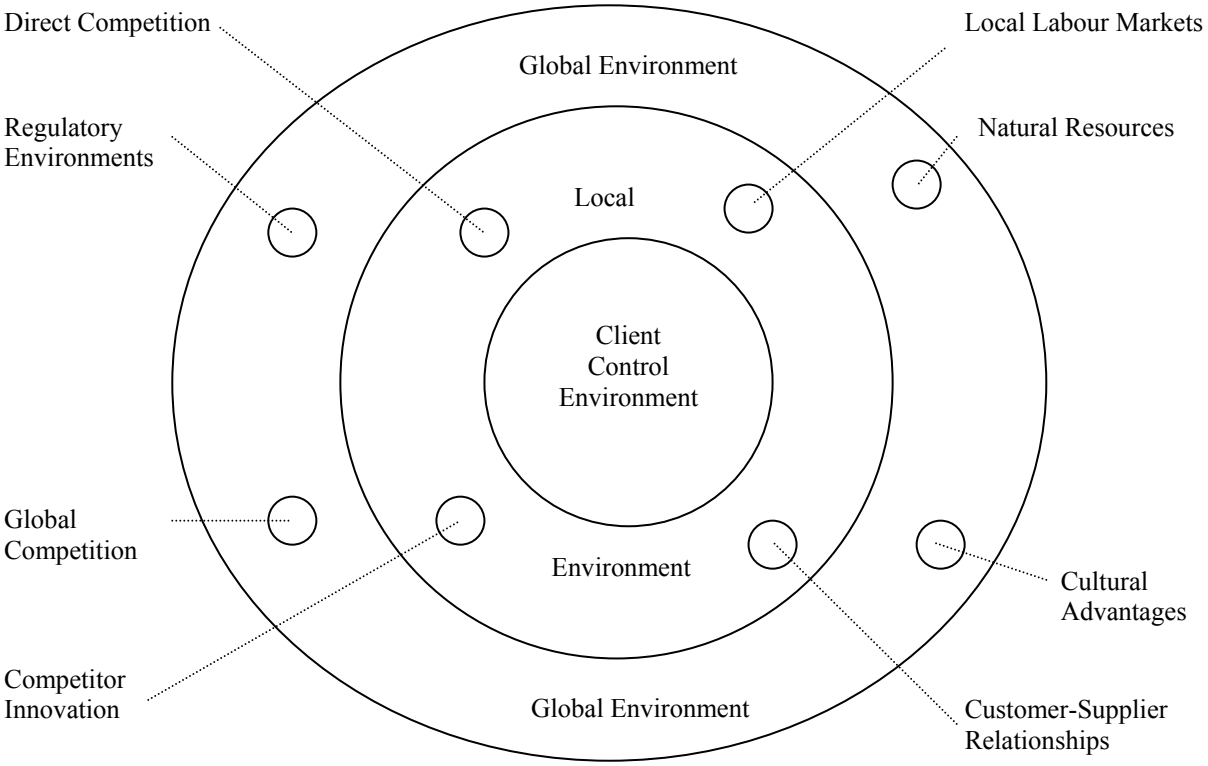
Furthermore, Schelluch *et al*. (2004: 106) goes on to say that "*Risk is often linked with control because controls exist only to minimise risks, or to keep risks within specific boundaries."* This raises the notion of an 'acceptable degree of firm business risk' (AcFBR) or uncertainty in a management control system setting. That is, an 'AcFBR' when coupled with that firm's aim, namely: 'to achieve its objectives via execution of its strategies', and 'uncertainty', would appear to present some of the critical elements necessary for a management accounting contingency-based study. That this observation could be made relying on risk information, particularly as it relates to the audit risk model (ARM), provided in the auditing literature is not surprising. Libby, Artman and Willingham (1985) and Friedlob and Schliefer (1999) highlighted the contingent nature of the ARM.

The auditing literature (e.g. Schelluck *et al*., 2004; Leung *et al*., 2004) identifies a number of factors which may generate risk in running a business that include:

- Lawsuits;
- Loss of professional reputation;
- Not being paid for goods and/or services supplied;
- Loss of customers;
- Management integrity;

- Unforeseen costs in doing business;
- Country business risk;
- Industry business risk;
- Foreign currency exposure;
- Inherent risk;
- Control risk; and
- Detection risk.

Gay and Simnet (2005) provide an environmental dimension in categorising risk as follows:



The relationship between client business risk and the global, local and internal environments*

*Source: Gay and Simnet (2005: 258)

Figure 2

This does present some similarities in terms of the sources of risk presented in Figure 1. While the auditing business risk analysis is informative, the focus is driven by achieving an acceptable audit risk outcome. And while consideration of a firm's MCS is central to those deliberations, achieving an acceptable level of audit risk is contingent on the types and quantum of auditing procedures that need to be undertaken. The focus here is on exploring the facets of uncertainty as they relate to the external and internal operating environments of

the firm. In doing so, provide a basis for explaining or predicting the design, structure, function and operation of the firm's MCS. In terms of firm business risk, environmental uncertainty will be explored on the basis of firm external business risk and firm internal business risk. Gay and Simnet (2005: 262) identify some potential risk indicators of the two broad external and internal environment categories in terms of positive opportunities or negative threats as follows.

Potential External Risk Indicators	External Risk Abating Strategies
Entry of lower-cost competitors	Serve additional customer groups
Rising sales of substitute products	Enter new markets or segments
Slowdowns in market growth	Expand product line to meet broader range of customer needs
Adverse shifts in foreign exchange rates and trade policies of foreign governments	Diversify into related products
Costly regulatory requirements	Vertical integration
Vulnerability to recession and business cycle	Falling trade barriers in attractive foreign markets
Growing bargaining power of customers and suppliers	Complacency among rival firms
Changing buyer needs and tastes	Faster market growth
Adverse demographic changes	Acquisition of rival firms
Vulnerability to industry-driving forces	
Potential Internal Risk Indicators	**Internal Risk Abating Strategies**
No clear strategic direction	A powerful strategy
Obsolete facilities	Adequate financial resources
Too much debt	Good competitive skill
Sub-par profitability	Strong brand name
Higher overall unit costs relative to key competitors	An acknowledged market leader
Lack of managerial depth and talent	Access to economies of scale
Missing some key skills or competence	Proprietary technology
Poor track record in implementing strategy	Superior technological skills
Plagued with internal operating problems	Cost advantages
Falling behind in R & D	Better advertising campaigns
Too narrow a product line	Product innovations skills
Weak market image	Proven management
Weak distribution network	Better manufacturing capability
Below-average marketing skills	Better product quality
Unable to finance needed changes in strategy	Wide geographic coverage
Underutilisation of plant	Alliances/joint ventures with other entities
Behind on product quality	

Potential External and Internal Risk Indicators and Risk Abating Strategies*

*Source: Adapted from Gay and Simnet (2005: 262)

Figure 3

Figure 3 presents both potential external and internal risk indicators in the left-hand column with potential external and internal risk abating strategies in the right-hand column. The potential risks identified in Figure 3 are comparable to the sources of uncertainty presented in

Figure 1. Similarly, while Figure 3 segregates external and internal risk indicators there can be an interaction between external and internal risk factors. For example, the nationalisation of a firm's foreign operations due to regulatory or government change in that foreign country could impact on gearing operations of the firm and threaten its solvency. Alternatively, a firm's inability to finance a needed change in market strategy from national to international might limit its opportunity to take advantage of falling trade barriers in another country.

Where Figure 3 departs from having similarity with Figure 1 is in the right-hand column and the inclusion of risk abating strategies. This may be attributable to the concept of firm business risk implicitly having a sense or measure of 'degree', which should similarly be evident when talking about sources and types of uncertainty listed in Figure 1. However, it is more likely due to the auditors need to identify factors that could abate, or act to reduce the degree of business risk faced by the auditee firm and target detection related types of auditing procedures and the quantum of those procedures necessary to assess audit risk. Auditors and financial accountants appear to have greater comfort in carrying out their tasks when there is some dimension given to risk or uncertainty. For example, La Porta, Lopez-De-Silanes, Shleifer and Vishny (1998), when examining the legal rules covering protection of corporate shareholders and creditors, the origin of the legal rules, and the quality of their enforcement in 49 countries, identified and developed a number of indicators of protection risk on a country basis that include the following indicators: efficiency of judicial system; rule of law; corruption; risk of expropriation; and risk of contract repudiation (Refer to Appendix). Similarly, the financial accounting and finance literature highlights the use of the capital asset pricing models (CAPM) (e.g. Sharpe, 1964; Lintner, 1965; Fama and French, 1992 and 1993) and the weighted average cost of capital (WACC) (e.g. Modigliani and Miller, 1958; Myers,

2001) assessments in combination with share price performance and the residual income model (Courteau, Kao and Richardson, 2001) to determine firm risk and value.

However, the audit risk model (ARM) is more likely to be operationalised using qualitative assessment indicators of risk rather than quantitative assessments of risk. In reality, the ARM is highly judgmental despite the precision implied by the mathematical appearance of the model. The audit objective being to limit audit risk (AR) to an acceptable low level, as judged by the auditor. In practice auditors are required to assess inherent risk (IR) and control risk (CR) along a qualitative continuum of three levels: low; medium; and high (Leung, *et al*., 2004).

Typically, the ARM is mathematically stated as follows:

$$AR = IR \times CR \times DR$$

Where:

AR = Audit risk (i.e., risk that the auditor may unknowingly fail to appropriately modify his or her opinion on financial statements that are materially misstated, in other words the risk of giving an unqualified opinion when it should be a qualified opinion, or vice verus);

IR = Inherent risk (i.e., the perceived level of risk that a statement[1] is susceptible to a material misstatement, assuming there are no related internal control procedures);

CR = Control risk (i.e., the perceived level of risk that a material misstatement that could occur in a statement will not be prevented or detected on a timely basis by the firm's internal control procedures); and

DR = Detection risk (i.e., the perceived level of risk that the auditor will not detect a material error, omission or misstatement that exists in a statement).

[1] That is, an assertion embodied in the account balance, transaction class, and disclosure components of the financial statements.

Operationalisation of the ARM in conducting an audit is undertaken on the basis of each of the account balances presented in the financial statements that are the subject of the audit. Given a predetermined and desired level of audit risk (i.e., an acceptable Low level of AR), then detection risk is contingent upon the auditor's assessment of both inherent risk and control risk. This can be shown in a mathematical equation as: DR = AR / (IR x CR). Thus the importance of the auditor's assessments of both IR and CR is highlighted by their interactive effect on the resultant level of DR. The lower the acceptable level of AR, and the higher the IR and CR, then the lower the resultant level of DR will be (i.e., a low DR means a low level of risk that the auditor will not detect a material error, which is due to poor inherent and control procedures by the auditor's client firm). Thus, a low DR will of necessity result in a need for more auditing procedures to provide the potential for detecting material errors. The auditor will compensate for the assessed levels of risk by designing and performing auditing procedures to detect material errors, omissions or misstatements. Deductively the interaction (IR x CR) provides six possible qualitative levels of interactions, namely: low-low, low-medium, low-high, medium-medium, medium-high, and high-high. Hence, given a defined acceptable Low level of AR, divided by these six possible qualitative levels of IR and CR interactions, provides a qualitative contingent view of the various resultant level of DR, as shown in Figure 4 below.

Defined acceptable level of AR	***Six possible qualitative levels of IR and CR interactions***					
	Low-Low	**Low-Medium**	**Low-High**	**Medium-Medium**	**Medium-High**	**High-High**
Very Low	*High*	*Medium*	*Low*	*Low*	*Very Low*	*Very Low*
Low	*Very High*	*High*	*Medium*	*Medium*	*Low*	*Very Low*
Medium	*Very High*	*Very High*	*High*	*High*	*Medium*	*Low*

A Qualitative Evaluation of Detection Risk in terms of the ARM*

*Source: Adapted from 'Tables for the estimation of the value of DR, given estimated evaluations of AR, IR and CR' accessed on 07/02/2007 at http://www.abrema.net/abrema/ar_tab.html

Figure 4

In simplistic terms, reading from Figure 4, when the maximum acceptable degree of AR required by the auditor is defined qualitatively as Low and the resultant level of DR is *Very*

Low, as judged via the auditor's assessment of High IR and High CR, then it can be interpreted that compensatory higher numbers and types of auditing procedures would be required so as to have the potential for detecting material errors, omissions and misstatements that exists within the financial statements being audited. Alternatively, when the resultant level of DR is *Very High* (i.e., a very high DR means a very high level of risk that the auditor will not detect a material error, which is due to the auditor's client firm having very good inherent and control procedures that had resulted is low IR and low CR assessments), then it can be interpreted that lower numbers and types of auditing procedures will still have the potential for detecting material misstatements within the financial statements. Hence, progressively increasing levels of compensatory auditing procedures will be contingent upon progressing from *Very High* through to *Very Low* assessed levels of DR, and will be required to be performed (i.e., undertaken or carried out) in order to satisfy the requirement of an acceptable Low degree of AR.

The above qualitative approach to determining the level of detection risk/uncertainty is appealing in identifying the numbers and types of firm resources and MCS functions required to be committed to a strategy (e.g., high profile marketing strategy associated with interactive, as opposed to diagnostic, MCS reporting and monitoring). The auditor states the acceptable level of AR that she/he is prepared to accept at the outset. In these terms, AR could be argued to be equivalent to a firm's determination of an acceptable level of business risk. Where the contingent nature of the ARM differs from MCS design, function and operation is in the determination of DR in designing and planning the audit. The purpose of the MCS is to manage and minimise those elements of risk that might negatively influence DR. This represents an alternative view for different outcomes only. In doing so, it highlights the potential for the notion of business risk to have utility under both views. However, it does not

immediately reveal the types of uncertainty that need to be considered in strategy formulation and MCS information and control support needs, which are required to assess whether or not an acceptable degree of business risk/uncertainty has been achieved, and for deciding whether or not strategy performance has been optimal.

For both the external and internal operating environments of a firm, there is some similarity between the sources of uncertainty presented in Figure 1 and the potential risk indicators presented in Figure 3. Given this, it may be possible that the types of uncertainty presented in Figure 1 may provide for an interpretive link between the sources of uncertainty/potential risk indicators and the risk abating strategies presented in Figure 3.

Merging Uncertainty and Firm Business Risk

The existence of an interpretive link between the sources of uncertainty/potential risk indicators and risk abating strategies has the potential to provide an ability to determine the degree of uncertainty/risk in explaining and/or predicting the design, function and operation of a firm's MCS. Figure 5 combines the considerations of Figures 1 and 3 and includes the range of strategy variables identified by Langfield-Smith (1997: 212), in order to add further relevance to MCS related issues. Langfield-Smith (1997) categorised cost leadership and differentiation as strategic positioning strategies, prospector, analyzer, and defender as strategic typologies, and build, hold, harvest as strategic missions. Selection of any of these strategies has the potential to be influenced by sources of uncertainty/risk emanating from a firm's external and/or internal operating environment.

A Combined Listing of Sources, Types and Degrees of Uncertainty/Risk and Risk Abating Strategies
Figure 5

External Environment			
Sources of Uncertainty/Risk **(1)**	**Types of Uncertainty/ Risk** **(2)**	**Degrees of Uncertainty/ Risk** **(3)**	**Risk Abating Strategies** **(4)**
Relationships and relative power of external stakeholders: - Owners: owners' risks preferences, interests and objectives - Suppliers: changing input prices, technology, growing monopolistic power - Customers: changing buyer needs and tastes - Distributors - Public community; Product market competition: - Competitor behaviour - Entry of lower-cost competitors - Rising sales of substitute products - Slowdowns in market growth Technology: - product technology on the market - competitors' technology - future technology and technology change - technology of inputs; - information technology on the market Global and national economy: - Vulnerability to recession and business cycle - Adverse shifts in foreign exchange rates and trade policies of foreign governments Industry inherent risks Regulation and legislation National and local culture Labour market and disputes	**Complexity:** - Security/ Assurance - Variability - Heterogeneity - Ambiguity - Variety - Diversity - Sophistication - Reliance - Dependency - Interdependency **Change:** - Predictability - Dynamism - Turbulence - Fluctuation	Controllability Domination Stress Hostility Prevalence/ Currency Restrictive/ Constraints High/Low	Serve additional customer groups Enter new markets or segments Expand product line to meet broader range of customer needs Diversify into related products Vertical integration Falling trade barriers in attractive foreign markets Complacency among rival firms Faster market growth Acquisition of rival firms **Strategic Positioning:** Cost Leadership Differentiation **Strategic Typologies:** Prospector Analyzer Defender **Strategic Missions:** Build Hold Harvest

Figure 5 continues on the next page

Internal Environment			
Sources of Uncertainty/Risk	**Types of Uncertainty/ Risk**	**Degrees of Uncertainty/ Risk**	**Risk Abating Strategies**
Firm aims and objectives: obligations and commitments, service ethos, goal conflicts Relationships and relative power of internal stakeholders: - Management - Employees/union - Domination of particular divisions/departments/ functions Technology: - Information system technology - Product technology (complexity, diversity and innovation) - Task/ Process technology - Inputs technology Human resource capacity and quality: - Employees' age, experience, knowledge, occupancy; - Missing some key skills or competence - Below-average marketing skills - Lack of managerial depth and talent Non-human resources: - supply of inputs - Machinery and facilities; - Information systems; - Finance sustainability - Utilization and maintenance; - Operational constraints on firm processes and activities; Firm culture Firm image and reputation Firm structure Firm size Firm strategy: - No clear strategic direction - Poor track record in implementing strategy Firm competitive status (profitability, product prices and quality, cost efficiency)	**Complexity:** - Security/ Assurance - Variability - Heterogeneity - Ambiguity - Variety - Diversity - Sophistication - Reliance - Dependency - Interdependency **Change:** - Predictability - Dynamism - Turbulence - Fluctuation	Controllability Domination Stress Hostility Prevalence/ Currency Restrictive/ Constraints High/Low	A powerful strategy Adequate financial resources Good competitive skill Strong brand name An acknowledged market leader Access to economies of scale Proprietary technology Superior technological skills Cost advantages Better advertising campaigns Product innovations skills Proven management Better manufacturing capability Better product quality Wide geographic coverage Alliances/joint ventures with other entities **Strategic Positioning:** Cost Leadership Differentiation **Strategic Typologies:** Prospector Analyzer Defender **Strategic Missions:** Build Hold Harvest

Figure 5 identifies some sources of uncertainty/risk (column 1) each of which might give rise to differing types of uncertainty/risk (column 2) that could influence the construct of one or more strategies, or result in the development of additional strategies (a sample of risk abating strategies is provided in column 4). However, critical to deciding the influence of the sources and types of uncertainty/risk on strategy formulation and MCS design, function and operation is the degrees of uncertainty/risk (column 3) associated with those sources and types of risk. For firms it is likely that some enabling strategies will expose them to higher degrees of business risk than others. These higher risk strategies will require not only higher levels of resources but will demand higher degrees of attention from within the firm's MCS. That is, the type and function of controls are likely to be more intensive and interactive as opposed to simplistic and diagnostic. Being able to identify the degree of risk and/or 'change in degree of total firm business risk' (ΔFBR) also provides a basis upon which management can decide whether a change in the MCS function and operations is required. However, where the degree of risk is determined to be unacceptable, review of 'objectives, strategies and operational activities of the firm' (OSOA) may be necessary, which in turn may necessitate a MCS review. Estimating the degree of uncertainty enhances the capacity to explain and/or predict the design, function and operation of a firm's MCS.

An exploration of the business risk view of uncertainty as it relates to the ARM is considered to be informative from two perspectives. Firstly, it has provided some insight into the relationship that source(s) and type(s) of uncertainty have to strategy formulation. Secondly, in doing so it highlights the role of the degree of uncertainty/risk in strategy formulation and implementation, as well as its potential impact upon the design and function of the MCS. Probably more importantly, given the expected source(s) and type(s) of uncertainty/risk that may have the potential to impact on a firm's objectives, strategies and operational activities, is

the potential explanatory and/or predictive role that might enable: (i) assessing or explaining a firms current MCS design, function and operation; and/or (ii) predicting the future MCS design, function and operation. Exploring how a business risk view of uncertainty might assist in the MCS design, development, function, operation and review is undertaken in the following section. The purpose of this framework is in part driven by the self-interest of the authors. However, through conceptualising what might constitute such a framework, it is hoped that an improved understanding of the potential, and application, of contingency-based research is achieved in respect of MCS.

The Start of a Potential Firm Business Risk Driven Contingency Model for MCS Design, Implementation and Review

In conceptualising this model a number of assumptions have been either drawn from the existing literature or made by the authors as follows. These assumptions build on the initial view (Samuelson, 1999; Hartmann, 2000) that the design, operation and review of a firm's MCS is contingent upon the uncertainty faced by that firm. Motivating both the design and review of a firm's MCS is the notion of fit. The presumption being that when a fit is achieved between the 'objectives, strategies and operational activities of the firm' (OSOA) and both its external and internal contingencies, then the firm should be capable of optimising performance (Otley, 1999; Langfield-Smith and Smith, 2003; Chenhall, 2003 and 2005). Assuming that an 'acceptable MCS' (AcMCS) facilitates this fit then Figure 6, *A MCS design, implementation and review framework contingent upon firm business risk and firm resource capacity*, can be viewed as a diagrammatical representation of a simple AcMCS contingency model. The underlying framework for the model presented in Figure 6 is derived from an adaptation of the Otley (1999) framework and Kaufman's (1992) strategic planning work. This model is a MCS design, implementation and review framework contingent upon firm

business risk and firm resource capacity. Firm resource capacity (human and nonhuman) is 'flagged' here as it is viewed by the authors as being a potential constraint, or if you like, source of friction throughout the life of a firm and its MCS. In particular, and under conditions of scarce resources, when there is a perception that a performance enhancing strategy, or activity, is considered a better firm business risk option than improving MCS performance. The purpose of flagging this trade-off is to ensure that the need for MCS change is recorded and that any present and future potential implications for firm business risk are considered. Further, it highlights that changes to the MCS have potential resourcing consequences for the firm. A variance on the Otley (1999) framework is reflected in targets being incorporated in the MCS design phase. Additionally, rewards, in this study, are considered to be incorporated in firm's strategies. Rewards are perceived to be either a separate strategy, or part of a strategy targeting internal uncertainties that might also consider succession planning, training, development and empowerment. In addition to the preceding assumptions relating to fit, firm resource constraints and performance it is assumed that managers are rational, knowledgeable and performance optimising. What follows is a list of acronyms used predominantly in this section. Then there are a number of complex concepts that are expounded below, before proceeding with the explanation[2] of Figure 6.

List of acronyms used

AcFBR = Acceptable degree of firm business risk

AcMCS = Acceptable MCS

AvAdFRC = Available additional firm human and non-human resource capacity

CΔMCS = Capacity to change firm's existing AcMCS

(expressed as a percentage, the minimum percentage required

[2] The explanation contains bracketed numbers such as (1), (5), (5a), etc. up to (10), which are references to specific identifiable points on Figure 6: *A MCS design, implementation and review framework contingent upon firm business risk and firm resource capacity*.

to proceed with the required MCS change is 100%)

ΔAcFBR = Change to firm's existing AcFBR

ΔFBR = Change in degree of total firm business risk

ΔRFRC = Change in required firm human and non-human resource capacity needed to provide the capacity and ability to proceed with the required MCS change

OSOA = Objectives, strategies and operational activities of the firm

RΔMCS = Required change to firm's existing AcMCS

RFRC = Required firm human and non-human resource capacity needed to support the AcMCS

ΣFBR = Total firm business risk

ΣFEBR = Total firm external business risk

ΣFIBR = Total firm internal business risk

ΣFRC = Total firm (human and non-human) resource capacity

Expounding complex concepts

Acceptable degree of firm business risk (AcFBR):

As discussed in the preceding section, acceptable firm business risk is a firm specific level of business risk that firm owners and managers are prepared to accept. That is, it recognises that the propensity for risk, or degree of uncertainty, could vary between firms.

Acceptable MCS (AcMCS):

In a business risk focused contingency model of a firm's MCS, an effective and efficient MCS is viewed as an AcMCS. That is an AcMCS, which meets the decision information needs of the firm in terms of past, current and future decisions, as influenced by the OSOA.

The AcMCS needs to provide the firm with the capacity and ability to manage the consequences of those decisions in achieving an AcFBR. Furthermore, the firm has specific 'required firm human and non-human resource capacity needed to support the AcMCS' (RFRC).

At time zero (t_0) this can be simply expressed conceptually as follows:

$$AcMCS_0 = f(AcFBR_0) \quad (1)$$

Where:

$AcMCS_0$ = Acceptable MCS at t_0; and

$AcFBR_0$ = Acceptable degree of firm business risk at t_0.

The assumption underlying this contingency model is that at t_0:

$$AcFBR_0 = f(\Sigma FBR_0, RFRC_0) \quad (2)$$

Where:

ΣFBR_0 = Total firm business risk at t_0.

$RFRC_0$ = Required firm human and non-human resource capacity needed to support the $AcMCS_0$.

And:

$$\Sigma FBR_0 = f(\Sigma FEBR_0, \Sigma FIBR_0) \quad (3)$$

Where:

$\Sigma FEBR_0$ = Total firm external business risk at t_0; and

$\Sigma FIBR_0$ = Total firm internal business risk at t_0.

Substituting Function (3) in Function (2) gives Function (4):

$$AcFBR_0 = f(\Sigma FEBR_0, \Sigma FIBR_0, RFRC_0) \quad (4)$$

While substituting Function (2) in Function (1) gives Function (5):

$$AcMCS_0 = f(\Sigma FBR_0, RFRC_0) \quad (5)$$

And substituting Function (3) in Function (5) gives Function (6):

$$AcMCS_0 = f(\Sigma FEBR_0, \Sigma FIBR_0, RFRC_0) \quad (6)$$

Accommodating small change within the existing AcMCS:

At any immediate time subsequent to t_0, it is assumed that a small decrease in degree of total firm business risk, which results in a low degree of 'Misfit', will be accommodated within the existing AcMCS. While it is also assumed that a small increase in degree of total firm business risk, which also results in a low degree of 'Misfit', might require operational alteration of existing MCS components. For example, related components of the MCS may need to revert from a diagnostic operation to an interactive operation, or vice versa, so as to assist in achieving 'Fit'. Such functional level change(s) can similarly be accommodated within the existing AcMCS. Furthermore, minor structural changes to the MCS might also be required. For example, there might be a need to refine the business forecasting model, improving debtor collection, improving asset management procedures, etc. However, it is assumed that accommodating such small change within the existing AcMCS will impose no additional strain on the current committed RFRC.

Review of 'objectives, strategies and operational activities of the firm' (OSOA):

At any immediate time subsequent to t_0, dependent upon the degree of change, or compositional change, in the ΣFBR since t_0, a degree of 'Misfit' may result that cannot be accommodated within the existing AcMCS. Such a 'Misfit' requires a review of the OSOA and the MCS. Similarly, at specific time intervals subsequent to t_0, more often than not annually, say time one (t_1), the firm will review the OSOA, again dependent upon the degree of change, or compositional change, in the ΣFBR since t_0. Such a review can necessitate a proactive review of the firm's MCS.

Acceptable MCS at t_1 ($AcMCS_1$):

At any time subsequent to t_0, say t_1, similar conceptual functions, to the prior Functions at t_0, can be expressed as follows for example:

At t_1 Function (1) gives Function (7):

$$AcMCS_1 = f(AcFBR_1) \quad (7)$$

Function (2) gives Function (8):

$$AcFBR_1 = f(\Sigma FBR_1, RFRC_1) \quad (8)$$

Function (4) gives Function (9):

$$AcFBR_1 = f(\Sigma FEBR_1, \Sigma FIBR_1, RFRC_1) \quad (9)$$

Function (5) gives Function (10):

$$AcMCS_1 = f(\Sigma FBR_1, RFRC_1) \quad (10)$$

And Function (6) gives Function (11):

$$AcMCS_1 = f(\Sigma FEBR_1, \Sigma FIBR_1, RFRC_1) \quad (11)$$

Required change to firm's existing AcMCS (RΔMCS) at t_1:

Given that the aim of the MCS is to restore ΣFBR to an acceptable degree of firm business risk (AcFBR), then a change in degree of ΣFBR (ΔFBR) between t_0 and t_1 will have an equilibrium probability of a required change, exceeding functional level and minor structural changes, to firm's existing AcMCS at t_1. However the probability of this equilibrium RΔMCS at t_1 is dependent upon the supporting 'change in required firm human and non-human resource capacity needed to provide the capacity and ability to proceed with the required MCS change' (ΔRFRC) at t_1.

It is therefore postulated that at t_1, such a RΔMCS is driven by the ΔFBR. It is further postulated that such a RΔMCS will involve a ΔRFRC, which is different to that which is

currently required and invested to support the existing AcMCS, so as to result in a new AcMCS at t_1. Thus conceptually at t_1, the RΔMCS is a function of ΔFBR and ΔRFRC. This new AcMCS will restore ΣFBR to an AcFBR.

At t_1 this can be simply expressed conceptually as follows:

Function (10) subtract Function (5) gives Function (12) as follows:

$$R\Delta MCS = f(AcMCS_1) - f(AcMCS_0) \quad (12)$$

Where:

$R\Delta MCS$ = Required change to firm's existing $AcMCS_0$ at t_1

Therefore:

$$R\Delta MCS = f(\Delta FBR, \Delta RFRC) \quad (13)$$

Where:

$$\Delta FBR = f(\Sigma FBR_1) - f(\Sigma FBR_0) \quad (14)$$

= Change in degree of total firm business risk between t_0 and t_1; and

$$\Delta RFRC = f(RFRC_1) - f(RFRC_0) \quad (15)$$

= Change in required firm human and non-human resource capacity needed to provide the capacity and ability to proceed with the required MCS change at t_1.

Similarly, Function (8) subtract Function (2) gives Function (16) as follows:

$$\Delta AcFBR = f(AcFBR_1) - f(AcFBR_0) \quad (16)$$

Where:

$\Delta AcFBR$ = Change to firm's existing $AcFBR_0$ at t_1

Therefore:

$$\Delta AcFBR = f(\Delta FBR, \Delta RFRC) \quad (17)$$

Substituting Function (17) in Function (13) gives Function (18):

$$R\Delta MCS = f(\Delta AcFBR) \quad (18)$$

Furthermore, manipulating Function (12) gives Function (19):

$$AcMCS_1 = f(AcMCS_0, R\Delta MCS) \quad (19)$$

Where:

$AcMCS_1$ = New $AcMCS_0$ at t_1.

Following on, the new acceptable MCS at t_1 can now simply be expressed as follows by substituting Function (13) in Function (19), as follows:

$$AcMCS_1 = f(AcMCS_0, \Delta FBR, \Delta RFRC) \quad (20)$$

Capacity to change firm's existing $AcMCS_0$ at t_1 ($C\Delta MCS_1$):

The potential for both the external and internal availability of additional firm human and non-human resources to moderate the firm's capacity and ability to bring about the required MCS change at t_1, does exist. Therefore the firm's CΔMCS needs to be assessed so as to determine whether or not the RΔMCS can be progressed. This in turn involves an evaluation of the 'available additional firm human and non-human resource capacity at t_1' ($AvAdFRC_1$).

Whether on not the firm has the resource capacity to change its existing $AcMCS_0$ at t_1 is assessed as follows:

$$C\Delta MCS_1 = f\left(\frac{AvAdFRC_1}{\Delta RFRC}\right) \times \frac{100}{1} \quad (21)$$

Where:

$C\Delta MCS_1$ = Capacity to change firm's existing $AcMCS_0$ at t_1

(expressed as a percentage, the minimum percentage

required to proceed with the required MCS change is 100%);

$AvAdFRC_1$ = Available additional firm human and non-human resource capacity at t_1; and

$\Delta RFRC$ = Change in required firm human and non-human resource capacity needed to provide the capacity and ability to proceed with the required MCS change.

Potential for Exit Strategies:

If the firm does not have 100% CΔMCS at t_1 ($C\Delta MCS_1$), then in reviewing the OSOA and revising as required, the potential for exit strategies does exist. Alternatively, if reviewing the OSOA results in unacceptable revised OSOA, then deciding on exit strategies can be necessary. Exit strategies vary from dropping a product line, closing down a division, leaving the industry, to allowing the firm to be merged or taken-over by another firm. However, whether these exit strategies will lead to 'Fit' or 'Misfit' is uncertain, as is determining whether an improvement or deterioration in performance will follow.

Explanation[3] of a MCS Design, Implementation and Review Framework Contingent upon Firm Business Risk and Firm Resource Capacity

The initial MCS design and implementation stage is reliant on the framework feedback-loop, which is designated with the specific identifiable points (1), (2), (3), (4), (5), (5b) and (10) on *Figure 6*.

[3] As per Footnote 2 which states that the explanation contains bracketed numbers such as (1), (5), (5a), etc. up to (10), which are references to specific identifiable points on Figure 6: *A MCS design, implementation and review framework contingent upon firm business risk and firm resource capacity*.

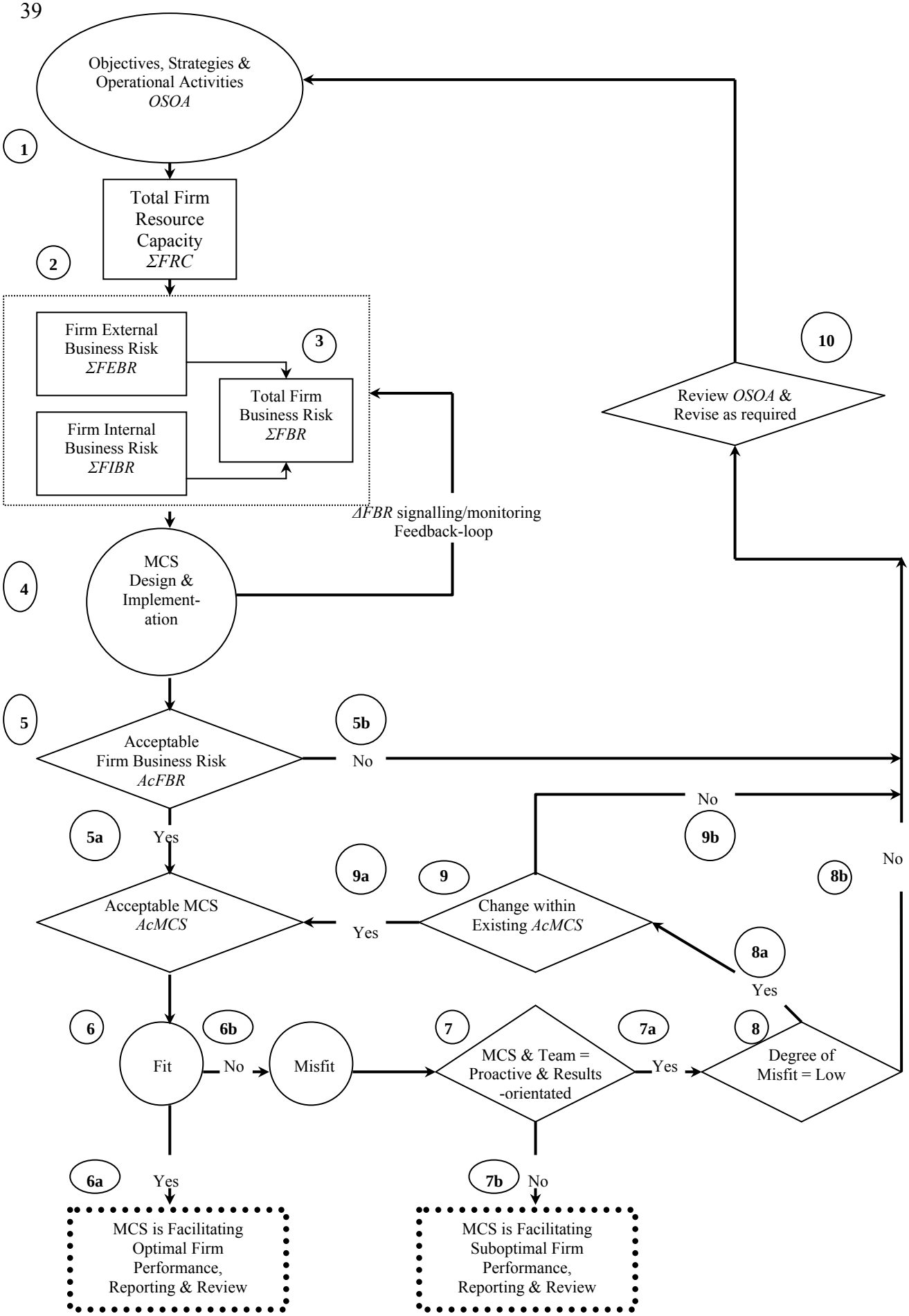


Figure 6. A MCS design, implementation and review framework contingent upon firm business risk and firm resource capacity

Any firm's management cannot decide upon the means of accomplishing anything before knowing the real ends that are to be accomplished. Furthermore, if deciding upon the means is not possible, nor is MCS design work feasible. Thus a proactive approach towards business which is results-orientated is essential. To this end management need to take a wide-angled societal and reality-based holistic view (hereafter Mega-view) of business opportunities and problems in determining the firm's objectives. In addition, it extends the firm's current objectives into the future and seeks new firm purposes. The Mega-view takes external factors out-side the firm such as clients and society into account in determining ΣFEBR, refer to point (3) on Figure 6. In this view the primary client and beneficiary is society and results are outcomes orientated. That is, management is concerned with the usefulness of what the firm delivers to external clients (Kaufman, 1992).

Once the objectives are known, it is possible for management to concentrate on determining the firm's strategies[4] for achieving its objectives. Here management need to determine whether society is satisfied with the firm and then use the feedback to make the firm more successful by concentrate on a reality-based-holistic view (hereafter Macro-view) of the firm itself. This Macro-view takes internal factors such as its total firm (human and non-human) resource capacity (ΣFRC) and the ΣFIBR into account, refer to points (2) and (3) on Figure 6. In this view the primary client and beneficiary is the firm itself and results are outputs orientated. That is, management is concerned with the quality of what the firm delivers to external clients. Once the strategies, which formulate how the firm will achieve its objectives, are determined, they need to be operationalised via the firm's operational activities (Kaufman, 1992).

[4] Due to the focus of this paper on understand the facets (sources, types and degrees) of uncertainty/risk and the collective impact of those facets of uncertainty/risk on MCS design, function and operation. No attempt is required to classify strategy or strategies in terms of strategic positioning strategies, strategic typologies and strategic missions (e.g. Langfield-Smith, 1997).

Operational activities, which embrace and implement strategies, require management to concentrate on a reality-based-accomplishment view (hereafter Micro-view) of the firm's divisions', small groups', and/or individual employee's performance. The time horizon within this Micro-view is short-term, generally measurable in units of weeks or months into the future. Here the primary client and beneficiary are the people within the firm who perform the various operational activities that are orientated towards providing services and/or products. That is, management is concerned with the quality of the service and/or product that an individual or small group within the firm delivers. Furthermore, management is concerned with the efficiency of the methods and procedures used by an individual or small group within the firm. Thus, the Micro-view is not outputs and outcomes orientated, although it contributes to their effective and efficient eventual accomplishment. This proactive and results-orientated approach helps identify what should be and what could be, ensuring that firm strategies are focused and firm operational activities are properly designed to be effective and efficient in ultimately accomplishing the firm's objectives (Kaufman, 1992). Refer to points (1), (2) and (3).

Having decided upon the means of accomplishing the firm's objectives, it is now feasible that management concentrate on the firm's initial MCS design and implementation, which will meet the decision information needs of the firm in terms of past, current and future decisions, as influenced by the OSOA, refer to point (4). The MCS needs to provide the firm with the capacity and ability to manage the consequences of those decisions in achieving an AcFBR, refer to point (5).

The preceding paragraphs are an amplification of the fundamental task of management, which is, to make people capable of joint performance by giving them common objectives, common values and the right structures, enabling them to accomplish those common objectives (Drucker, 1988).

MCS as a signalling/monitoring mechanism of 'change in degree of total firm business risk' (ΔFBR)

In order to enable firms to respond to 'change in degree of total firm business risk' (*ΔFBR*), the MCS need to continuously assess, report and monitor ΔFBR associated with the 'objectives, strategies and operational activities of the firm' (*OSOA*). This capacity for signalling/monitoring ΔFBR needs to be embedded in the initial MCS design, development and implementation. This results in a continuous ΔFBR signalling/monitoring feedback-loop. This loop provides information as to change in degree of uncertainty/risk faced by the firm and whether such change necessitates firm adaptation. Dependent on the degree of deviation of the new 'total firm business risk' (*ΣFBR*) from the 'acceptable degree of firm business risk' (*AcFBR*), the MCS's current design, function and operation, as well as the OSOA, will be reviewed and revised as required. The following section will elaborate this review process.

MCS review as well as its facilitation of OSOA review, and revision as required - Six levels of MCS design and review consideration

Any time after the initial MCS design, development and implementation, there are six levels of MCS design and review consideration; refer to points (5) through (10) on *Figure 6*. The first five levels of consideration each have two decision scenarios, while the sixth level of consideration may result in a number of review and revise sub-considerations that may need to be undertaken prior to moving to the higher level OSOA review and revise

consideration/process. Any 'change in degree of total firm business risk' (*ΔFBR*) after t_0 gives rise to two possible decision scenarios at each of the first five levels of consideration, refer to points (5) through (9). Each successive level of consideration requires assessment of whether or not the impact level(s) and magnitude(s) of any ΔFBR necessitate change(s) to the currently AcMCS. Finally the sixth level of consideration requires a review of OSOA and revision as required. All these levels of consideration stem from change in degree of ΣFBR.

First level of MCS design and review consideration (5):

After the initial MCS design, development and implementation, this first level of consideration requires an assessment as to whether or not what management are doing and have done does achieve an AcFBR. Alternatively, any change in degree of ΣFBR after t_0 requires a first level consideration assessment as to whether or not the t_0 AcFBR can accommodate the 'change in degree of total firm business risk' (*ΔFBR*) that has occurred after t_0, in which case the MCS still equates to an AcMCS. Both these assessments give rise to the following identical two possible decision scenarios. The first decision scenario (5a) represents the circumstances when the above discussed two assessments conclude that an AcFBR is achieved in the first situation, or still prevails in the alternative situation. In this decision scenario the final conclusion is that an AcMCS has also been achieved or still prevails. The second decision scenario (5b) represents the circumstances when the above discussed two assessments conclude that an AcFBR is not achieved in the first situation, or no longer prevails in the alternative situation. In this decision scenario the conclusion is to review the OSOA and revise as required, refer to point (10) on Figure 6, and proceed along the MCS design, implementation and review framework feedback-loop, points (1), (2), (3), (4), (5), (5b) and (10), until such time that an AcFBR, point (5a), is achieved.

Second level of consideration (6):

The second level of consideration requires an assessment as to whether or not what management are doing and have done has achieved a 'Fit' between the OSOA and the external and internal contingencies of the firm, as facilitated by the AcMCS at t_0. The first decision scenario (6a) represents the circumstances when this assessment concludes that a 'Fit' has been achieved. In this decision scenario the conclusion is that the MCS is facilitating optimal firm performance, reporting and review. The second decision scenario (6b) represents the circumstances when this assessment concludes that a 'Fit' has not been achieved, resulting in a 'Misfit'. In this decision scenario all that remains is to proceed along the MCS design, implementation and review framework feedback-loop to the third level of consideration (7).

Third level of consideration (7):

The third level of consideration requires an assessment as to whether or not the MCS and its team are proactive and results-orientated. The first decision scenario (7a) represents the circumstances when this assessment concludes that the MCS and its team are proactive and results-orientated. In this decision scenario all that remains is to proceed along the MCS design, implementation and review framework feedback-loop to the fourth level of consideration (8). The second decision scenario (7b) represents the circumstances when this assessment concludes that the MCS and its team are not proactive and results-orientated. In this decision scenario the conclusion is that the MCS is facilitating suboptimal firm performance, reporting and review, due to the 'Misfit' (6b).

Fourth level of consideration (8):

The fourth level of consideration requires an assessment of the degree of 'Misfit' (6b). The first decision scenario (8a) represents the circumstances when this assessment concludes that the degree of 'Misfit' is low. In this decision scenario all that remains is to proceed along the MCS design, implementation and review framework feedback-loop to the fifth level of consideration (9). The second decision scenario (8b) represents the circumstances when this evaluation concludes that the degree of 'Misfit' is not low. In this decision scenario all that remains is to proceed along the MCS design, implementation and review framework feedback-loop to the sixth level of consideration (10).

Fifth level of consideration (9):

The fifth level of consideration requires an assessment as to whether or not the ΔFBR that has occurred after t_0 can be accommodated within the existing $AcMCS_0$. This might require functional level and/or minor structural changes to the existing MCS. Refer back to *'Accommodating small change within the existing AcMCS'*, expounded in the section on *'Expounding complex concepts'*. The first decision scenario (9a) represents the circumstances when this assessment concludes that the degree of total firm business risk at t_1 (ΣFBR_1) has not changed materially, or has declined, in comparison to the acceptable degree of firm business risk at t_0 ($AcFBR_0$). Thus change within the existing acceptable MCS ($AcMCS_0$) will suffice to provide the necessary 'Fit' required for the MCS to facilitate optimal firm performance, reporting and review. The second decision scenario (9b) represents the circumstances when this assessment concludes that the degree of ΣFBR_1 has changed materially, or has increased in comparison to the $AcFBR_0$. Hence, change within the existing $AcMCS_0$ will not suffice to provide the necessary 'Fit' required for the MCS to facilitate optimal firm performance, reporting and review. In this decision scenario all that remains is

to proceed along the MCS design, implementation and review framework feedback-loop to the sixth level of consideration (10).

Sixth level of consideration (10):

The sixth level of consideration requires a review of OSOA and revision as required. Refer back to *'Review of objectives, strategies and operational activities of the firm (OSOA)'*, expounded in the section on *'Expounding complex concepts'*. Such a review of OSOA requires recognition of possible revisions, taking the following potential limitations into account, in sequential order:

(i) Required change to firm's existing AcMCS (*RΔMCS*) at t_1;

(ii) Change in required firm human and non-human resource capacity needed to provide the capacity and ability to proceed with the required MCS change (*ΔRFRC*);

(iii) Available additional firm human and non-human resource capacity at t_1 ($AvAdFRC_1$);

(iv) Capacity to change firm's existing $AcMCS_0$ at t_1 ($C\Delta MCS_1$);

(v) Accepting a higher degree of ΣFBR_1 as a new $AcFBR_1$; and

(vi) Potential for exit strategies.

Refer back to *'Acceptable degree of firm business risk (AcFBR)'*, *'Required change to firm's existing AcMCS (RΔMCS) at t_1'*, *'Capacity to change firm's existing $AcMCS_0$ at t_1 ($C\Delta MCS_1$)'*, and *'Potential for Exit Strategies'*, expounded in the subsection on *'Expounding complex concepts'*, for a clearer understanding of these six potential limitations. This sixth level of MCS design and review consideration results in revised OSOA that are required and acceptable. However, revised OSOA may in most cases entail substantial restructuring of the existing MCS, which by its implication also needs to be acceptable. The MCS design, implementation and review framework feedback-loop is operational and working; the never-ending cycle continues.

At a naïve conceptual level the framework presented in Figure 6 does appear to provide a logical methodology for designing, implementing and reviewing a firm's MCS needs. In doing so it also provides the potential to explain and/or predict a firm's MCS under the conditions of a defined AcFBR. However, it is also recognised that a focus on one proxy for uncertainty, and whilst that proxy may include sources, types, and degrees of uncertainty as identified in an exploration of the contingency theory literature, it cannot be denied that the exploration undertaken here was not one of total discovery.

A pre-stated limitation of the framework relates to the scope of the framework focusing on the facets of uncertainty. This focus precluded issues relating to firm strategy formulation and selection. However, in doing so, there are apparent implications for one of the underlying assumptions that infers goal congruence between managers, owners and other significant stakeholders. Those implications not only provide potential support for Chenhall's (2003) argument for contingency-based research to draw on support from other theories, but also provide some potential insight as to the level and identification of type of additional theory support that might be used. The assumption that managers are rational, knowledgeable and performance optimising could be argued to infer goal congruence between managers, owners and other key stakeholders (also refer to point 7, Figure 6). Otley (1999) potentially deals with this issue through formal consideration of 'rewards in his framework. In this paper we have attempted to maintain a naïve level of analysis in order to isolate examination of the facets of uncertainty. In doing so, the need for consideration of issues such as goal congruence (agency, etc.), stakeholder, legitimacy, transaction level issues, etc. have relegated to strategy development, selection and performance review areas of the framework presented in Figure 6. The relationships and inter-relationships required to operationalise any strategy

not only provide the focus for performance measurement development but also are a primary source of friction or tension that must be managed by the firm should it wish to optimise performance. The nature, proximity and significance of the relationship mix would also provide a basis for identifying other theories that might assist in identifying the potential drivers of friction and tension due to that relationship mix. Any improved understanding about the drivers of firm friction and tension must improve MCS design, function and operation. In doing so, provide improved information for management to control the contingent impact of that friction and tension on firm performance, and to maintain an acceptable level of firm business risk.

Some Concluding Comments

It was stated at the outset that the fundamental aim of this paper was to attempt to unravel the facets of uncertainty in order to develop an improved understanding of MCS contingency-based management accounting research. In doing so, the primary objective of this paper has been to provide the beginnings of a framework that will assist accounting contingency-based MCS researchers in improving the quality of their research. A secondary objective has been to contribute to the development of contingency-based research in the area of management control. It is argued that the aim, as well as the primary and secondary objectives (stated above) of this paper, has been achieved.

In providing a separation between sources, types and degrees (facets) of uncertainty/risk, some dimensions are given to the intra-relationships of these facets of uncertainty/risk. It is through the identification of the relationships a firm establishes as well as the significance and proximity to the firm of such relationships, which clarifies the sources of uncertainty. More particularly, the importance of the identification of the business relationships as the potential

source(s) of uncertainty provides a basis for determining what might give rise to tension/fractions within these relationships. In doing so, it is considered that an improved potential is provided for identifying the type(s) of uncertainty that could be related to the source(s) of uncertainty particularly in terms of firm external operating environment relationships potentially being less controllable than firm internal operating environment relationships. Additionally, through identification of the types of relationships a firm has made, or it requires to establish in order to operationalise strategies, a potential basis is provided for the identification of alternate theory support for contingency-based studies (Chenhall, 2003).

However, in terms of improving the explanatory and predictive capacity of contingency based research, improved specification of the degrees of uncertainty is argued to be of significant importance. Knowing, or being able to estimate the degrees of uncertainty, is considered essential for two reasons. First, determining fit, a central and pivotal theoretical notion underlying contingency-based research (Hartmann and Moers, 1999; Luft and Shields, 2003; Gerdin and Greve, 2004; Chenhall and Chapman, 2006) requires some level of qualification and/or quantification in order to improve the rigour of this research. Second, a common basis for qualifying and/or quantifying the degrees of uncertainty is considered to provide a potential for improving the ability to compare and contrast study results.

To this end, the framework developed in this study is argued to provide a potential basis for identifying the level of MCS, design, function and operation necessary for determining 'fit'. Through improving the capacity to estimate MCS 'fit' it is argued that the explanatory and/or predictive capacity of contingency-based research is better placed for comparing and/or contrasting different study findings. Two added advantages of the framework developed in

this paper are apparent. Firstly, the framework highlights that MCS could function as a signalling mechanism for change in firm business risk, which in turn triggers the review of both the MCS itself, and the 'objectives, strategies and operational activities of the firm' (*OSOA*). The literature has predominantly dealt with the roles of MCS as reporting, monitoring and control tools, which have an internal "bottom-line" focus. The framework considers an important additional role of MCS in that its purpose extends to both inward and outward views of the firm. Specifically, MCS provides a means for the firm to monitors and report changes in the sources, types and degrees of uncertainty/risk in both the external and internal environments of the firm. Following from that, secondly, and dependent on the degree of the reported change in uncertainty/risk, the MCS provides a mechanism to assess the suitability of the OSOA and the suitability of the current MCS design, function and operation. Furthermore, the MCS, due to its signalling capacity, also serves a proactive role of facilitating the review and revision, as required, of the OSOA. This therefore presents a potential extension to the current MCS literature. Future research could aim to find empirical evidence to test whether these two added roles of MCS exist.

The study limitations aside, when the preceding comments and the future research opportunities identified in the preceding section are incorporated, the aim and objectives of this paper are argued to have been achieved.

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Appendix

TABLE 5

RULE OF LAW

COUNTRY	ENFORCEMENT VARIABLES: Efficiency of Judicial System	Rule of Law	Corruption	Risk of Expropriation	Risk of Contract Repudiation	ACCOUNTING: Rating on Accounting Standards	GNP PER CAPITA (U.S. $)
	A. Country Scores						
Australia	10.00	10.00	8.52	9.27	8.71	75	17,500
Canada	9.25	10.00	10.00	9.67	8.96	74	19,970
Hong Kong	10.00	8.22	8.52	8.29	8.82	69	18,060
India	8.00	4.17	4.58	7.75	6.11	57	300
Ireland	8.75	7.80	8.52	9.67	8.96	na	13,000
Israel	10.00	4.82	8.33	8.25	7.54	64	13,920
Kenya	5.75	5.42	4.82	5.98	5.66	na	270
Malaysia	9.00	6.78	7.38	7.95	7.43	76	3,140
New Zealand	10.00	10.00	10.00	9.69	9.29	70	12,600
Nigeria	7.25	2.73	3.03	5.33	4.36	59	300
Pakistan	5.00	3.03	2.98	5.62	4.87	na	430
Singapore	10.00	8.57	8.22	9.30	8.86	78	19,850
South Africa	6.00	4.42	8.92	6.88	7.27	70	2,980
Sri Lanka	7.00	1.90	5.00	6.05	5.25	na	600
Thailand	3.25	6.25	5.18	7.42	7.57	64	2,110
United Kingdom	10.00	8.57	9.10	9.71	9.63	78	18,060
United States	10.00	10.00	8.63	9.98	9.00	71	24,740
Zimbabwe	7.50	3.68	5.42	5.61	5.04	na	520
English-origin average	**8.15**	**6.46**	**7.06**	**7.91**	**7.41**	**69.62**	**9,353**
Argentina	6.00	5.35	6.02	5.91	4.91	45	7,220
Belgium	9.50	10.00	8.82	9.63	9.48	61	21,650
Brazil	5.75	6.32	6.32	7.62	6.30	54	2,930
Chile	7.25	7.02	5.30	7.50	6.80	52	3,170
Colombia	7.25	2.08	5.00	6.95	7.02	50	1,400
Ecuador	6.25	6.67	5.18	6.57	5.18	na	1,200
Egypt	6.50	4.17	3.87	6.30	6.05	24	660
France	8.00	8.98	9.05	9.65	9.19	69	22,490
Greece	7.00	6.18	7.27	7.12	6.62	55	7,390
Indonesia	2.50	3.98	2.15	7.16	6.09	na	740
Italy	6.75	8.33	6.13	9.35	9.17	62	19,840
Jordan	8.66	4.35	5.48	6.07	4.86	na	1,190
Mexico	6.00	5.35	4.77	7.29	6.55	60	3,610
Netherlands	10.00	10.00	10.00	9.98	9.35	64	20,950
Peru	6.75	2.50	4.70	5.54	4.68	38	1,490
Philippines	4.75	2.73	2.92	5.22	4.80	65	850
Portugal	5.50	8.68	7.38	8.90	8.57	36	9,130
Spain	6.25	7.80	7.38	9.52	8.40	64	13,590
Turkey	4.00	5.18	5.18	7.00	5.95	51	2,970
Uruguay	6.50	5.00	5.00	6.58	7.29	31	3,830
Venezuela	6.50	6.37	4.70	6.89	6.30	40	2,840
French-origin average	**6.56**	**6.05**	**5.84**	**7.46**	**6.84**	**51.17**	**7,102**
Austria	9.50	10.00	8.57	9.69	9.60	54	23,510
Germany	9.00	9.23	8.93	9.90	9.77	62	23,560
Japan	10.00	8.98	8.52	9.67	9.69	65	31,490
South Korea	6.00	5.35	5.30	8.31	8.59	62	7,660
Switzerland	10.00	10.00	10.00	9.98	9.98	68	35,760
Taiwan	6.75	8.52	6.85	9.12	9.16	65	10,425
German-origin average	**8.54**	**8.68**	**8.03**	**9.45**	**9.47**	**62.67**	**22,067**
Denmark	10.00	10.00	10.00	9.67	9.31	62	26,730
Finland	10.00	10.00	10.00	9.67	9.15	77	19,300
Norway	10.00	10.00	10.00	9.88	9.71	74	25,970
Sweden	10.00	10.00	10.00	9.40	9.58	83	24,740
Scandinavian-origin average	**10.00**	**10.00**	**10.00**	**9.66**	**9.44**	**74.00**	**24,185**
Sample average	**7.67**	**6.85**	**6.90**	**8.05**	**7.58**	**60.93**	**11,156**
	B. Tests of Means between Origins (t-Statistics)						
Common vs. civil law	1.27	−.77	.39	−.46	−.51	3.12*	−.94
English vs. French origin	2.65*	.51	1.79***	.90	1.06	4.66*	.85
English vs. German origin	−.41	−1.82***	−.93	−2.19**	−2.79*	2.22**	−2.86*
English vs. Scandinavian origin	−3.78*	−15.57*	−5.38***	−2.06**	−2.26**	−1.05	−3.24*
French vs. German origin	−2.53*	−2.55*	−2.49*	−3.20*	−3.90*	−2.10**	−3.79*
French vs. Scandinavian origin	−9.34*	−20.80*	−9.77*	−2.94*	−3.17*	−3.32*	−4.28*
German vs. Scandinavian origin	−2.06***	−11.29*	−2.88*	−.63	.10	−2.66**	−.36

* Significant at the 1 percent level.
** Significant at the 5 percent level.
*** Significant at the 10 percent level.

Source: La Porta et al (1998: 1142-3)