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The appropriateness of statistical methods for testing contingency hypotheses in management accounting research

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Abstract

In recent years, the contingency-based management accounting literature has been criticized for being fragmentary and contradictory as a result of methodological limitations. This study adds to this picture by showing that the theoretical meaning of some commonly used statistical techniques is unclear, i.e. the functional forms are not precise enough to be able to discriminate between several sometimes even conflicting theories of contingency fit. The study also shows that the techniques differ significantly in terms of how interaction effects between context and management accounting are modeled. This implies that some methods are only appropriate when theory predicts interaction effects in general while others are only appropriate in cases where theory specifies a more precise functional form of interaction such as symmetrical or crossover interactions. Based on these observations, several recommendations for future research are proposed.

Introduction

In recent years, several literature reviews have highlighted that many different ways of conceptualizing 'contingency fit' between context and Management Accounting System (MAS) have been used in the literature (Chenhall, 2003; Luft & Shields, 2003) and that few researchers fully acknowledge the difficulties of relating these forms to each other (Gerdin & Greve, 2004). There has also been a growing interest in (and debate about) how individual statistical techniques have been applied in contingency-oriented MAS research (Dunk, 2003; Gerdin, 2005a, 2005b; Hartmann, 2005; Hartmann & Moers, 1999, 2003). The purpose of this paper is to combine these two streams of research by providing a systematic analysis of the appropriateness of commonly used statistical techniques for testing the different forms of fit found in the literature.

In so doing, we propose a conceptual framework which identifies a number of possible perspectives of contingency fit. Unlike most of the

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existing MAS literature (e.g. Chenhall, 2003; Gerdin & Greve, 2004; Luft & Shields, 2003), the framework explicitly elaborates on the distinction between a matching and a multiplicative model of fit (Schoonhoven, 1981). The framework also contributes to the more general discussion about the use of statistical techniques in contingency research (Donaldson, 2001; Drazin & Van de Ven, 1985; Meilich, 2006; Venkatraman, 1989) by highlighting that the paradigm seems to accommodate at least three levels of theory specification.

The paper proceeds as follows. Drawing upon seminal contingency work, three levels of precision in the functional form of context/MAS interactions and four principal and conflicting approaches to contingency fit are identified. Next, it is discussed to what extent statistical methods frequently applied in contingency-based MAS research can be used to test the different levels of interaction and to distinguish between the four approaches. This results in several conclusions and recommendations for future research which finalize the paper.

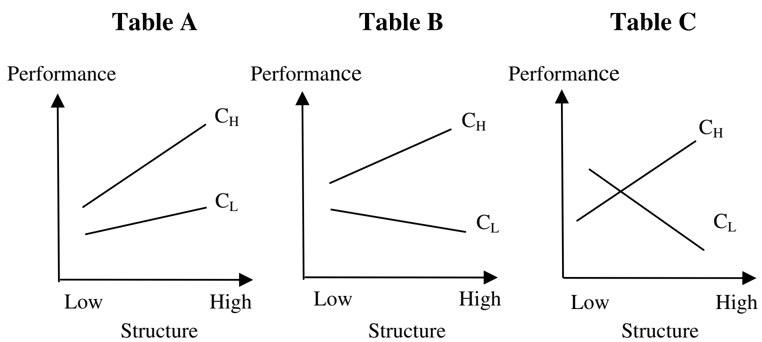
Levels of theory specification in the contingency paradigm

The essence of contingency theory is that organizations must adapt their structure to contingencies such as the environment, organizational size and business strategy if the organization is to perform well (Burns & Stalker, 1961; Donaldson, 2001; Drazin & Van de Ven, 1985; Lawrence & Lorsch, 1967; Pennings, 1992; Woodward, 1965). Galbraith (1973, p. 2) formulated this core idea of contingency theory in the following way:

1. There is no one best way to organize.
2. Any way of organizing is not equally effective.

These statements imply that the effectiveness of organization structures is contingent on context—i.e. there is no universally best way to organize—and that, in a particular context, certain structure(s) will outperform other structures. Schoonhoven (1981, p. 351) referred to this particular form of relations between variables as *interactions*.

Generally, an interaction effect exists whenever the effect of an independent variable (structure) on the dependent variable (performance) varies due to the values of a third variable (context) (Jaccard & Turrisi, 2003). As illustrated in Table A, Fig. 1, an interaction effect thus implies that a change in structure has a more positive (or negative) effect on performance in different contexts (Luft & Shields, 2003). Given the broad format of this type of interaction, it will henceforth be referred to in terms of 'general interaction' and represents the first level of theory specification.



[a] C_H and C_L denote high and low levels of the contingency factor, respectively.

Fig. 1. Illustration of an interaction (monotonic) function (Table A), a symmetrical interaction (non-monotonic) function (Table B) and a crossover interaction function (i.e. both non-monotonic and disordinal function) (Table C)[a].