Integrating business strategy, organizational configurations and management accounting systems with business unit effectiveness: a fitness landscape approach

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Abstract

This study adopts a fitness landscape approach to test contingency hypotheses about the relationship between business strategy, organizational configurations, management accounting systems, and business unit effectiveness. Central to this approach is the notion of contingent fit between strategic priorities and its contextual variables. Building on Kauffman’s \textit{N-locus, two-state additive fitness model}, this study predicts that the degree of contingent fit, defined as the weighted sum of independent fitness contributions of each contextual variables, will have a positive association with business unit effectiveness.

Based on a mail survey and personal interviews of 106 business unit managers of publicly held companies listed under consumer goods industry, this study indicates that the degree of contingent fit has a positive association with business unit effectiveness. Further analysis reveals that strategic priorities affect the types of controls and management accounting systems used by the business units.

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1. Introduction

In today’s business environment, companies need to take every advantage they can to remain competitive. Global competition, rapid innovation, entrepreneurial competitors, and increasingly demanding customers have altered the nature of competition in the marketplace. This new competitive en-
vironment requires companies’ ability to create value for their customers and to differentiate themselves from their competitors through the formulation of a clear business strategy (Simon, 2000; Porter, 1985). Other researchers, however, argue that to achieve competitive advantages and to ensure high performance, a clear business strategy is a necessary but not a sufficient condition. Business strategy must be supported by appropriate organizational factors such as effective manufacturing process, organizational design and accounting information systems (e.g., Jermias and Armitage, 2000; Waterhouse and Svensen, 1998; Shank and Govindarajan, 1993; Johnson and Kaplan, 1987).

Researchers have attempted to explain how accounting systems might be affected by the fit between environmental, organizational, and decision-making style factors. Bruns and Waterhouse (1975) were among the first to address the contingent nature of environment, technology, organizational structure, and management control systems by hypothesizing that there is no universally appropriate accounting system which applies equally to all organizations in all circumstances. Rather, they suggest that appropriate accounting systems depend upon organizational contextual variables (see also Otley, 1980; Waterhouse and Tiessen, 1978; Gordon and Miller, 1976). Otley (1980), for example, proposes the need to identify specific aspects of an accounting system that are associated with certain defined circumstances and demonstrate an appropriate matching. More recent researchers that employ contingency theory have incorporated strategy as an important contingent variable (Chenhall and Langfield-Smith, 1988; Samson et al., 1991; Dent, 1990; Gupta, 1987; Gupta and Govindarajan, 1984).

Central to the contingency approach in examining the relationships between strategic priorities, organizational configurations, and management accounting systems is the notion of contingent fit. This approach asserts that neither the type of strategy, nor the organizational configuration will directly affect performance. Rather, this approach suggests that the most important determinant of performance is the contingent fit between the chosen strategy and its contextual variables.

While previous studies have added to our understanding of the interrelationship between contextual variables and organizational design, few, if any contingency studies have successfully developed and measured the construct of “appropriate match” or fit between strategic priorities and its contextual variables. In addition, previous studies tend to underutilize performance measures as dependent variables (notable exceptions include Govindarajan and Gupta, 1985; Govindarajan and Fisher, 1990; Chenhall and Langfield-Smith, 1988), even though these variables are considered by many as key components of a system-based contingency approach (e.g., Ginsberg and Venkatraman, 1985; Govindarajan and Gupta, 1985; Selto et al., 1995; Garg et al., 2003). Researchers argue that ignoring performance variables not only impedes the development of a true contingency theory (Otley, 1980) but also indicates the lack of consideration that organizational researchers have for the concerns of practitioners (Sussman and Evered, 1978).

The objective of this paper is to contribute to the limited body of knowledge in this area by attempting to develop and measure the contingent fit between strategic priorities and its contextual variables using fitness landscape approach and investigate the association between the level of contingent fit and effectiveness at business unit levels.

A mail survey and personal interviews are used to collect quantitative information from business unit managers of publicly held companies listed under consumer goods industry. Consistent with the main prediction, the level of contingent fit has a significant positive association with business unit effectiveness. Further analysis reveals that strategic priorities do not affect the relationship between the level of con-
tangible fit and business unit effectiveness. Although the association between contingent fit and business unit effectiveness is stronger for low cost business units as compared to that of product differentiation business units, the difference is not statistically significant.2

Examining these issues is important for both theoretical and practical reasons. From a theoretical perspective, this study provides insights into the development of the contingent fit construct to represent an appropriate matching between strategic priorities and its contextual variables and how to measure this construct. From a practical perspective, the findings of this study can help to increase understanding of how different strategic priorities may require different organizational configurations to positively affect performance.

The rest of the paper is organized as follows. The next section contains the background theory, a review of the related literature, the conceptual model used, and hypotheses tested. The research method is then described followed by the results. The final section presents a discussion of the major findings, limitations, and implications for future research and practice.

2. Theoretical background, related literature and hypotheses

The conceptual appeal of contingency approach to study the complex relationship between strategic priorities, organizational design, management accounting systems and its impact on organizational performance has attracted the attention of numerous researchers to investigate this issue. Contingency approach in management accounting is based on the premise that there is no universally appropriate management accounting system that applies equally well to all organizations in all circumstances (Bruns and Waterhouse, 1975; Waterhouse and Tiessen, 1978). To be effective, strategic priorities need to demonstrate an appropriate fit with its contextual variables. Although the notion of contingent fit is crucial to understand the contingent relationship, researchers have yet to agree on the conceptual as well as the measurement of the contingent fit.

Several methods have been used in the contingency literature to define contingent fit. Among those methods are selections, interactions, and cluster analyses using Euclidean distances. Most early studies employing contingency approach use the selection or interaction approach for defining contingent fit. These two approaches, however, have been criticized for their inability to measure the fit of the whole system (Selto et al., 1995; Van de Ven and Drazin, 1985). Cluster analysis with Euclidean distances uses a system approach and employs two steps to define fit. First, it develops the “ideal” models based on data from high performing firms. Second, it compares the “test” firms to the ideal models using Euclidean distance formula3 by calculating the absolute value of the differences between the test firms and the ideal models along the structural dimensions of the contingency variables. There are three main concerns associated with this approach. First, the formulation of the ideal models is based on the struc-

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2 To examine whether the correlation in product differentiation differs from that in low cost business units, we conducted a z-test using the following formula:

\[ z = \frac{z_{rlc} - z_{rpd}}{\sqrt{\frac{1}{n_{rlc} - 3} + \frac{1}{n_{rpd} - 3}}} \]

as suggested by Chen and Popovich (2002). The observed z-value of 0.440 is smaller than the critical value at any conventional \(\alpha\)-levels indicating that the correlation in product differentiation is not significantly different from that in low cost business units.

3 The following formula is used to calculate the Euclidean distance:
tural dimensions of high performing firms. Since different high performing firms often employ different structural dimensions, the ideal models depend on the data used and the criteria selected to define the high performing firms. Second, the causal relationship between outcome variables and contingent variables is not well defined. Since the ideal models are developed based on the outcome variables (high performance), it is not clear whether performance affects the selection of contingent variables or vice versa. Third, the definition of fit (in this case misfit) is based on the absolute score deviations from the ideal models. Any deviations from the ideal models increase the degree of misfit of the company. Since the ideal models are those used by the high performing firms, what is considered fit by this approach might be contradictory to the predicted relationship hypothesized by the contingency theory. For example, if the high performing firms adopt product differentiation strategy and used a medium degree of centralization, then any product differentiation companies that used either high or low degrees of centralization would be considered misfits. This is inconsistent with the hypothesized relationship proposed by contingency-based theory which predicts that product differentiation companies should use high degree of decentralization.

This study employs the fitness landscape theory to define the contingent fit between strategic priorities and its contextual variables. This theory has obtained recognition from organizational and management scientists as an appropriate approach to investigate the fitness between strategic priorities and its contextual variables and the relationship between fitness and organizational performance (McCarthy, 2002; Dooley and Van de Ven, 1999; Beinhocker, 1999; Levinthal, 1997; Kauffman, 1993).

According to this theory, there are four steps to test the relationship between contingent fit and performance. First, the hypothesized pattern of relationships among the contingent variables should be developed theoretically. Second, the range of possible scores of each contextual variable and the score of the ideal configuration should be determined. Third, the observed pattern of relationship from the sampled firms can be evaluated relative to the ideal configuration to determine the level of contingent fit for each business unit using the following formula:  

\[ F_j = \frac{1}{N} \sum_{i=1}^{N} X_{ij}, \quad \forall j = 1, \ldots, J \]

where \( F_j \) is the total fitness value of company \( j \), \( X_{ij} \) is the fitness contribution of contextual variable \( X \) for company \( j \), \( N \) is the number of contextual variables in the model, and \( J \) is the number of companies.

Finally, the association between contingent fit and performance can be examined using correlation analysis. This theory predicts that higher contingent fit scores indicate a better chance of survival represented by higher performance.

\[ \text{Dist}_{ij} = \sqrt{\sum_{s=1}^{S} (X_{is} - X_{js})^2} \]

where \( \text{Dist}_{ij} \) is the Euclidean distance of the \( j \)th firm from the ideal; \( X_{is} \) is score of the \( j \)th firm on the \( s \)th structural dimension; \( X_{js} \) is score of the ideal firm on the \( s \)th structural dimension. (For a more detailed explanation about this model, please consult Van de Ven and Drazin, 1985.)

\( ^4 \) Notice that the development of the fit construct is based on the hypothesized pattern of relationship and is independent of performance. Therefore, it is crucial that the pattern of relationships is developed theoretically. The Euclidean distance approach, in contrast, determines the fit construct based on data from what are considered high performing firms.
The original theory was used in biological science to measure the degree of fitness among sub-systems and how fitness affects the ability of an evolving system to survive and produce offspring (Kauffman, 1993; Kauffman and Weinberger, 1989). Organizational and management scientists that use this model have argued that since organizational systems do not sexually reproduce, fitness reveals itself in terms of the ability of organizations to survive which are often measured by their performance (see, e.g., McCarthy, 2002; Dooley and Van de Ven, 1999; Beinhocker, 1999; Ruef, 1997).

Fitness landscape theory offers a useful insight on how to measure fitness contribution of each variable in a complex system and provides discerning and testable hypotheses of the relationship between fitness level and performance. A critical issue to the fitness landscape theory is the definition of fitness and how we assign fitness value to each combination. This theory asserts that fitness contributes positively to the level of survival of an evolving system. One specific model of the fitness landscape theory that has attracted a wide attention is the NK model proposed by Kauffman in the field of biological science. The \( N \) represents number of variables or subsystems of the evolving system. Each variable may have a number of alternative forms or states denoted by \( A \) and makes a fitness contribution which depends on that variable and interconnectedness with other variables denoted by \( K \). \( K \) range from 0 to \( N - 1 \) where 0 indicates no inter-connection between variables and \( N - 1 \) indicate the maximum possible interconnection among variables that may exist. In general, the number of combinations of a system with \( N \) variables, \( K \) interconnectedness and \( A \) alternative states is \( A^N \). For example, if \( N = 3 \), \( K = 2 \), and \( A = 2 \) (the simplest case represented by a binary code where 1 is the presence of a certain sub-system and 0 is the absence of a certain sub-system) the number of combinations of the system is \( 2^3 = 2^3 = 8 \). Table 1 illustrates the number of combinations of this example with its respective fitness contribution.

Fitness is defined as a proper match among the subsystems within the evolving system. Each subsystem is assigned a fitness score based on its existing state as compared to the hypothesized state. The closer a subsystem to its ideal state, the higher will be its fitness contribution to the system. In the original model, the fitness contribution of each subsystem was randomly assigned between 0 and 1 (values close to 0 indicate poor fitness and values close to 1 indicate good fitness).

The total fitness value represents the ability of the evolving system to survive. Higher fitness values indicate a better chance of survival. Throughout its lifecycle, the system engages in a process of moving

<table>
<thead>
<tr>
<th>Combination</th>
<th>System 1 (fitness contribution)</th>
<th>System 2 (fitness contribution)</th>
<th>System 3 (fitness contribution)</th>
<th>Total fitness value</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>Absent (0.2)</td>
<td>Absent (0.1)</td>
<td>Absent (0.1)</td>
<td>0.13</td>
</tr>
<tr>
<td>001</td>
<td>Absent (0.3)</td>
<td>Absent (0.2)</td>
<td>Present (0.6)</td>
<td>0.37</td>
</tr>
<tr>
<td>010</td>
<td>Absent (0.2)</td>
<td>Present (0.7)</td>
<td>Absent (0.1)</td>
<td>0.33</td>
</tr>
<tr>
<td>100</td>
<td>Present (0.8)</td>
<td>Absent (0.3)</td>
<td>Absent (0.4)</td>
<td>0.50</td>
</tr>
<tr>
<td>110</td>
<td>Present (0.9)</td>
<td>Present (0.8)</td>
<td>Absent (0.3)</td>
<td>0.67</td>
</tr>
<tr>
<td>101</td>
<td>Present (0.6)</td>
<td>Absent (0.4)</td>
<td>Present (0.5)</td>
<td>0.50</td>
</tr>
<tr>
<td>011</td>
<td>Absent (0.4)</td>
<td>Present (0.6)</td>
<td>Present (0.7)</td>
<td>0.57</td>
</tr>
<tr>
<td>111</td>
<td>Present (0.7)</td>
<td>Present (0.8)</td>
<td>Present (0.9)</td>
<td>0.80</td>
</tr>
</tbody>
</table>
from one combination to another in search of an improved fitness until it reaches the global optimum. (In Table 1, it is the 111 combination with total fitness value of 0.80.)

The most idealized NK model assumes that each variable contributes to the overall fitness value independently of all the other variables. Therefore, given the fitness contribution of the variable at each cell, the fitness of the system is just the sum of the $N$ independent fitness contributions from each variable divided by $N$, hence the average of those contributions. Kauffman calls this model a two-state fitness model.

The link between fitness landscape theory and contingency approach in management accounting research focuses on the concept of contingent fit. Researchers have argued that the contingent fit between a chosen strategy and its contextual variables contributes to increased performance. However, there has been a lack of conceptual approach to develop the construct of contingent fitness and how to measure it. In addition, not until recently that contingency researchers have tried to investigate the relationship between the contingent fit and performance.

Fitness landscape theory predicts that fitness makes positive contributions to the level of survival of an evolving system. Relating this to contingency research in management accounting, it is hypothesized that the degree of contingent fit between a chosen strategy and its contextual variables has a positive correlation with organizational performance (i.e., the ability of the organization to survive in the market place).

In this study, we develop the contingent fit construct based on a match between a chosen strategy (Product Differentiation or Low Cost) and its contextual variables (see Fig. 1 for the predicted match). There are three contextual variables for each strategy: decentralization, types of control and types of management accounting systems. Each contextual variable has seven possible states representing the level of intensity of each variable used by a business unit and we assume that each contextual variable is

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**Fig. 1.** The hypothetical relationship between competitive strategy, organizational design, management accounting systems and business unit performance.

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5 The assumption that each variable contributes to overall fitness independently of all other variables is clearly an idealization. In a system with $N$ contextual variables, the fitness contribution of one variable may often depend upon the other $N - 1$ remaining variables. One method to deal with the dependency among variables is by multiplying their fitness contributions. In general, however, we almost have no idea what might be the mutual influences on overall fitness and if the mutual contributions are affected by a large number of variables, the interacting variables are mostly unknown.
Table 2
Example of possible combination, fitness contribution of each contextual variable, and total contingent fit value

<table>
<thead>
<tr>
<th>Combination</th>
<th>Degree of centralization (fitness contribution)</th>
<th>Type of control (fitness contribution)</th>
<th>Type of MAS (fitness contribution)</th>
<th>Total fit value $\sum_{i=1}^{A} x_i$</th>
</tr>
</thead>
<tbody>
<tr>
<td>111</td>
<td>Extremely low (0.1)</td>
<td>Extremely low (0.1)</td>
<td>Extremely low (0.1)</td>
<td>0.10</td>
</tr>
<tr>
<td>526</td>
<td>Moderately high (0.7)</td>
<td>Low (0.3)</td>
<td>High (0.9)</td>
<td>0.63</td>
</tr>
<tr>
<td>143</td>
<td>Extremely low (0.1)</td>
<td>Average (0.6)</td>
<td>Moderately low (0.5)</td>
<td>0.40</td>
</tr>
<tr>
<td>714</td>
<td>Extremely High (1.0)</td>
<td>Extremely low (0.1)</td>
<td>Average (0.6)</td>
<td>0.57</td>
</tr>
<tr>
<td>676</td>
<td>Extremely high (0.9)</td>
<td>Extremely high (1.0)</td>
<td>Extremely high (0.9)</td>
<td>0.93</td>
</tr>
</tbody>
</table>

independent of all the other variables and therefore no accumulative effects to the overall fitness value among the contextual variables.⁶

Relating to Kauffman’s NK model, this study has the following properties: $N = 3$, $A = 7$, and $K = 0$. Therefore, the total possible combination for this study is $A^N = 7^3 = 343$. Table 2 provides examples of five out of 343 possible combinations of a company that adopts a product differentiation strategy. Notice that the fitness contributions of each contextual variable in this study are drawn from a defined range associated with the level of intensity of each variable used by a business unit (i.e., $1–7$, where $1$ = extremely low intensity; and $7$ = extremely high intensity).⁷

At a particular point in time, a company may exist in any of the combination (states). To be optimal, a company must engage in a process of moving from one combination to another in search of an improved fit. The global optimum is reached when all the contextual variables match with the chosen strategy at the highest fit value. Contingent Fit, however, is a relative concept. It is constantly changing in response to the changes in its context (e.g., due to innovation in technology, new approach in management accounting, or new development in organizational design).

2.1. The model

Porter (1985) develops a framework for considering the nature of strategic priorities for companies to compete effectively. He argues that a company must derive its sustainable competitive advantages either by becoming the lowest-cost producer in its industry (low cost strategy) or by providing products to suit customers’ specific needs related to quality, physical characteristics, or product-related services (product differentiation strategy).

Porter argues that a company must choose between competing on either low cost or product differentiation to be successful in the market place. Recent studies in management accounting, however, have found that the formulation of a clear strategic priority is a necessary but not sufficient condition to achieve competitive advantages and to ensure high organizational performance. Strategic priorities should be

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⁶ As the dependency among contextual variables increases ($K$ increases from 0 to a maximum of $N − 1$), the contribution of each contextual variable to the overall fitness value depends on the level of intensity of a contextual variable along with the level of intensity of the other contextual variables.

⁷ To be consistent with Kauffman’s NK model, the fitness contribution of each contextual variable is divided by the highest possible contribution. For example, if the level of intensity of a particular contextual variable is two, the fitness contribution from this variable toward the overall fitness value is 0.3 (two divided by seven).
supported by appropriate control system, organizational structure, and management information systems (Chenhall and Langfield-Smith, 1988; Shank and Govindarajan, 1993; Johnson and Kaplan, 1987).

Contingency theories of accounting provide discerning and testable hypotheses of why there is no one universal system of accounting that is optimal for every environment and context in which these systems operate. This theory posits that there is a contingent relationship between competitive strategy, organizational design, and management accounting systems. Achieving a proper match between strategies, organizational design and management accounting systems is predicted to enhance organizational performance. Several empirical studies have tested these propositions and found proper match between a particular competitive strategy and its contextual variables (Moores and Yuen, 2001; Chenhall and Langfield-Smith, 1988; Miller, 1981).

Fig. 1 depicts the hypothetical relationship between competitive strategies, organizational design, management accounting systems and organizational performance (outcome variable). The model shows that a company must choose a particular strategic (either low cost or product differentiation) to achieve sustainable competitive advantages. To be optimal, however, the chosen strategy should be supported by appropriate organizational designs (i.e., degree of centralization and type of control) and management accounting systems. The dashed lines represent a mismatched while the solid lines represent a match between strategy and the respected variable. When a company has a pattern consist of all solid lines, then it is said that the company has a match between its strategy and its contextual variables.

Fig. 1 indicates that product differentiation companies will benefit more from using a more decentralized organizational structure (Govindarajan, 1986; Tushman and Nadler, 1978; Galbraith, 1973; Laurence and Lorsch, 1967; Burns and Stalker, 1961), put more emphasis on behavioural control (Govindarajan and Fisher, 1990; Ouchi, 1977), and use more management accounting systems that enhance companies’ ability to differentiate their products and to satisfy their customers (MAS type I) (Hoque and James, 2000; Chenhall and Langfield-Smith, 1998; Ittner and Larker, 1997; Atkinson et al., 1997; Kaplan and Norton, 1996).

On the other hand, low cost strategies will benefit more from using a more centralized organizational structure (Merchant, 1985; Govindarajan and Gupta, 1985; Porter, 1980), emphasizing more on output control (Govindarajan and Fisher, 1990; Ouchi, 1977), and using more management accounting systems that enhance companies’ ability to control costs (MAS type II) (Chenhall and Langfield-Smith, 1988; Johnson and Kaplan, 1987).

Therefore, for business units that adopt a product differentiation strategy, higher fit value is characterized by a more decentralized structure, and a more intensive application of behavioural control and MAS type I. For business units that adopt a low cost strategy, higher fit value is characterized by a more centralized structure, and a more intensive application of output control and MAS type II. The appropriate match between strategic priorities and its contextual variables will be reflected in business units’ ability to survive as measured by their performance.

2.2. Hypotheses

Based on contingency research reviewed in the previous section, we investigate the extent to which the degree of contingent fit between competitive strategy and its contextual variables affects business

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3 Although this study does not provide main effects of control systems on performance, these authors argue that product differentiation companies will benefit more from using behavioural control due to low knowledge of means and ends, low task programmability, and low outcome observability.
We are also interested in investigating the likelihood of companies adopting different competitive strategies and how they support their chosen strategy with appropriate organizational design and management accounting systems. To investigate these issues, the following hypotheses will be examined.

2.2.1. Contingent fit and performance

Contingency theory posits that achieving a proper match between strategic choice, organizational design, and management accounting systems enhance organizational performance. This argument leads to the following hypothesis:

**H1.** The degree of contingent fit between competitive strategy and its contextual variables is positively associated with business unit effectiveness regardless of the strategic choice.

Contingency theory also predicts that the most important determinant of performance is the fit between strategic choice and its contextual variable and not the type of strategies. Therefore, we expect that the positive association between degree of contingent fit and effectiveness will be revealed in product differentiation and low cost units. More specifically, we predict:

**H2.** There is a positive association between degree of contingent fit and effectiveness for business units that adopt product differentiation strategy.

**H3.** There is a positive association between degree of contingent fit and effectiveness for business units that adopt low cost strategy.

2.2.2. Degree of centralization

Business units that adopt product differentiation strategies tend to face a higher degree of uncertainty since the companies obtain their competitive advantages by trying to satisfy the ever changing demand of their customers in terms of superior quality, more flexible and better designed products. Researchers argue that high a degree of autonomy is an appropriate response to increased uncertainty. On the other hand, low cost companies focus on achieving low cost relative to their competitors through productivity and efficiency improvements, elimination of waste, and tight cost control (Horngren et al., 2000). Porter (1985) characterizes low cost companies as those that emphasise on cost reduction, employ highly skilled people, maximize economies of scale, use routine tasks, and produce standard products. With these characteristics, low cost companies tend to use a more centralized structure by creating highly specialized work roles, formalized job descriptions, and standardized operating procedures (particularly when outcome observability is high but behaviour observability is low). This discussion leads to the following hypothesis:

**H4.** Product differentiation units tend to use more decentralized structure as compared to that of low cost units.

2.2.3. Type of control

The primary objective of product differentiation companies is to differentiate their products and to satisfy their customers by producing unique products or by entering new markets. The tasks involved
in producing and marketing unique products tend to be unstructured and more uncertain. Furthermore, Porter (1980) argues that product differentiation companies invest more heavily in basic research and new product development which makes short-term output measurement for control purposes inappropriate. Govindarajan and Fisher (1990) argue that when task programmability and outcome observability are low, companies will benefit more from employing behavioural control.

On the contrary, the primary objective of low cost companies is to control cost by producing standard, undifferentiated products. Tasks involved in producing standard products tend to be routine and highly programmable and the knowledge of ends and means is relatively high. Govindarajan and Fisher (1990) argue that since the outcome is highly observable, low cost companies tend not to incur expenses to make behaviour observable. Therefore, low cost companies will benefit more from using output control. The preceding discussion can be summarized with the following hypotheses:

H5. Product differentiation units tend to use behavioural control more intensively than low cost units.

H6. Product differentiation units tend to use output control less intensively than that of low cost units.

2.2.4. Management accounting system

Researchers argue that management accounting systems that provide measures of customer satisfaction, timely and reliable delivery, measures of key production activities, quality, benchmarking, employee-based measures and strategic planning (MAS type I) enhance companies ability to differentiate their products and to satisfy their customers. However, it has been suggested in the management accounting literature that budgetary performance measures, variance analysis and activity-based costing are suitable for companies that adopt low cost strategy (Chenhall and Langfield-Smith, 1988). This argument leads to the following hypotheses:

H7. Product differentiation units tend to use MAS type I more intensively than that of low cost units.

H8. Product differentiation units tend to use MAS type II less intensively than that of low cost units.

3. Research method

To test the hypotheses developed in the previous section, a single industry was selected to minimize the effect of environmental heterogeneity (Moores and Yuen, 2001; Dess and Davis, 1984). Companies listed on the Jakarta Stock Exchange under the consumer goods industry were selected as the research sample since this industry has multi strategic business units and multi products or brands which are expected to employ different types of organizational design, control mechanism, and management accounting systems. Data were collected from general managers, controllers or management accountants through a mail survey and personal interviews. Initial contact was made with all companies in the target industry. After obtaining approval from senior management, a contact in the top management was asked to nominate

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9 Two pilot studies were conducted. The first study used two business unit managers to investigate the degree of understanding of the questionnaires. As a result, some clarification and simplifications were made to the questionnaires. The second study used four business unit managers to obtain preliminary results related to the hypotheses develop in this study and to investigate any changes necessary before the final survey and interviews were conducted.
business units and contact person to be surveyed. We suggested that the contact person should be a manager responsible for a particular product or group of products that adopt similar strategy, a controller or a management accountant who had been in their current position for at least 1 year prior to this study. This was considered necessary to ensure that the respondents have an understanding of the market in which their business unit operates, as well as the strategic and operating decisions they make.

The initial contact resulted in 115 business units from 26 companies interested in this study. Each of the respondents was sent the following materials: a letter explaining the purpose of the study, the questionnaires, and a self addressed, stamped return envelope. Each questionnaire consists of six sections. The first section asks for demographic information about the respondent. The second to the fifth sections requests information about competitive strategy, degree of centralization, type of control, management accounting systems, and level of effectiveness of the strategic business unit. The last section asks respondents if they are interested in having a copy of the final report.

3.1. Variable measurement

This study consists of two stages. The first stage investigates the relationship between the degree of contingent fit level and business unit effectiveness. In the second stage, this study evaluates the degree of centralization, type of control, and type of management accounting systems used by product differentiation and low cost units. There are six variables used to test the hypotheses outlined in the previous section. The measurement of each of these variables is presented below.

3.1.1. Business unit effectiveness

Effectiveness of a business unit is measured by a multiplication of nine performance dimensions with their respective relative importance for the business unit. This approach is considered appropriate for this study since different competitive strategy imply quite a different set of priorities (Govindarajan and Gupta, 1985; Steers, 1975).

Respondents were asked to indicate their business unit performance relative to their company’s standard and to position their products relative to leading competitors. The instrument has nine items and responses were given on a 7-point Likert-type scale (1 = significantly below average; and 7 = significantly above average) in terms of return on investment, profit, cash flow from operation, cost control, development of new products, sales volume, market share, market development, and personnel development. In addition, respondents were also asked to indicate the degree of importance their superior attached to the nine performance indicators mentioned above. Responses to those statements were combined into one construct to represent business unit effectiveness.

3.2. Contingent fit

The contingent fit scale was obtained by calculating the weighted sum of the fitness contribution of each contextual variable to the overall fitness value for each business unit. Following fitness landscape approach, the contribution of each variable was transformed into the value between zero and one by dividing each contribution with the highest possible value. One complicating factor was the coexistence

10 All the scales used in this study are developed based on the principle of semantic differences described in Osgood et al. (1957).
of variables that both match and mismatch the chosen strategy. All respondents use both output and behavioural control, and management accounting systems that both support low cost as well as product differentiation strategy at different level of intensity. To overcome this problem, we reverse coded variables that are inconsistent with the chosen strategy. Therefore, to calculate the fitness value for companies that adopt product differentiation strategy, output control and MAS type II were reverse coded. For companies that adopt low cost strategy, the degree of centralization, behavioural control, and MAS type I were reverse coded. These procedures are necessary to ensure that a higher score represents a better match between the chosen strategy and its contextual variables.

3.2.1. Competitive strategy

Competitive strategy is measured by asking respondents to position their products relative to leading competitors on a 7-point Likert-type scale (1 = significantly lower; and 7 = significantly higher) in terms of product selling price, percent of sales spent on research and development, product quality, product features, brand image, introduction of new products, changes in design, fast and delivery, and post sales support. The questions were intended to signify the strategic choice of the business unit where a higher score indicates product differentiation and lower score indicates low cost strategies. The strategy measure was derived as follows. If the average score from the above questions is higher than the mean, the business unit adopts a product differentiation strategy. If the average score is below the mean, the business unit adopts a low cost strategy. If the average score equals the mean (i.e., the average total score = 4), the business units do not have a clear strategic choice and therefore are excluded from further analysis. Fig. 2 shows the measurement of the strategic choice.

3.2.2. Degree of centralization

Degree of centralization is measured by asking respondents the typical influence they have in affecting the outcome of each operating decisions that could affect their business unit performance. The instrument has four items and responses were given on a 7-point Likert-type scale (1 = no influence; and 7 = total autonomy). Therefore, a higher score is associated with a more decentralized business unit.
Responses to these four statements were collapsed across statements to represent the degree of centralization construct.

3.2.3. Type of control

Type of control was assessed by asking respondents to indicate their superior approach to managing their business unit on a 7-point Likert-type scale (1 = no influence; and 7 = total control). The instrument has six items. The first three items concern about the attainment of sales targets, expense targets, and market share targets. The last three items ask about the procedures, the decisions taken, and the implementation of the decisions to achieve the targets. Responses to these six questions were combined into two constructs: output control (based on responses to the first three questions) and behavioural control (based on responses to the last three questions).

Fig. 3. The measurement of contextual variables and contingent fit for LC and PD business units and its relationship with business unit effectiveness. *Reverse coding is used to measure the contingent fit value.
3.2.4. Type of management accounting systems

Type of management accounting systems used by the business unit was assessed by asking respondents to indicate whether they use a particular management accounting systems and to rate the degree of importance attached to each system used on a 7-point Likert-type scale (1 = negligence; and 7 = significantly very important). There are 14 items in this instrument and responses obtained from these questions were combined into two constructs: MAS type I (based on responses to management accounting systems that support product differentiation strategy) and MAS type II (based on responses to management accounting systems that support product differentiation strategy).
accounting systems that support low cost strategy). Fig. 3 shows the measurement of the contextual variables used in this study and the development of contingent fit for product differentiation and low cost business units and the hypothesized relationship with business unit effectiveness.

The questionnaire items related to competitive strategy, degree of centralization, type of controls and management accounting systems were derived from instruments used by previous researchers (Jermias and Armitage, 2000; Chenhall and Langfield-Smith, 1988; Innes and Mitchell, 1995). The questionnaire items for business unit effectiveness were derived from instrument proposed by Govindarajan and Fisher (1990). The fitness construct was derived from the contribution of each contextual variable toward the total fitness value based on the approach suggested by the fitness landscape theory.

The six constructs and their inter-item reliability were as follows:

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Cronbach alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business unit effectiveness</td>
<td>0.93</td>
</tr>
<tr>
<td>Contingent fit</td>
<td>0.87</td>
</tr>
<tr>
<td>Strategic choice</td>
<td>0.93</td>
</tr>
<tr>
<td>Degree of centralization</td>
<td>0.86</td>
</tr>
<tr>
<td>Type of control</td>
<td></td>
</tr>
<tr>
<td>Output control</td>
<td>0.81</td>
</tr>
<tr>
<td>Behavioural control</td>
<td>0.90</td>
</tr>
<tr>
<td>Management accounting systems</td>
<td></td>
</tr>
<tr>
<td>Type I</td>
<td>0.78</td>
</tr>
<tr>
<td>Type II</td>
<td>0.94</td>
</tr>
</tbody>
</table>

These results indicate that the reliability of the constructs is within the acceptable range (Nunnally, 1967).

4. Data analysis and results

A total of 106 responses to questionnaires distributed by mail survey and interviews were received. This represents a response rate of 92%. Because of the high response rate, no test for non-response bias was considered necessary. To test the hypotheses outlined in the previous section, three main steps were used to analyse the data. First, we classify respondents into product differentiation and low cost companies by analysing their scores on the 10 items under competitive strategy. Companies that score greater than the mean of the 10 items were classified as product differentiation, while those that score lower than the mean were classified as low cost companies. Second, we determine the contingent fit value for each company by calculating the weighted sum of the fitness contribution of each contextual variable using the formula derived from the fitness landscape theory discussed in the previous section. The total contingent fit value is then correlated with the business unit effectiveness. Finally, we compare the degree

11 Nine respondents were excluded from further analysis either because they do not have a clear strategic preference (three respondents with mean score for strategic choice equals four) or they are considered as outliers based on Boxplot data validation analysis (six respondents).
Table 3
Descriptive statistics: mean (standard deviation) by strategic priorities

<table>
<thead>
<tr>
<th>Variables</th>
<th>All sample (n = 106)</th>
<th>PD (n = 75)</th>
<th>LC (n = 31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business unit effectiveness</td>
<td>3.83 (1.22)</td>
<td>4.13 (1.15)</td>
<td>3.11 (1.07)</td>
</tr>
<tr>
<td>Contingent fit</td>
<td>0.57 (0.06)</td>
<td>0.58 (0.06)</td>
<td>0.57 (0.07)</td>
</tr>
<tr>
<td>Degree of centralization</td>
<td>3.97 (1.40)</td>
<td>3.87 (1.27)</td>
<td>4.22 (1.66)</td>
</tr>
<tr>
<td>Type of control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioural</td>
<td>4.68 (1.44)</td>
<td>4.92 (1.40)</td>
<td>4.10 (1.39)</td>
</tr>
<tr>
<td>Output</td>
<td>5.36 (1.14)</td>
<td>5.50 (1.03)</td>
<td>5.01 (1.32)</td>
</tr>
<tr>
<td>Type of management accounting systems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAS type I</td>
<td>5.87 (0.82)</td>
<td>6.00 (0.80)</td>
<td>5.54 (0.78)</td>
</tr>
<tr>
<td>MAS type II</td>
<td>4.94 (0.73)</td>
<td>4.93 (0.73)</td>
<td>4.94 (0.75)</td>
</tr>
</tbody>
</table>

*All scores are based on raw scores except for the contingent fit variable in which some reverse coding was performed.

4.1. Descriptive statistics

Table 3 provides the descriptive statistics for all the variables used to test the hypotheses outlined in the previous section. All scores are based on raw scores except for the contingent fit variable for which some reverse coding was performed (see Fig. 3 for the list of items that were reverse coded). The means of total contingent fit value are quite similar for product differentiation and low cost units ($M_{	ext{fitpd}} = 0.58$ and $M_{	ext{fitlc}} = 0.57$). Product differentiation units, however, show a higher mean of business unit effectiveness than that of low cost units ($M_{	ext{efpd}} = 4.13$ and $M_{	ext{eflc}} = 3.11$). As expected, product differentiation units use more behavioural control ($M_{	ext{behpd}} = 4.92$ and $M_{	ext{behlc}} = 4.10$) and more MAS type I ($M_{	ext{ms1pd}} = 6.00$ and $M_{	ext{ms1lc}} = 5.54$) and less MAS type II ($M_{	ext{ms2pd}} = 4.93$ and $M_{	ext{ms2lc}} = 4.94$) than those of low cost units. Contrary to our prediction, however, product differentiation units also use less decentralized structure ($M_{	ext{decpd}} = 3.87$ and $M_{	ext{declc}} = 4.22$) and more output control than those of low cost units ($M_{	ext{outpd}} = 5.01$ and $M_{	ext{outlc}} = 5.50$).

4.2. Hypothesis testing

The first hypothesis predicted that contingent fit would have a positive correlation with business unit effectiveness regardless of the strategic choice. Panel A of Table 4 reports the correlation analysis for the full sample without separating for strategic choice. Contingent fit is significantly positive, suggesting that the higher the fitness value, the better the performance of the business unit. This result was consistent with H1.

The second hypothesis expected that there would be a positive correlation between contingent fit and effectiveness for product differentiation units and low cost units. Panel B of Table 4 shows the results of the statistical test. The results indicate that the correlation between contingent fit and effectiveness for product differentiation and low cost units are both significantly positive. The results are consistent with H2 and H3.
Table 4
Spearman’s rho correlation between contingent fit and business unit effectiveness test of H1–H3 (P-values in parentheses)

<table>
<thead>
<tr>
<th>Prediction</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: total sample of 106 companies</td>
<td>+</td>
</tr>
<tr>
<td>Panel B: partition by strategic priorities</td>
<td></td>
</tr>
<tr>
<td>Product differentiation (n = 75)</td>
<td>+</td>
</tr>
<tr>
<td>Low cost (n = 31)</td>
<td>+</td>
</tr>
</tbody>
</table>

* Denote significance levels of 0.05. The significance tests are one tailed since the tests are for directional hypotheses.

Table 5
Comparisons between the level of usage of the contextual variables: PD vs. LC test of H4–H8 (P-values in parentheses)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Prediction</th>
<th>t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of decentralization</td>
<td>+</td>
<td>-1.18 (0.120)</td>
</tr>
<tr>
<td>Types of control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behavioural control</td>
<td>+</td>
<td>2.75 (0.003)**</td>
</tr>
<tr>
<td>Output control</td>
<td>-</td>
<td>2.04 (0.022)*</td>
</tr>
<tr>
<td>Types of management accounting systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAS type I</td>
<td>+</td>
<td>2.72 (0.004)**</td>
</tr>
<tr>
<td>MAS type II</td>
<td>-</td>
<td>-0.07 (0.471)</td>
</tr>
</tbody>
</table>

The symbols (• and ••) denote significance levels of 0.05 and 0.01, respectively. The significance tests are one tailed since the tests are for directional hypotheses.

To test H4–H8, we compare the scores from the questions that asked about the degree of decentralization, types of controls and types of management accounting systems. Table 5 shows the results of the statistical tests.

The fourth hypothesis expected that product differentiation units will use a more decentralized organizational structure as compared to that of low cost units. The results show that although low cost business units use a more decentralized structure, the difference is not statistically significant. Therefore it is difficult to interpret this result.

The fifth hypothesis states that product differentiation units tend to use behavioural control more intensively than that of low cost units. The results indicate a significant positive difference in the level of intensity of behavioural control between product differentiation and low cost units. The result is consistent with H5.

The sixth hypothesis postulates that product differentiation units tend to use output control less intensively than that of low cost units. The result indicates a significant negative difference in the level of intensity of output control between product differentiation and low cost units. The result contradicts H6.

The seventh hypothesis predicts that product differentiation units tend to use MAS type I more intensively than that of low cost units. The result reveals a significant positive difference in the use of MAS type I by product differentiation units as compared to that of low cost units. The result is consistent with H6.

The eighth hypothesis expects that product differentiation will tend to use MAS type II less intensively than that of low cost units. The results show that although product differentiation units use MAS type
II less intensively, the difference is not statistically significant. Therefore it is difficult to interpret this result.

5. Discussion

Conceptually, this study relies on the proposition that contingent fit between chosen strategy and its contextual variables is positively associated with business unit effectiveness. The findings from this study indicate that contingent fit has a significant positive relationship with business unit effectiveness regardless of the strategic choice. This is consistent with the proposition from contingency theory that no systems are universally appropriate to all organization and to all circumstances. Instead, a particular strategic choice must be associated with a certain organizational configuration and management accounting systems and demonstrate an appropriate matching to positively affect performance.

Previous research has found that product differentiation units tend to use a more decentralized structure, more intensive behavioural control, and more intensive management accounting systems that support business units’ ability to differentiate their products and to satisfy their customers. Low cost units tend to be organized with a more centralized structure, use more intensive behavioural control, and more intensive management accounting systems that promote efficiency.

The results of this study indicate that product differentiation units tend to use more behavioural control and management accounting systems that support companies’ ability to differentiate their product and to satisfy their customers. These results are consistent with those of previous research. One contradictory result was observed when comparing the level of intensity of output control used by product differentiation and low cost units. While we predict that product differentiation units will tend to use output control less intensively as compared to low cost units, the results show the opposite. Further analysis indicates that there is a strong correlation between output control and behavioural control indicating that business units in this industry use both behavioural and output controls simultaneously, but product differentiation companies use both types of controls more intensively.

We also performed an alternative test to compare the total control and relative control levels (defined as percentage of behavioural or output control to total control) used by product differentiation and low cost business units. Tables 6 and 7 present the descriptive statistics and the t-test results. The results indicate that as a percentage of total control, product differentiation business units use more behavioural control and less output control as compared to low cost business units (46.72% versus 44.82% and 53.28% versus 55.18%). These results are consistent with H5 and H6 although the differences are not statistically significant. It is interesting to note that both product differentiation and low cost business units use more output control than behavioural control. It might be that business units in this industry rely more on output control than behavioural control because of high outcome observability. Another

<table>
<thead>
<tr>
<th>Variables</th>
<th>PD (n = 75)</th>
<th>LC (n = 31)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total control</td>
<td>5.21 (0.63)</td>
<td>4.55 (0.87)</td>
</tr>
<tr>
<td>Behavioural control/total</td>
<td>46.72 (11.23)</td>
<td>44.82 (11.65)</td>
</tr>
<tr>
<td>Output control/total control (%)</td>
<td>53.28 (11.24)</td>
<td>55.18 (11.66)</td>
</tr>
</tbody>
</table>
possible explanation for the fact that output controls are more intensely used than behavioural controls may be that the companies studied here are all listed companies. In most cases, these companies tend to be bigger (in size) than average. Size may motivate managers to rely more on output-based controls than on behaviour controls (like detailed rules and procedures). Hence, bigger companies tend to have different control structures than smaller companies (see also Zimmerman, 2003). Furthermore, the results indicate that product differentiation business units use significantly more total control than low cost business units. One possible explanation for this finding is that being more stable and less risky, low cost units may not require intense control as opposed to product differentiation units.

5.1. Limitations

Although contingent fit between business strategy and its contextual variables is considered by many as the central issue in using the contingency approach, researchers have yet to agree on the construct of contingent fit and how to measure it. This study sheds some new light on how to develop and measure the contingent fit between strategic choice and its contextual variables. One limitation of this study is the assumption that each contextual variable is independent of the other variables (K = 0) and makes an independent contribution to the overall fitness value. In a contingency model with more than one contextual variable, it is likely that the contribution of each variable is affected by the state of the other variables. We leave this for future research.

Second, the findings of this study are based on data from a single industry that might not necessarily reflect the general pattern of companies. Therefore, caution should be taken in making inferences from the results of this study. The advantage of using a single industry, however, is that the influence of business environment is greatly minimized.

While data collected from a survey and personal interviews can enable researchers to explore the richness of the reality by obtaining information that is not publicly available, socially desirable bias due to subjective responses to the questionnaires should be taken into considerations.

Finally, this study only investigates the fit between strategic choice, degree of centralization, type of control and type of management accounting systems and its association with business unit effectiveness. Other variables such as size, technology, and leadership style might also play a significant effect on business unit performance.

5.2. Implication for future research and practice

The approach used to define and measure the contingent fit and its association with business unit effectiveness is a preliminary step toward understanding the complex relationship between business strategy, its contextual variables and performance. Further studies are needed to extend the model used in this study.
for example, by relaxing the assumption that each contextual variable makes an independent contribution toward the overall fitness value. To do this, one needs to find the interdependency among contextual variables and their cumulative effect on fitness value to affect performance. Future research might also use cross-industry data to investigate the impact of fitness on business units as well as organizational level performance.

From a practical perspective this study is relevant to executives responsible for the design and implementation of organizational structure, control and management accounting systems. The results of this study provide insights into the need to align strategic priorities, organizational design and management accounting systems since the appropriate match between business strategy and its contextual variables is likely to affect performance.

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