Management Accounting Research, 2002, **13,** 101–130
doi: 10.1006/mare.2002.0183
Available online at http://www.idealibrary.com on IDEAL®

The differential effect of environmental dimensionality, size, and structure on budget system characteristics in hotels

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Whilst the service sector is a major component of world economies, research into, and thus our understanding of, how management control systems function in the service environment is limited. To advance our knowledge and understanding of the role of budgets in service organizations, this organizational level study extends prior manufacturing context research investigating the influence of contextual variables on budget system characteristics (BSC) to hotels. Since the nature of service firm operations is highly dependent on the external environment, perceived environmental uncertainty (PEU) is likely to be a key contextual variable. Consistent with the organizational theory literature, this study conceptualizes PEU more correctly as a multi-dimensional construct and seeks to ascertain the influence of components of PEU on the BSC of hotels, the chosen service industry. Based on a sample of 106 hotels and using path analyses, the results indicated that: (1) different dimensions of PEU have differential effects on BSC and organizational structure, (2) hotel size has a significant effect on BSC, (3) hotel size does not significantly influence structure, and (4) hotel organizational structure has significant influences on BSC. The finding for PEU raises implications for future researchers studying PEU.

Key words: contingent variables; service organizations; path analysis; PEU; budget system characteristics.

1. Introduction

Service organizations are becoming an increasingly important component in major world economies. Despite the growth and economic significance of service

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Received 25 August 1999; accepted 5 August 2001.

1044–5005/02/$ - see front matter

organizations, there is a paucity of research on management control systems (MCS) in such organizations. Lowry (1990, p. 176) emphasized that:

> the service environment underscores the importance of both research into the organizational context of management accounting and critical consideration of what we conceive of as progress in this discipline [management accounting].

Research in the service sector has tended to focus primarily on non-profit organizations (e.g. Covaleski and Dirsmith, 1983; Coombs, 1987; Williams *et al.*, 1990; Abernethy and Stoelwinder, 1991; Rayburn and Rayburn, 1991; Macintosh and Williams, 1992). Notwithstanding some of the inconsistencies in this literature, these studies illustrate that traditional roles of the MCS expounded in manufacturing organizations require a re-orientation if MCS are to effectively serve the needs of non-profit service organizations. This re-orientation stems from differences in the nature of operations and the organizational context between manufacturing and non-profit service firms.

However, unlike non-profit service organizations, profit seeking service firms like manufacturing firms, are more likely to implement and utilize MCS. This is because they share the common goal of meeting profitability and performance targets contained in the budget (for a comprehensive discussion see, for example, Brignall *et al.*, 1991; Fitzgerald *et al.*, 1991; Brignall, 1997). Hence, the inconsistencies in the service literature and the inconsistencies between manufacturing and service contexts could be attributed to the objective of being profit or non-profit oriented. In addition, although contingency researchers have tended to neglect the service sector, the origins of contingency relationships (e.g. Thompson, 1967; Weber, 1947) do not differentiate between service and non-service organizations. Therefore, in advancing our knowledge and understanding of when certain contingency relationships may hold, industry type should not be a discriminating factor. Rather, we should strive to encompass a larger set of industries to enrich our knowledge and understanding of contingency relationships and to develop a more complete and robust contingency theory. As a first step in that direction, this study seeks to provide a more unified knowledge and understanding of MCS and their context by extending contingency relationships established in manufacturing firms to profit seeking service firms. In doing so, the study addresses the question whether the design of MCS in the service sector can be informed by the results and inferences based on MCS design in manufacturing firms. Consequently, this study is a partial replication of prior studies.[1]

In addition to being limited to the non-service sector, prior studies examining, what is regarded as one of the most influential contingency variables, perceived environmental uncertainty (PEU), showed inconsistent and conflicting results (see Tymon *et al.*, 1998). Variations in the measure of PEU, non-validation of the PEU construct and the use of inappropriate measures have been offered as explanations for the observed inconsistencies and contradictions (Briers and Hirst, 1990; Tymon *et al.*, 1998). It has been acknowledged that PEU is a multi-dimensional concept and measure (Duncan, 1972; Downey *et al.*, 1975; Milliken, 1987; Gerloff *et al.*, 1991). Despite drawing upon the original work of Duncan (1972), who maintained a multi-dimensional view of PEU, management accounting research continues to treat PEU as if it was uni-dimensional (see Tymon *et al.*, 1998). Moreover, PEU plays an equally,

[1] Consequently, the test instruments used in this study are drawn from past contingency research.

if not more, important role in service organizations than in manufacturing firms, because service firms have greater exposure to the external environment (Lowry, 1990). The greater complexity faced by service firms, which arises from their external environment, suggests greater research attention is warranted. As Lowry (1990, p. 181) put it: 'The challenge in this research will, in part, come from the contrasting sources of complexity for manufacturers and service firms. For manufacturers, complexity arises from internal sources—elaborate administration and coordination. For service firms, structure is simpler, but greater complexity arises from external sources, that is, their greater environmental dependency.' Supportive of Lowry, Fitzgerald *et al.* (1991) and Brignall (1997) suggest that the volatility, uncertainty, and competition in a service firm's external environment cause complexity and influence the design of its control system. A logical extension of this line of argument is to ascertain whether these seemingly distinct, yet related, components of the external environment have differential or similar effects on the control system design of service firms. Moreover, it provides an opportunity to investigate whether PEU plays a similar role to that observed in the manufacturing context. Therefore, to advance our understanding of PEU as a contingency factor, this study conceptualizes PEU as a multi-dimensional construct, seeks to validate a commonly used PEU scale, and examines the effect of different dimensions of PEU on budget system characteristics (BSC) in hotels.[2]

Given the economic importance of the hotel industry in many world economies, it is imperative that we as researchers inform the appropriate design and use of MCS in hotels. However, a comprehensive review of the management accounting literature did not reveal any studies examining budget-related activities for hotels or the effect of contextual variables on BSC in hotels.[3] This is not surprising given the relative paucity of research in service organizations. A review of the hospitality literature also revealed limited papers on the topic of budgets. The few works identified revealed that budgets are indeed utilized for forecasting and control (Ferguson and Berger, 1986; Schmidgall and Ninemeier, 1987; Yesawich, 1988) and that hotels appear to assess their environment to determine appropriate and effective strategies (Chekitan, 1989). The hospitality literature stresses that budgets are important mechanisms that provide the benchmark for specific planning and control measures such as occupancy rates, revenue and profit per room, gross returns in restaurants and bars, etc. They also emphasize the role of budgets in quantifying the strategic plans of hotels, which can subsequently be translated into day-to-day operating performance measures. Brignall *et al.* (1991) illustrate that budgets are indeed utilized in hotels for cost planning and control purposes.[4] Their case study of a large multinational

[2]The term hotel as used in this study refers to hotels, motels, resorts and holiday units.

[3]Although there are management accounting texts for the hotel industry (e.g. Kotas, 1986; Harris and Hazzard, 1992), there is very limited research in management accounting in hotels with recent strategy work done by Collier and Gregory (1995). Collier and Gregory (1995, p. 2) noted that '…apart from Brignall *et al.* and Harris there is no accounting literature on management accounting and its contribution to the management of groups of hotels.'

[4]Whilst non-financial performance measures are utilized by hotels, reliance on budgetary information is the primary performance evaluation information. This is because of the difficulty of quantifying the many non-financial and intangible performance evaluation measures that are used to measure customer satisfaction and customer loyalty. A further difficulty arises when attempts are made to trace drivers of customer satisfaction such as friendliness of staff, cleanliness, response time of housekeeping and room-

chain hotel revealed that department managers had budget responsibility and were motivated and rewarded through appropriate bonuses based on achieving budget targets. Budgets form an integral component of MCS in various types of service firms such as professional service firms, service shops and mass service firms (Fitzgerald *et al.*, 1991; Brignall, 1997). Hotels fall into the service shop category, which in the categorization scheme falls in the 'grey area' between professional service firms and mass services. The grey area classification of hotels itself presents an interesting context for study because the recent normative literature in service firms tends to ascribe features of control systems in service shops with reference to the two extreme categories, viz, professional service and mass service firms (e.g. Fitzgerald *et al.*, 1991). Fitzgerald *et al.* (1991) proposed that the budgetary system found in service firms would be contingent on PEU, a variable they consider being a strong determinant of BSC in service firms. Moreover, Fitzgerald *et al.* (1991) and Brignall (1997) propose that given the natural differences between service and manufacturing firms, the effect of contextual factors, particularly PEU, on the design of MCS in service firms may be different to the effect observed in manufacturing firms. Therefore, an informing and interesting research question relates to understanding the effect of contextual factors on BSC, a component of the overall MCS, of service firms. Some of the issues worthy of consideration include the extent to which BSC are influenced by variations in the size of a hotel, hotel administrators' perceptions of the external environment, and the internal structure of hotels. Accordingly, the present study contributes to the literature and practice by examining the influence of contextual variables on specific features of BSC that are important for planning and control purposes in hotels. Specifically, the study investigates the direct effects of variations in (1) PEU, (2) organizational size and (3) organizational structure, and the indirect effects of variations in PEU and organizational size through structure, on the role of budgets in hotels.[5]

The remainder of the paper is organized as follows. The next section discusses the direct and indirect effects of size and PEU, and the direct effect of organization structure, on BSC in hotels. This section adapts the findings of prior contingency research in informing the expected relationships in the hotel context. Section 3 outlines the research method and Sections 4 and 5 contain the results and discussion, respectively. The final section provides a concluding commentary.

service, etc to customer satisfaction. Consequently, hotels find it relatively easier to incorporate these non-financial and intangible factors into their occupancy rate or capacity utilization measures of performance—which usually is financial and forms the basis for developing budgets and subsequently for performance evaluation. For more discussion see Brignall (1997).

[5]This study focuses on contextual factors that may influence the general design and use of budgetary systems rather than on specific performance measurement factors such as occupancy rates, income per room and gross margin in bars and restaurants for two major reasons. First, an attempt was made to study some of these specific performance measurement factors but initial discussions with hotels and the relevant hotel regulatory body indicated information on these sensitive factors would not be readily available. For example, I sought to elicit total hotel revenue in our questionnaire but the level of disclosure was too few to permit its consideration in further analysis. Second, as an initial first step, the purpose of the study is to generally understand the factors and the extent to which they influence MCS in hotels. Subsequent research could examine specific control and performance measurement issues. The non-inclusion of performance measures in this study is not inconsistent with prior contingency studies and certainly does not invalidate the contributions of the study.

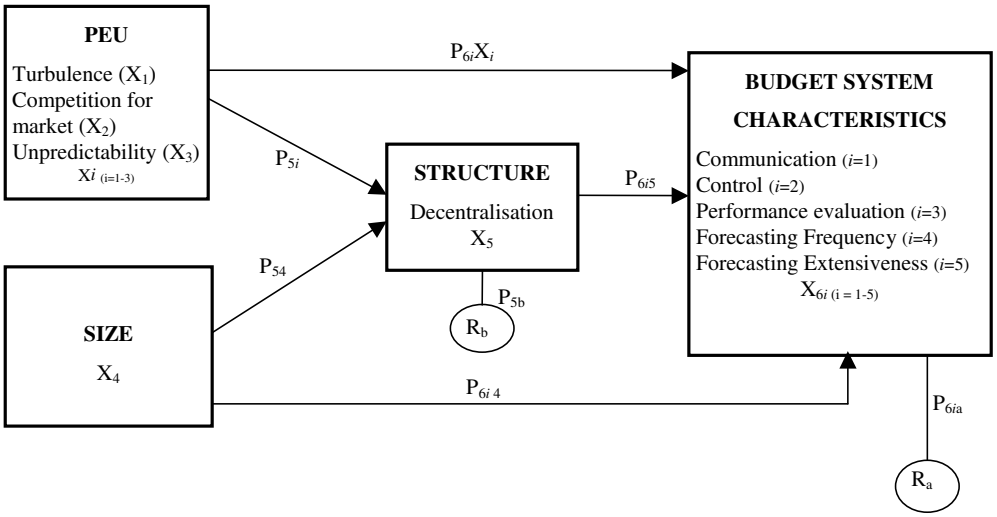

Figure 1. Path diagram.

2. Experimental variables and hypotheses formulation

Whilst the BSC literature has tended to focus on manufacturing organizations, there is no reason to believe that such relationships may not be applicable to service organizations. A growing body of literature is showing that BSC are equally important in service firms and that the MCS of service firms must be considered in their wider context which includes contingent variables external and internal to the service firm (e.g. Fitzgerald *et al.*, 1991; Brignall, 1997). There is general acceptance in the literature that BSC vary across organizations. Such variations are generally attributed to influences external to the organization such as PEU, and to influences internal to the organization such as size and structure. These influences can be direct and indirect as shown in Figure 1 which provides the framework for this study. Each of these effects is discussed later.

Size and budget system characteristics—hypothesis 1

Organizational size has been identified as a key contextual variable by various researchers (Lawrence and Lorsch, 1967; Pugh *et al.*, 1969; Child, 1972; Khandwalla, 1972; Bruns and Waterhouse, 1975; Merchant, 1981, 1984). These researchers argued that as organizational size increases, social control, communication, and coordination become increasingly difficult. Consequently, larger and more diverse organizations will tend to implement a system that formalizes communication, increases the frequency of communication, and standardizes the information for coordination, communication and control (Bruns and Waterhouse, 1975; Merchant, 1981). These control features are known as administratively-oriented control (Bruns and Waterhouse, 1975). Administratively-oriented control is more likely to be present in larger firms that tend to view the formal budgeting processes as important. Some of the BSC of administratively-oriented control firms include (i) extensive use of budgets as a communication mechanism (Flamholtz, 1983), (ii) extensive use of budgets for performance evaluation (Merchant, 1981), and (iii) extensive use of budgets

as a control mechanism (Bruns and Waterhouse, 1975). In contrast, smaller firms tend to implement systems where the control, coordination, and communication mechanisms are more informal and personal. Such interpersonal-control type firms (Bruns and Waterhouse, 1975) would exhibit budget characteristics that contrast those of administratively-oriented control firms.

Extending these relationships to the hotel context suggests the following. First, relative to smaller hotels, the social and functional complexity of larger hotels would impose greater imperatives to maintain social control, communication, and coordination throughout the organization. Second, larger hotels would have greater capital investment in a variety of functional areas such as physical plant, room furnishings, dining and entertainment facilities, recreational facilities, and hotel services (e.g. housekeeping, maintenance, telephone systems, etc.). Therefore, larger hotels would need to ensure appropriate resource utilization in these areas through planning and the provision of a framework or benchmark for control, monitoring and performance evaluation purposes. Additionally, larger hotels would be more likely than smaller hotels to implement a formal budgetary system to deal with the increasing complexity and spans of communication, control and performance evaluation.[6] Accordingly, it is hypothesized that:

$\boldsymbol{H_1}$: *There will be a positive and direct relationship between hotel size and:*

$H_{1A:}$ *use of the budget more extensively for communication.*
$H_{1B:}$ *use of the budget more extensively for control.*
$H_{1C:}$ *use of the budget more extensively for performance evaluation.*

Perceived environmental uncertainty and budget system characteristics

Briers and Hirst (1990) and more recently Tymon *et al.* (1998) argued that the observed inconsistencies regarding the influence of PEU on MCS could be attributed to the conceptualization and variations in the measurement of PEU. Tymon *et al.*'s (1998) critical review of accounting research examining PEU revealed that most prior research has not correctly conceptualized and operationalized PEU. This result is not surprising because organizational theory researchers have long since recognized that PEU is a multi-dimensional construct. For example, Milliken (1987) discovered that research on the effects of PEU on organizational variables often produced inconsistent results. She proposed that decomposing the PEU construct could reduce inconsistencies in the results and enhance our understanding of the role of PEU in organizational settings. Downey *et al.* (1975) echoed similar concerns more than a decade earlier. Gerloff *et al.* (1991) tested the propositions of Downey *et al.* (1975) and Milliken (1987) and reported results consistent with Downey *et al.* (1975) and Milliken's (1987) propositions. Gerloff *et al.* (1991) also reported that a uni-dimensional measure of PEU and its components differentially affected variables of MCS. Therefore, Gerloff *et al.* (1991, p. 766) urged researchers to

[6]In the literature (e.g. Merchant, 1984; Hoque and Hopper, 1997) control refers to managers' accountability for their budget measured through questions relating to required explanation of variances and budgets used to motivate managers to perform better. Performance evaluation usually refers to using budgetary information to reward managers (Merchant, 1984; Hoque and Hopper, 1997). This study uses the terms control and performance evaluation in this distinct sense. It is acknowledged however that the two terms are related.

consider PEU as a multi-dimensional construct because 'a better understanding of the differential effects of PEU and its components is relevant to continued development of contingency theories of management'. Tymon *et al.* (1998) echo this urge for the advancement and understanding of the effects of PEU on variables of interest to management accounting researchers. Accordingly, the present study conceptualizes PEU as a multi-dimensional construct, viz, environmental turbulence, environmental predictability, competition intensity and environmental complexity.

PEU, as used in the accounting literature, refers to an administrator's *perceptual experience* of the organization's external environment. Milliken (1987) labels this *state* uncertainty because it reflects an organizational administrator's perception of, and ability to, assess the organization's external environment or a component of it. According to Milliken (1987), the experience of state uncertainty is a function of volatility, complexity, and heterogeneity of the external environment. Milliken (1987) argued that only state uncertainty could be referred to as 'PEU'. Tymon *et al.* (1998) concur with this view. Perceived uncertainty about the external environment implies that organizational administrators are not certain as to how the components of the external environment might vary and hence, affect their organization. Organizational and management accounting researchers refer to four common components of PEU.

Environmental turbulence has attracted the most attention and is considered the major factor contributing to PEU (Child, 1972). Environmental turbulence refers to changes or volatility in the external environmental factors facing an organization (Child, 1972; Kren, 1992). A recognized measure of environmental turbulence is Duncan's (1972) environmental dynamism-stability dimension of PEU. A second dimension of PEU is the ability to predict the future state of relevant environmental factors (Milliken, 1987). Milliken (1987) highlights that turbulence and predictability are not identical constructs. She contends that turbulence is not necessarily unpredictable, that is, if the environment is turbulent in predictable ways then organizational administrators are unlikely to experience PEU. However, if environmental changes are unpredictable then a higher level of PEU will be experienced.[7] Therefore, predictability and turbulence appear as two different but related dimensions of PEU. A third dimension of PEU is intensity of competition (Child, 1972; Khandwalla, 1972). The degree of external competition threatens the achievement of organizational objectives. The greater this threat, and the greater the difficulty in assessing this threat, the greater the degree of PEU experienced by organizational administrators. The fourth dimension of PEU is environmental complexity. Duncan (1972) defined complexity using a heterogeneity–homogeneity dichotomy. In a heterogeneous environment, PEU is higher because a heterogeneous environment comprises a larger array of environmental factors relevant to an organization's operations. However, Downey *et al.*'s (1975) replication of Duncan's (1972) thesis indicated that environmental complexity did not significantly contribute to PEU and was found to actually reduce PEU—a result inconsistent with Duncan (1972). Downey *et al.* (1975) attributed this inconsistency to design flaws inherent in Duncan's instrument and therefore suggested its exclusion when studying PEU.

[7] As a first step in examining the role and effect of PEU as a multi-dimensional construct on BSC, this study examines the separate effects of each dimension of PEU. The conjunctive effects of unpredictability and turbulence are briefly considered later in the paper. Detailed analysis of these conjunctive effects is beyond the scope of this paper and is left to subsequent research.

Accordingly, the complexity dimension of PEU was not considered in this research. The following discussion relates each of the three dimensions of PEU to BSC. The relationships proposed are based on prior research with adaptations to the hotel industry. The very nature of contingency research suggests that relationships between contingency variables are generalizable to various contexts.

Turbulence and BSC—hypothesis 2. Amigoni (1978) argued that as environmental turbulence increases, the MCS should be oriented to the future and must respond *rapidly*. In terms of budget characteristics, Gordon and Miller (1976) hypothesized that as environmental turbulence increases, an effective MCS should (i) increase the *frequency* of reporting, (ii) consider *greater use* of forecast information, and (iii) provide management with *information* about what is going on in the external environment. Both Amigoni (1978) and Gordon and Miller's (1976) contentions are premised on the need for decision makers to react quickly and appropriately to changing trends and important issues before they turn into complex and difficult problems. However, Amigoni (1978) and Gordon and Miller's (1976) propositions have not been widely tested despite their long standing appeal for further development and testing of their hypotheses.

The perceived turbulence of the external environment may influence a hotel manager's perception of environmental uncertainty and his/her response in the following manner. Under a highly turbulent environment, it is likely that hotel administrators will expend greater effort on environmental scanning and forecasting to learn about the external environment. Consequently, they will increase their understanding of the environment and hence be in a better position to formulate and implement appropriate strategic responses. Subsequently, the information gathered would be assimilated and translated within the framework of organizational strategies and objectives, and then communicated to relevant levels in the hotel. These propositions are consistent with Fitzgerald *et al.* (1991) who contended that the best use of budgets under uncertain environments facing a service firm would be for learning about, and communicating changes in the external environment to appropriate levels in the organization. Consequently, MCS in hotels would be expected to increase the frequency and extent of budgetary forecasting to capture the effects of the external environment and increase communication of these budgetary forecasts for planning and control purposes. Accordingly, it is hypothesized that:

$\boldsymbol{H_2}$: *There will be a positive and direct relationship between environmental turbulence and:*

H_{2A}: *use of the budget more extensively for communication.*
H_{2B}: *use of the budget more frequently for forecasting.*
H_{2C}: *use of the budget more extensively for forecasting.*

Unpredictability and BSC—hypothesis 3. If the environment is highly unpredictable then greater levels of PEU will be experienced. Under such conditions, it may become impossible to characterize environmental conditions with a high degree of accuracy and confidence (Milliken, 1987). Consequently, it is expected that less reliance will be placed on the budget for forecasting and communication purposes. Furthermore, under high environmental unpredictability, the budgetary system will become less appropriate for control and performance evaluation purposes

(Chenhall and Morris, 1986; Govindarajan, 1984; Gordon and Narayanan, 1984; Fitzgerald *et al.*, 1991). This is because *a priori* budget targets for subsequent control and performance evaluation purposes would become outdated and resulting variances would arguably be beyond the control of those being evaluated. Conversely, in a predictable environment, where deviations would be impounded in the budget and result in controllable and low variances, the budgetary system would serve a useful role for specifying and controlling behaviour, and thus for evaluating performance. Therefore, it is hypothesized that:

H_3: *There will be a negative and direct relationship between environmental unpredictability and:*

H_{3A}: *use of the budget more extensively for communication.*
H_{3B}: *use of the budget more extensively for control purposes.*
H_{3C}: *use of the budget more extensively for performance evaluation.*
H_{3D}: *use of the budget more frequently for forecasting.*
H_{3E}: *use of the budget more extensively for forecasting.*

Competition and BSC—hypothesis 4. Porter (1985) argued that in a competitive environment, an organization needs to scan, communicate, and monitor its environment to facilitate appropriate strategic responses. Learning about the intensity of competition for planning, coordination, and control purposes is also relevant for service firms (Fitzgerald *et al.*, 1991; Brignall, 1997). Competitive complexity and intensity suggest greater emphasis on the budget processes; primarily for understanding the competition and communicating that information throughout appropriate levels in hotels so that appropriate prices can be planned and controlled. Hotels typically set prices based on market competition and product/service differentiation, with a good costing system including the proper use of budgetary information (Brignall *et al.*, 1991; Brignall, 1997). Therefore, it is expected that environmental competition will have a positive association with the frequency and extent of forecasting, and the extent of communicating that information to appropriate departments in hotels. Hence, it is hypothesized that:

H_{4a}: *There will be a positive and direct relationship between environmental competition and:*

H_{4A}: *use of the budget more extensively for communication.*
H_{4B}: *use of the budget more frequently for forecasting.*
H_{4C}: *use of the budget more extensively for forecasting.*

On the other hand, emphasizing the budget for control and performance evaluation purposes under intense competition is likely to cause dysfunctional management behaviour. Gordon and Narayanan (1984) and Merchant (1990), amongst others, provide evidence from the non-service industry consistent with this view. Fitzgerald *et al.* (1991) extrapolate this argument to service firms and argue that emphasizing budgetary information for control and performance evaluation purposes, under high environmental uncertainty, could lead to dysfunctional behaviour. Thus, when competition is intense, hotels' management are likely to use the budget less extensively for performance evaluation and control than under less competitive

conditions. In other words, a negative association is expected between intensity of competition and use of the budget for control and performance evaluation (Ezzamel, 1990). Therefore, it is hypothesized that:

***H*$_{4b}$**: *There will be a negative and direct relationship between environmental competition and:*

H_{4D}: *use of the budget more extensively for control.*
H_{4E}: *use of the budget more extensively for performance evaluation.*

Size and structure—hypothesis 5

Bruns and Waterhouse (1975) and Merchant (1981) argued that as organizations increase in size, it becomes increasingly difficult to control the exponentially increasing array of activities through informal mechanisms. They observed that larger organizations were decentralized and used formal control devices such as budgets to facilitate effective planning and control of activities. Smaller organizations however, were able to effectively control their activities through centralized informal processes such as direct supervision and oral communication. A similar argument can be made for hotels. Larger hotels with greater capital investment would tend to offer a greater variety of services to their clients. For example, large resort type hotels such as the Marriott and Sheraton, would offer a greater array of services (e.g. in-house movies and satellite TV, health club, children's club, tour services, conference/meeting facilities, etc). This heterogeneity would naturally cause a larger number of heterogeneous hotel sub-units but with greater homogeneity within each sub-unit. For instance, the room department would have naturally distinctive responsibilities compared to the food and beverage department, and even the entertainment department, whilst responsibilities within the food and beverage department would be more homogeneous. If functional autonomy is extensive, then centralized management would be problematic and hence decentralization to these responsibility centres would be encouraged. In addition, larger hotels would also impose problems for centrally directing larger numbers of people through more personalized and informal controls. Consequently, a more decentralized mode of control would be expected in larger hotels. Accordingly, it is hypothesized that:

***H*$_5$**: *There will be a positive relationship between organizational size and decentralization.*

PEU and structure—hypothesis 6

The relationship between PEU and organizational structure is widely recognized and has been empirically substantiated in the organizational theory literature and in the management accounting contingency theory paradigm, *albeit* largely in a manufacturing context. The argument posits that as organizational administrators perceive greater environmental uncertainty, they will tend to design decentralized structures so that organizations can more effectively respond to the perceived uncertainty. In this sense, organization structure is conceptualized on a mechanistic-organic continuum where decentralization is represented by an organic structure. Khandwalla (1972) and Duncan (1971) found that greater perceived environmental competition was positively associated with decentralization. A greater degree of decentralization was also found to be associated with environmental turbulence (Lawrence and Lorsch, 1967; Leifer and Huber, 1978; Gordon and Narayanan, 1984)

and environmental unpredictability (Gordon and Miller, 1976; Waterhouse and Tiessen, 1978; Gordon and Narayanan, 1984). These authors argued that decentralization enhances an organization's ability to adapt to environmental uncertainty which subsequently increases performance.

The environmental conditions of service firms are more complex and uncertain than manufacturing firms. Lowry (1990), Fitzgerald *et al.* (1991) and Brignall (1997) comprehensively discuss the environment of service firms. They suggest that the nature of service firms presents an environment that is more complex, volatile, and uncertain than manufacturing firms. In service firms, customer interaction and provision of goods and services occur simultaneously, and in the presence of customers whose needs, particularly for service shop types of service firms (and hotels fall into this category), are not known with certainty. Service firms have greater environmental dependence than manufacturing firms because they are in constant interaction with their environment; and they have open productive systems where production of services occurs at the interface between customers and service employees (Lowry, 1990). Environmental pressures on service firms are likely to increase as the external environment becomes more competitive, turbulent, and uncertain. Hotels facing such conditions are likely to devolve decision making authority to the outer operational core (Lowry, 1990). This may include devolving decisions regarding pricing, packages, development of new products and services, and deals to departmental sub-units. Because of their continual interaction with customers, departmental sub-units are more likely than top management to possess assimilated professional knowledge about their customers. Accordingly, the following hypotheses are advanced:

***H*$_6$**: *There will be a positive relationship between structure and:*

H_{6A}: *environmental turbulence.*
H_{6B}: *environmental competition.*
H_{6C}: *environmental unpredictability.*

Structure and MCS—hypothesis 7

Since decentralized organizations are more likely to adopt administratively oriented controls and given that under such circumstances formal control mechanisms are emphasized (Bruns and Waterhouse, 1975), it is proposed that decentralized organizations will make greater use of the budget for communication, control, and performance evaluation. This proposition is premised on the notion that as organizations become larger and more diverse, informal control mechanisms become less effective. The need to communicate, coordinate, and control delegated responsibilities is effectively enhanced through the formal use of budgets. Thus, it is hypothesized that:

***H*$_7$**: *There will be a positive and direct relationship between decentralization and:*

H_{7A}: *use of the budget more extensively for communication.*
H_{7B}: *use of the budget more extensively for control.*
H_{7C}: *use of the budget more extensively for performance evaluation.*

Indirect effects—hypotheses 8, 9 and 10

The preceding hypotheses considered the direct effects of PEU and size on BSC, and the direct effects of PEU and size on organizational structure. If, as hypothesized, PEU and size are related to organizational structure, then the indirect effects of PEU and size acting through decentralization on BSC may be proposed. BSC variables that may be affected through these indirect effects are those directly related to (1) PEU and decentralization, and (2) size and decentralization. The preceding hypotheses suggest that for both cases the relevant BSC variables are communication, control, and performance evaluation.

The extant literature (Gordon and Miller, 1976; Waterhouse and Tiessen, 1978; Gordon and Narayanan, 1984) provides evidence that decentralization is an appropriate response to PEU. Furthermore, it has been argued that extensive use of the budget for communication is necessary under high environmental turbulence, and less reliance on the budget for control and performance evaluation purposes under high environmental unpredictability and high competition. Hence, it is proposed that:

H_8: *There will be a positive indirect relationship between environmental turbulence, acting through decentralization, and use of the budget more extensively for communication.*

H_9: *There will be a negative indirect relationship between environmental unpredictability and competition, acting through decentralization, and:*

H_{9A}: *use of the budget more extensively for control.*
H_{9B}: *use of the budget more extensively for performance evaluation.*

Decentralization as an appropriate control for size was discussed earlier in the paper. It was proposed that larger hotels would tend to adopt a more decentralized structure. It was also emphasized that larger hotels would tend to place more reliance on formal methods of coordination, communication, and control. Thus, it is proposed that some of the effects of size on BSC may be through an indirect effect on decentralization. Hence:

H_{10}: *There will be a positive indirect relationship between size, acting through decentralization, and:*

H_{10A}: *use of the budget more extensively for communication:*
H_{10B}: *use of the budget more extensively for control.*
H_{10C}: *use of the budget more extensively for performance evaluation.*

3. Research method

Sample

Data was collected through a questionnaire that was initially discussed with the Queensland Hotel Association and the Queensland Motel and Accommodation Association and pilot tested on six hotels. No significant alterations to the questionnaire were made following the pilot study. The Queensland Hotel Association and the Queensland Motel and Accommodation Association were approached to

identify the database of hotels in the Queensland region. The databases provided by these two associations contained more than 500 hotels varying considerably in size. Following discussions with personnel from these two associations, hotels with less than 30 rooms were excluded from the population of study because they were unlikely to implement formal budgetary systems and to control for potential ownership structure effects (since smaller hotels typically are owner operated). Two hundred hotels were randomly selected from this population.

An initial phone call to the financial controller of each hotel was made to explain and solicit their interest in the study. Questionnaires, including written endorsements encouraging the target respondents to participate in the study from the Queensland Hotel Association and the Queensland Motel and Accommodation Association, were then sent to the financial controller of each hotel.[8] Of the 200 hotels, 110 returned the questionnaire of which 106 were useable.[9] This 53 per cent response rate is fairly high for contingency type research and for conventional survey research (Babbie, 1973). The mean experience of the financial controllers was 23.6 years implying they had considerable experience. Hotel size ranged from 32 to 751 rooms with an average of 163.71 rooms. Although revenue data was requested, many respondents elected not to disclose this, suggesting that revenue was a sensitive issue in a highly competitive and dynamic environment. Therefore, revenue statistics are not provided nor discussed, as doing so would considerably reduce the sample size.

Measures

Summary statistics for the variables are reported in Table 1. *Size* was measured as the number of rooms for each hotel. For comparative purposes, number of employees was also used because most, if not all, manufacturing based studies used number of employees as a measure of size. Because of seasonal variations in hotel employee numbers, three levels of employee numbers were computed: total for the year including seasonal employees, total for the year without seasonal employees, and average for the year.[10]

Structure was measured using the standard questionnaire reported by Gordon and Narayanan (1984). Five items relating to the degree of decentralisation were factor analysed which produced one factor with an eigenvalue of 2.98 and explained 60 per cent of the variability in organization structure. The Bartlett test of sphericity (180, $P < 0.01$) and Kaiser's measure of sampling adequacy (0.83) indicated that the exploratory factor analysis for structure was within acceptable levels

[8]Discussions with financial controllers or officers holding a similar position in each hotel indicated they were appropriate persons for completing the questionnaires since they had a better understanding and more knowledge about the external environment, they were involved in the budget and related processes, and they collaborated closely with managers. Further, the Queensland Hotel Association and Queensland Motel and Hotel Association suggested financial controllers or a person holding a similar top management position would be the most appropriate subject. This view is consistent with Tymon *et al.*'s (1998) suggestion that since PEU is a strategic variable, top managers are the appropriate subjects.

[9]Comparing early and late respondents checked non-response bias. No significant differences were noted.

[10]Standardized measures of size were used in the analysis. As the results for these measures of size were identical, the results are reported for measure of size on a room basis. The Pearson correlation between room numbers and employee size (full time employees) was 0.643, $P = 0.00$ indicating that room numbers was an acceptable and reliable measure for size. Room was selected because it is a more stable measure than employee size.

Table 1
Summary statistics

	Cronbach alpha	Mean	SD	Theoretical range	Actual range
Size	—	163.71	145.81	—	32–751
Structure	0.83	4.38	1.49	1–7	1–7
PEU—Turbulence	0.71	4.53	1.26	1–7	1–7
—Competition for market	0.57	4.20	1.30	1–7	1–7
—Unpredictability	0.66	3.55	1.32	1–7	1–7
BSC					
Frequency					
Forecasting overall	0.91	3.75	1.89	1–7	1–7
Short-term forecast	0.91	4.33	2.09	1–7	1–7
Long-term forecast	0.82	3.17	1.90	1–7	1–7
Extensiveness					
Communication	—	4.58	2.39	1–7	1–7
Control	0.90	4.46	2.28	1–7	1–7
Performance					
Evaluation	0.81	4.42	2.19	1–7	1–7
Forecasting	0.95	5.24	2.33	1–7	1–7

(Tabachnik and Fidell, 1989). A confirmatory factor analysis using EQS (Bentler, 1995) was performed to assess the convergent validity[11] of the items measuring the structure construct. The chi-square statistic and the comparative fit index (CFI) are two important indicators of the fit of the measurement model. Since a statistically significant chi-square indicates a malfitting model, it is a 'badness' of fit measure. The CFI is arguably a more direct and reliable indicator of goodness of fit (Bentler and Bonnett, 1980). The goodness of fit indices for the structure construct indicated a good fit (the chi-square of 4.609 ($P = 0.33$) and CFI of 0.997 exceeded the minimum 0.90 recommended by Bentler and Bonnett (1980)). The reliability (Cronbach alpha) for these five items was 0.83 which was judged acceptable according to Nunnally's (1978) criteria. Factor scores for each respondent were used in subsequent analyses.

PEU was measured using an adapted version of Gordon and Narayanan's (1984) adaptation of Khandwalla (1972, 1977). According to Tymon *et al.* (1998), this PEU instrument is the only one that clearly measures perceived uncertainty of the external environment. Two items were dropped from the final version because the pilot study indicated they were not immediately relevant to the service industry. These items related to technology and the legal, political, and economic constraints.[12] Pearson correlation coefficients for the PEU measures are shown in Table 2. Correlations statistically significant at $P < 0.05$ ranging from -0.244 to 0.702 generally indicate the presence of more than one PEU factor. A Varimax rotated exploratory factor analysis

[11]Convergent validity refers to the degree to which items in a scale measure the same latent variable.

[12]Discussions with respondents participating in the pilot study indicated that these issues were not relevant to their operating decisions. Miller (1993) and Werner *et al.* (1996) suggested that the technology construct should be dropped because it was found unacceptably unreliable.

Table 2
Pearson correlation for PEU items

Variable		1	2	3	4	5	6	7
(1)	Competition for supplies							
(2)	Competition for manpower	0.425*						
(3)	Price competition	0.125	0.282*					
(4)	No. of services & packages marketed	0.009	0.433*	0.211#				
(5)	Economic turbulence	0.150	0.220#	−0.009	0.340*			
(6)	Technological turbulence	0.343*	0.297*	0.005	0.319*	0.702*		
(7)	Predictability of competitors' actions	−0.084	−0.191	−0.084	−0.200#	0.212#	−0.140	
(8)	Predictability of consumers' preferences	−0.244#	−0.160	−0.05 1	0.021	−0.025	−0.075	0.494*

* $P < 0.01$; # $P < 0.05$.

Table 3
Varimax rotated factor loadings for PEU

	Turbulence	Competition for market	Unpredictability	Competition for supplies
Economic turbulence	0.90			
Technological turbulence	0.86			
Price competition		0.78		
No. of services & packages marketed		0.66		
Competition for manpower		0.65		
Predictability of competitors' actions			0.86	
Predictability of consumers' preferences			0.85	
Competition for supplies				0.91
Eigenvalue	2.55	1.41	1.21	1.06
% Variance explained	32	18	15	13

Bartlett's Test of Sphericity = 201.4; $P < 0.01$ and KSA = 0.60.

produced four dimensions explaining 78 per cent of the total variance all with eigenvalues greater than one. These factors were labelled turbulence, competition for market, unpredictability, and competition for supplies as shown in Table 3. As shown in Table 3, the Bartlett's test of sphericity and Kaiser's measure of sampling adequacy for factorability of PEU were within acceptable levels (Tabachnik and Fidell, 1989).

Traditionally, PEU has been operationalized as a uni-dimensional construct in management accounting research. The multi-dimensional structure proposed in this research is inconsistent with much of the extant contingency literature (see Tymon *et al.*, 1998). Since the more commonly used exploratory factor analysis does not validate the convergent and discriminant validities of latent variable indicators, two confirmatory factor analyses using EQS were performed. The first confirmatory factor analysis was undertaken to ascertain if PEU was a uni-dimensional construct.

All PEU measures were specified to load onto one PEU factor. The results indicated a significant misfit (chi-square of 400.00, $P = 0.00$ and CFI $= 0.00$). The second confirmatory factor analysis assessed the convergent and discriminant validities[13] of the measures and factors identified by the earlier theory and exploratory factor analysis. Guided by theory and the exploratory factor analysis, the PEU items were specified to load onto their respective four factors (refer Table 3). The chi-square of 32.90, $P < 0.001$ and CFI of 0.873 indicated that the proposed four factor structure for PEU was a vast improvement over the single factor model but with a marginally unacceptable fit. Because of its relatively large standard error (Byrne, 1994) the fourth factor, competition for supplies, was dropped. Respecifying the confirmatory factor analysis model to three factors yielded a chi-square of 13.63, $P = 0.092$ and CFI $= 0.961$. These indices suggest a good fit.[14]

Therefore, three dimensions of PEU were used, viz, turbulence, competition for market, and unpredictability. Turbulence reflects the dynamism of the economic and technological environment. The intensity of competition for price for accommodation, seeking technical manpower, and launching of new services/packages were captured by the competition for market factor. The unpredictability dimension captures the extent to which customers' preferences and competitors' actions are predictable. Factor scores were derived for each PEU factor for each respondent and used in subsequent analyses. As shown in Table 1, the reliability (Cronbach alpha) of the three factors were judged acceptable using Nunnally's (1978) criteria. The results of the confirmatory factor analysis and the reliability of each scale imply that items within each scale are measuring a single latent variable, and that each scale is indicative of a separate latent variable.[15] Although the data was from one geographic region and therefore, significant variations in PEU were not expected, the possibility that the three components of PEU varied according to the location (and therefore also clientele) of hotels within the one region was considered. The sample was partitioned into three major locations, viz, the south east coast of Queensland known as the Gold Coast, the Brisbane metropolitan area, and the central coast of Queensland known as the Sunshine Coast. An ANOVA by location was performed for each of the three dimensions of PEU. The ANOVA results did not reveal significant ($P > 0.10$) variations in any of the three dimensions of PEU.

Budget System Characteristics was measured through an adapted version of the instrument developed by Cress and Pettijohn (1985) and Lyne (1992). The BSC section of the questionnaire consisted of 10 items capturing *frequency* of forecasting (items 1, 2, 3) and *extent* of use of the budget for: communication (item 4), performance evaluation (items 5, 6), control (items 7, 8), and forecasting

[13]Discriminant validity refers to the degree to which each scale measures a separate latent variable.

[14]This is the only study since Gordon and Narayanan (1984) that examines the factor structure of PEU and the reliability of each factor (see Tymon *et al.*, 1998, for a review of studies examining PEU).

[15]Decomposing PEU avoids the ambiguity underlying the PEU construct which is necessary for a meaningful development and test of contingency theory (Otley, 1980; Briers and Hirst, 1990) and also enables a better understanding of the influence of the *components* of PEU on BSC. From a methodological perspective, possible confounding of PEU due to using a summative measure is also eliminated. A second order confirmatory factor analysis was also run to determine if the three PEU dimensions could be collapsed into an overall PEU factor. The results indicated a poor fit (chi-square = 4196.38, $P = 0.00$, CFI $= 0.00$).

(items 9, 10).[16] The initial question in this section of the questionnaire, not forming part of the 10 items, asked respondents if their organization used budgets at all. If this question was answered in the affirmative then respondents were asked to rate on a seven-point scale the extent to which budgets were used for various purposes (see footnote 16). Responses received indicated that all hotels used the budget for planning and control purposes. Where appropriate, responses for the items were averaged to form a single scale for the relevant BSC. Summary statistics and Cronbach alpha are shown in Table 1. The Cronbach alpha results indicate satisfactory internal reliability of the BSC items.

4. Results

A traditional path analysis approach using multiple regression was used to compute the direct and indirect path coefficients.[17] The direct effects of the

[16]The items were: (1) Forecasting of your organization's sales and profits, and of the size and the nature of the markets are: from not done at all (1) to done to a great extent (7); how *frequently* does your organization make (2) short-term forecasts and (3) long-term forecasts from: never (1) to frequently (7) and weekly to annually. To what *extent are budgets used* (4) as a means by which management communicates to other levels in the organization; (5) to judge performance; (6) as a means of calculating rewards; (7) to motivate employees to do better; (8) to control performance by calculating and investigating variances; (9) to forecast the future and (10) to forecast profit maximizing. The scale for items (4) to (10) was a seven-point scale from (1) not used at all to (7) used to a great extent. It is acknowledged that the level of sophistication of the MCS in each hotel may differ thus affecting the extent to which budgetary information is provided and used for various purposes. However, the literature (e.g. Emmanuel *et al.*, 1990; Amigoni, 1978) suggests that budget systems are the main providers of the information considered in this study. Moreover, controlling for MCS sophistication is difficult in a large-scale cross-sectional study such as this and similar studies reported in the literature may suffer from this control threat. MCS sophistication can be conceptualized and measured in many ways thus presenting a challenge and opportunity for future research. If it is accepted that larger organizations would tend to have a more sophisticated MCS then the incorporation of the size variable in the framework of this study controls for MCS sophistication to some extent. MCS sophistication may also vary across industries. The study of one industry minimizes the variation of sophistication. Finally, assuming that hotels in this study, in keeping with technological advances, have implemented technologically advanced information systems then MCS sophistication could also be considered relatively uniform across hotels. A more detailed case study approach could address this issue and is left to future research.

[17]While analysing the hypothesized relationships using structural equation modelling (SEM) would produce optimum results, it was not employed due to limitations of the data. SEM requires a fairly large sample (recommended minimum of 100) for a reliable analysis. The minimum sample size increases as the number of parameters (hypothesis) to estimate increases. This requirement is explained by the concept of *statistical identification* of a structural model. Briefly, statistical identification refers to the question of 'whether there is a unique set of parameters consistent with the data' (Byrne, 1994, p. 15). A model is said to be identifiable and hence its parameters estimateable if the number of estimateable parameters is less than or equal to the number of data points (variances and covariances). Byrne (1994) recommends an over-identified model in which the data points exceed the number of parameters to estimate. Analysing the data for the present study using SEM and the maximum likelihood method of EQS (Bentler, 1995) consistently produced under-identification errors. An under-identified error occurs if the model cannot be estimated due to insufficient information for identifying a determinate solution. Further support for the under-identification results is provided in Hair *et al.* (1995). Hair *et al.* (1995) recommend a minimum of five respondents per estimateable parameter for a valid and reliable solution. Accordingly, the 33 hypothesized parameters to estimate requires a minimum of 165 respondents whereas there were 106 responses for this study. It is acknowledged that traditional path analysis assumes no random measurement error in the measurement scales. Consequently, any attenuation effects of random error may not reveal relationships between latent variables that may exist. However, on this basis, the traditional path analytic approach is conservatively biased—it under-estimates the parameters.

contextual variables (PEU, size and structure) on BSC (communication, control, and performance evaluation) were tested by estimating the following regressions with respect to hypotheses 1 (1_A, 1_B, 1_C), 2_A, 3 (3_A, 3_B, 3_C), 4 (4_A, 4_D, and 4_E) and hypothesis 7 (7_A, 7_B, 7_C):

$$X_{6i} = \beta_o + \beta_1 X_1 + \beta_2 X_2 - \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \quad (1)$$

where X_1 = PEU-turbulence—only with respect to communication; X_2 = PEU-competition for market (+ve effect on communication, −ve on control and performance evaluation); X_3 = PEU-unpredictability; X_4 = size; X_5 = structure; X_{6i} = BSC: communication ($i = 1$), control ($i = 2$), and performance evaluation ($i = 3$).

To test the direct effects of the three PEU factors on the frequency ($H2_B$, $H3_D$, $H4_B$) and extensiveness of forecasting ($H2_C$, $H3_E$, $H4_C$), the following regressions were run:

$$X_{6i} = \beta_o + \beta_1 X_1 - \beta_2 X_2 - \beta_3 X_3 \quad (2)$$

where X_1 = PEU-turbulence; X_2 = PEU-competition for market; X_3 = PEU-unpredictability; X_{6i} = BSC: frequency of forecasting ($i = 4$), and extensiveness of forecasting ($i = 5$).

Direct effects on structure were tested by regression equation (3). This regression represents hypotheses 5 and 6, the effects of PEU and size on structure.

$$X_5 = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \quad (3)$$

where X_1 = PEU-turbulence; X_2 = PEU-competition for market; X_3 = PEU-unpredictability; X_4 = size; X_5 = structure.

Pearson correlation coefficients for these hypothesized relationships are presented in Table 4. There is a strong correlation amongst the BSC variables suggesting they relate to one factor. PEU-turbulence is significantly and positively correlated with all five BSC variables at $P < 0.01$. PEU-competition for market is significantly and positively correlated with communication, forecasting frequency, and forecasting extensiveness at $P < 0.05$. PEU-unpredictability is not significantly related with any BSC variable. Size is significantly and positively correlated with all BSC variables at $P < 0.01$ while structure exhibits statistically significant positive associations with control, performance evaluation, and forecasting extensiveness at $P < 0.01$ and at $P < 0.05$ with communication and forecasting frequency. Size and structure were not statistically significantly correlated.

The direct effect regression results are presented in Table 5. Tests of the indirect effects of PEU and size, acting through structure, on BSC (hypotheses 8, 9 and 10) were conducted through a path analysis. The path model is presented in Figure 1. In the path diagram, the path coefficients (p_{ij}) specify the relationships between the variables. These path coefficients are equivalent to standardized beta coefficients by first regressing X_6 on X_1, X_2, X_3, X_4, and X_5 (Duncan, 1966; Heise, 1969; Chenhall and Morris, 1986) which is represented by equation (1). The second step is to regress structure on PEU and size as reflected in equation (3). The direct and indirect effects of the contextual variables are found by combining the path coefficients as shown in Table 6. Results of the path analysis are shown in Table 6.[18]

[18]Since there are a large number of path coefficients, they are not reported in Figure 1 due to lack of space and doing so would clutter Figure 1.

Table 4
Pearson correlation coefficient for all variables

	Variable	1	2	3	4	5	6	7	8	9
(1)	Communication									
(2)	Control	0.842*								
(3)	Performance evaluation	0.807*	0.979*							
(4)	Forecasting frequency	0.784*	0.781*	0.763*						
(5)	Forecasting extensiveness	0.781*	0.869*	0.837*	0.830*					
(6)	PEU-turbulence	0.379*	0.418*	0.374*	0.456*	0.431*				
(7)	PEU-comp. market	0.204#	0.133	0.099	0.246#	0.209#	0.00			
(8)	PEU-unpredictability	−0.152	−0.073	−0.050	−0.134	−0.086	0.00	0.00		
(9)	Size	0.381*	0.340*	0.312*	0.336*	0.392*	0.203	0.198	0.118	
(10)	Structure	0.208#	0.267*	0.285*	0.234#	0.307*	0.184	0.086	−0.042	0.092

* $P < 0.01$; # $P < 0.05$.

Ex post power analyses were conducted for each regression reported in Table 5. Based on the power formula and regression power tables in Cohen (1988), the power for each regression was computed. The analysis indicated that regressions for tests of hypotheses 1, 2, 3, 4 and 7 had statistical power in the range 80 to 99 per cent which are considered acceptable given the recommended 80 per cent threshold for high power (Cohen, 1988). Regressions for hypotheses 5 and 6 had a power of 50 per cent suggesting that there is only a 50 per cent chance that the inferences from that regression for significant coefficients are valid. Interested readers are referred to Cohen (1988) for details and implications of power analysis.

Results of direct effect hypotheses 1, 2, 3, 4, 5, 6 and 7

The results for hypothesis 1 in Table 5 show that size was significantly and positively associated with three BSC, viz, communication, control, and performance evaluation. These results support all parts of hypothesis 1. The betas representing the effects of PEU-turbulence on BSC support all parts of hypothesis 2. PEU-turbulence had significant and positive relationships with communication, frequency of forecasting, and extent of forecasting. Table 5 shows that while PEU-unpredictability had relationships with all BSC in the predicted direction, the only significant relationship was for communication. Thus, only $H3_A$ is supported for the effects of PEU-unpredictability on BSC. Hypothesis 4 examined the relationship between PEU-competition for market and BSC. The beta coefficients reported in Table 5 indicate significant and positive effects of PEU-competition for market on frequency of forecasting ($H4_B$) and extensiveness of forecasting ($H4_C$). The results for the remaining hypothesized relationships were not significant ($H4_A$, $H4_D$, $H4_E$). Hypothesis 5 was not supported as indicated by the regression results reported in Table 5. This indicates that size does not influence structure. The relationship was however in the hypothesized direction. Only one PEU factor, PEU-turbulence, had a significant association with structure. Therefore, hypothesis 6 is supported only for the PEU-turbulence factor. Hypothesis 7, examining the effects of structure on BSC, was supported in relation to using the budget for control ($H7_B$) and performance evaluation ($H7_C$) purposes. Structure had positive and significant effects on these two BSC, while there was a non-significant but predicted directional effect on communication ($H7_A$).

Table 5
Regression results

	Coefficient	Value	Standard error	t	Probability
Hypotheses 1, 2, 3, 4 & 7					
Communication					
PEU-turbulence (H_{2A})	β_1	0.29	0.21	3.20	<0.01
PEU-comp.market (H_{4A})	β_2	0.09	0.22	0.97	ns
PEU-unpredictability (H_{3A})	β_3	−0.18	0.20	−2.13	<0.05
Size (H_{1A})	β_4	0.29	0.002	3.01	<0.01
Structure (H_{7A})	β_5	0.11	0.21	1.32	ns
$AdjR^2 = 0.25$, $F = 8.04$, $P = 0.00$					
Control					
PEU-comp.market (H_{4D})	β_2	0.01	0.21	−0.11	ns
PEU-unpredictability (H_{3B})	β_3	−0.10	0.20	−1.13	ns
Size (H_{1B})	β_4	0.34	0.002	3.42	<0.01
Structure (H_{7B})	β_5	0.23	0.20	2.57	<0.05
$AdjR^2 = 0.15$, $F = 5.62$, $P = 0.00$					
Performance evaluation					
PEU-comp.market (H_{4E})	β_2	−0.01	0.21	−0.54	ns
PEU-unpredictability (H_{3C})	β_3	−0.07	0.19	−0.78	ns
Size (H_{1C})	β_4	0.23	0.002	2.36	<0.05
Structure (H_{7C})	β_5	0.21	0.20	2.35	<0.05
$AdjR^2 = 0.20$, $F = 6.27$, $P = 0.00$					
Forecasting frequency					
PEU-turbulence (H_{2B})	β_1	0.46	0.16	5.45	<0.01
PEU-comp.market (H_{4B})	β_2	0.25	0.16	2.95	<0.01
PEU-unpredictability (H_{3D})	β_3	−0.13	0.16	−1.60	ns
$AdjR^2 = 0.26$, $F = 13.66$, $P = 0.00$					
Forecasting extensiveness					
PEU-turbulence (H_{2C})	β_1	0.43	0.20	4.99	<0.01
PEU-comp.market (H_{4C})	β_2	0.21	0.20	2.42	<0.05
PEU-unpredictability (H_{3E})	β_3	−0.09	0.20	−0.99	ns
$AdjR^2 = 0.22$, $F = 10.66$, $P = 0.00$					
Hypotheses 5 and 6					
Structure					
PEU-turbulence (H_{6A})	β_1	0.18	0.10	1.76	<0.10
PEU-comp.market (H_{6B})	β_2	0.08	0.11	0.73	ns
PEU-unpredictability (H_{6C})	β_3	−0.04	0.10	0.45	ns
size (H_5)	β_4	0.02	0.001	0.22	ns
$AdjR^2 = 0.01$, $F = 1.14$, $P = 0.34$					

Results of indirect effect hypotheses 8, 9 and 10

Hypotheses 8, 9 and 10 proposed indirect effects of PEU and size, respectively, acting through structure on three BSC, viz, communication, control, and performance evaluation. The results in Table 6 indicate that there were very weak indirect effects of PEU and size on BSC. According to Bartol (1983) and Mia and Clarke (1999), a path coefficient of 0.06 and greater is important in a path analysis. None of the estimated indirect effects are greater than, or equal to, the suggested 0.06 threshold. The absence of finding significant indirect effects is probably attributable to insignificant

Table 6
Path coefficients and decomposition of effects

	Observed correlation	Direct path coefficient	Direct effect	Indirect path coefficient	Indirect effect	Unanalysed effects
PEU-turbulence (X1)						
Structure (X5)	0.184	P51	0.178	N/A	N/A	0.006
Communication ($X6_1$)	0.379	$P6_11$	0.286	$P6_15$ P51	0.02	0.073
PEU-competition for market (X2)						
Structure (X5)	0.086	P52	0.077	N/A	N/A	0.009
Communication ($X6_1$)	0.204	$P6_12$	0.09	$P6_15$ P52	0.01	0.104
Control ($X6_2$)	0.133	$P6_22$	−0.011	$P6_25$ P52	0.018	0.126
Performance evaluation ($X6_3$)	0.099	$P6_32$	−0.005	$P6_35$ P52	0.02	0.084
PEU-unpredictability (X3)						
Structure (X5)	−0.042	P53	−0.044	N/A	N/A	0.002
Communication ($X6_1$)	−0.152	$P6_13$	−0.181	$P6_15$ P53	0.005	0.034
Control ($X6_2$)	−0.073	$P6_23$	−0.102	$P6_25$ P53	−0.010	0.039
Performance evaluation ($X6_3$)	−0.050	$P6_33$	−0.069	$P6_35$ P53	0.009	−0.01
Size (X4)						
Structure (X5)	0.092	P54	0.024	N/A	N/A	0.068
Communication ($X6_1$)	0.381	$P6_14$	0.287	$P6_15$ P54	0.003	0.091
Control ($X6_2$)	0.340	$P6_24$	0.335	$P6_25$ P54	0.005	—
Performance evaluation ($X6_3$)	0.312	$P6_34$	0.232	$P6_35$ P54	0.005	0.075
Structure (X5)						
Communication ($X6_1$)	0.208	$P6_15$	0.114	N/A	N/A	0.094
Control ($X6_2$)	0.267	$P6_25$	0.233	N/A	N/A	0.034
Performance evaluation ($X6_3$)	0.285	$P6_35$	0.210	N/A	N/A	0.075

N/A = not applicable since these are direct effects.

relationships between the PEU factors and structure (H_6)[19] and between size and structure (H_5). A second possibility relates to the statistical technique adopted. The traditional path analysis approach is incapable of assessing or correcting for measurement error, thus failing to reveal relationships that do in fact exist (Bagozzi *et al.*, 1980). While structural equation modelling would correct for measurement error, it was not employed for reasons outlined in footnote 17.

5. Discussion

This organizational level study investigated the relationships between contextual variables internal and external to the organization and a number of specific BSC. The framework for the study is presented in Figure 1. The results of the study assist in understanding how the selected contextual variables singly, and in combination, influence BSC in hotels. Based on a sample of 106 hotels, the results generally suggest that:

(1) different dimensions of PEU have differential effects on BSC,

(2) not all dimensions of PEU have significant effects on the structure of hotels,

[19]While PEU-turbulence had a significant relationship with structure, structure did not have a significant relationship with communication, the only indirect path between PEU-turbulence and BSC.

(3) hotel structure is associated with some BSC,

(4) hotel size is associated with BSC,

(5) hotel structure is not influenced by hotel size, and

(6) PEU has a weak indirect effect through structure on BSC.

The result that there is no significant relationship between size and structure is inconsistent with Bruns and Waterhouse (1975) and Merchant (1981), amongst others, but consistent with the work of Mills (1986) in organizational theory. Results obtained were similar to the number of employees measure of size.[20] Therefore, on the basis of these observations, it is inferred that hotel size does not have a significant association with structure. Hence, the size—structure contingency relationship observed in the manufacturing industry (Bruns and Waterhouse, 1975; Merchant, 1981) is not generalizable to hotels examined in this study. Mills (1986) observed minimal impact of firm size on structure for service firms but a greater impact for manufacturing firms. Mills (1986) explained that the lower complexity for service firms accounts for this difference. The fact that some large hotels may offer a limited array of services and facilities despite the number of rooms and employees, is analogous to the complexity explanation advanced by Mills (1986). More recently, Brignall (1997) argued that service firms such as hotels are likely to be functionally integrated rather than being functionally different. The rationale for integrating various functions lies in the packaged nature of services offered by hotels and high on-site customer interaction. In comparison, larger manufacturing firms tend to represent increasing levels of functional differentiation (high complexity), thus decentralization becomes imperative.

Using a widely recognized automobile club accommodation guide it was found that each of the four general type of hotels (hotels $n = 30$, resorts $n = 26$, motels $n = 37$, and holiday units $n = 13$) offered common core services. These were accommodation, restaurant, and recreational facilities. An ANOVA was performed to determine if the type of services offered differed across each type of hotel. A significant effect was found ($P < 0.05$) which following *post hoc* comparisons revealed that this difference was driven by differences between hotels and motels ($P < 0.10$). On average, hotels offered a more extensive range of services relative to motels. Hotels offered various types or luxury levels of accommodation, more than one restaurant, licensed bar, gymnasium, pool and conference facilities. Motel services were limited to a narrower range of accommodation, a pool and in some cases, a restaurant. Motels typically were self-contained. Moreover, hotels tended to resemble large chain type operations such as the 'Marriotts' and 'Park Royals' whereas motels were relatively smaller and owner operated. A correlation analysis was performed to determine if the size and structure relationship varied across hotel types. The results did not reveal significant associations.[21] The preceding analyses suggest

[20]The use of employee size in the regression did not alter the inferences drawn from the results. Beta for employee size was -0.001, $t = -0.013$, $P = 0.990$.

[21]The correlation between size and structure for each hotel type was: hotels $r = -0.418$, $P > 0.10$, resorts $r = 0.066$, $P > 0.10$, motels $r = -0.214$, $P > 0.10$ and holiday units $r = 0.089$, $P > 0.10$. Potential difference in structure between hotels that were part of a chain and independent hotels was considered. Following a classification of hotels into chain or independent, an ANOVA was performed. There was no significant difference in structure between chain and independent hotels ($F = 0.668$, $P > 0.10$).

that generally hotels are not functionally different, thus explaining the insignificant relationship between size and decentralization.

Larger more diverse hotels tend to use the budget more extensively. As hotels expand in size, they tend to rely on the budget more extensively for communication, performance evaluation, and control. These results are consistent with Bruns and Waterhouse (1975) and to some extent with Merchant (1981). Merchant's (1981) results between structure and communication were contrary to his theoretical expectations. Ezzamel (1990) also observed contrary relationships between (i) size and performance evaluation & control and (ii) structure and performance evaluation & control. The structure—BSC results imply that when hotels delegate authority, they use the budget to coordinate, monitor, and evaluate this authority. The size—BSC association is not surprising if the potential determinant of hotel size is considered. It is possible that hotels in a chain are larger than independent hotels thus ownership structure may have a bearing on BSC. In order to maintain control of hotels that are geographically dispersed, management of chain hotels is more likely to implement formal control and performance evaluation mechanisms. Their independently owned counterparts are relatively less likely to implement extensive formal control and performance evaluation systems as the owners may be geographically closer to the action. Accordingly, the three BSC found to be related to size were analysed using an ANOVA where the factor was chain hotels or independent hotels. ANOVA was used because the measure chain or independent was dichotomous. Since the results indicated that chain hotels were significantly larger than independent hotels ($F = 20.948$, $P < 0.01$), it was expected that the BSC would also differ by ownership structure, with more extensive use of budgets for chain hotels. The results were as expected. Hotels in a chain used the budgets more extensively than independent hotels for communication ($F = 9.162$, $P < 0.01$), control ($F = 6.195$, $P < 0.05$), and performance evaluation ($F = 5.729$, $P < 0.05$). Non-parametric Kendall's Tau correlation tests yielded similar results with chain or independent having a correlation of 0.404 ($P < 0.01$) with size. These results suggest that the size and BSC relationship is attributable, in part, to ownership structure.[22]

The PEU-structure association was significant only for the environmental turbulence dimension of PEU. This suggests that hotels decentralize decisions to counter turbulence rather than unpredictability or competition. This is reasonable since reactions to turbulence are much easier to anticipate at lower organizational levels with unpredictability being better left to the centralized accounting information system.

Table 7 summarizes the observed relationships between PEU and BSC. PEU-unpredictability was negative and significant in its relationship with the communication aspect of BSC. This finding is not unreasonable because as the environment becomes more difficult to predict, quantification of environmental effects would become increasingly difficult and complex. Moreover, as the environment became more unpredictable, the results indicated non-significant relationships with using the budget for control and performance evaluation purposes. The findings for PEU-unpredictability are consistent with Chenhall and Morris' (1986) argument that

[22]Future research could examine the specific nature of chain hotels in that whether hotels are simply part of a chain for marketing purposes, whether the chain name is franchised or not and whether there is one owner who operates geographically both nationally and internationally. Data on these dimensions were not available for this study and hence this is left for future research.

Table 7
Summary of PEU effects on BSC

BSC	Dimensions of PEU					
	Turbulence		Competition		Unpredictability	
	Exp.	Obs.	Exp.	Obs.	Exp.	Obs.
Communication	+	$+^{***}$	+	+ ns	−	$-^{**}$
Control	N/A	N/A	−	+ ns	−	− ns
Performance evaluation	N/A	N/A	−	− ns	−	− ns
Frequency of forecasting	+	$+^{***}$	+	$+^{***}$	−	− ns
Extent of forecasting	+	$+^{***}$	+	$+^{**}$	−	− ns

Exp. = expected; Obs. = observed; N/A = not applicable as relationship not hypothesized; + = positive effect; − = negative effect; $^{***}P < 0.01$; $^{**}P < 0.05$; ns = not significant.

under high unpredictability, budgets become ineffective control devices as initial standards become outdated and less relevant. The PEU-unpredictability findings are also consistent with the notion that when the environment becomes less predictable then financial measures become less appropriate for control and performance evaluation purposes (Govindarajan, 1984; Gordon and Narayanan, 1984; Fitzgerald *et al.*, 1991).

It is appropriate that the hotels surveyed tended to rely on the budget less extensively for performance evaluation and control when the environment was highly unpredictable because doing so may induce pressure and hence dysfunctional and myopic behaviour (Merchant, 1990). Furthermore, evaluating performance via budgets under highly unpredictable conditions may be met with explanations that budget shortfalls are due to unpredictable and uncontrollable environmental factors (Merchant, 1990).

The significant PEU-turbulence relationship with the communication aspect of BSC indicates that as the environment becomes more turbulent then greater reliance is placed on the budget for communication purposes. Taking the observed significant relationships between PEU-unpredictability and communication, and PEU-turbulence and communication, suggest that if the environment is turbulent in predictable (unpredictable) ways, then the budget may be used extensively (not used extensively) to communicate environmental changes. The significant associations between PEU-turbulence and using the budget more frequently and extensively for forecasting purposes provide further support for this inference.[23] On the other hand, as environmental competition intensifies, hotels increase the frequency and extent of forecasting (PEU-competition for market had significant positive relationships with

[23]The interaction effect of PEU-turbulence and PEU-unpredictability on BSC was tested by running regressions containing three independent variables, viz, PEU-turbulence, PEU-unpredictability and their interaction effect. PEU-turbulence was measured as a dichotomy where low unpredictability (less than the median) was coded 1 and high unpredictability (greater than the median) coded −1. Note that median scores were not included because those observations do not clearly fall into either category. Consequently, the sample was reduced from 106 to 86. Results for the communication aspect of BSC revealed a positive interaction coefficient ($\beta_3 = 0.723$) that was significant at $P < 0.10$. This implies that if the environment were turbulent but predictable then the budget would be used for communication purposes. The interaction term was also positive for frequency of forecasting and extent of forecasting but not significant ($P > 0.10$). The achieved expected direction implies once again that if the environment was turbulent but predictable then hotels tend to increase the frequency and extent of forecasting.

forecasting aspects of the budget). The finding that environmental turbulence and competition induce more extensive and more frequent forecast and communication via budgets, reflects the responsiveness of hotels' MCS to environmental conditions. This observation is consistent with Amigoni (1978) and Gordon and Miller's (1976) contention that decision makers need to react rapidly, and communicate the effects of changing trends in the environment before they become more problematic. The finding that budgets are not used for performance evaluation and control under intense environmental competition is consistent with Gordon and Narayanan (1984) and Merchant (1990). They demonstrated that under high PEU, less reliance was placed on the budget for control and performance evaluation purposes.

The results of this study are consistent with the argument that hotels facing environmental turbulence tend to adopt decentralized structures (Gordon and Miller, 1976; Waterhouse and Tiessen, 1978; Gordon and Narayanan, 1984), and that under decentralized circumstances, more formal mechanisms for coordination, communication, and control are required (Bruns and Waterhouse, 1975; Merchant, 1981; Flamholtz, 1983). From the results of the relationships between contextual variables and BSC, it is inferred that use of the budget for a particular purpose depends on perceptions of aspects of environmental uncertainty, organizational structure, and size. The results for PEU indicate that hotels align the use of the budget in varying degrees depending on whether the environment is turbulent, competitive or unpredictable, thus generally supporting earlier research (e.g. Lawrence and Lorsch, 1967; Khandwalla, 1972; Gordon and Miller, 1976; Amigoni, 1978; Otley, 1978; Ewusi-Mensah, 1981). More importantly, the current study extends earlier research by illustrating the differential effects of dimensions of PEU on BSC. The size—BSC and the structure—BSC results support prior studies (Bruns and Waterhouse, 1975; Merchant, 1981; Flamholtz, 1983) which imply that with increasing size and decentralization, reliance on the budget will also increase for communication, control, and performance evaluation purposes.

6. Conclusion

In practical terms, the results imply that management of hotels respond to increased environmental uncertainty by increasing the *frequency* of forecasting. This enables them to communicate more recent and updated budgetary information so that they can enhance their competitiveness and control the issues before they become increasingly difficult to manage. When the environment was perceived as more turbulent but less unpredictable, the budget was used more extensively to forecast the future and communicate the results to appropriate organizational levels. This suggests that if the environment is turbulent in predictable ways then forecasting will be less problematic than when the environment is turbulent and unpredictable. Furthermore, the *extent* to which budgetary information is used appropriately is also affected by managers' perceptions of the environment. When the environment was perceived unpredictable and highly competitive, the budget was used less extensively for communication, performance evaluation, and control. The results also strongly suggest that management of hotels that adopt a more autonomous approach through decentralization, implement appropriate budgetary mechanisms to monitor this autonomy.

This study raises an important implication for researchers studying the PEU construct. The results of this study indicate that the PEU construct is not universally uni-dimensional. It is multi-dimensional and therefore influences features of BSC in varying degrees. Since PEU is a dynamic phenomenon—also studied by numerous researchers at various temporal periods—it is expected that the items in the PEU instrument may not always load on one PEU factor and that various aspects of PEU may be more salient under different economic and industrial conditions. A methodical implication for a thorough understanding of the influence of PEU on MCS is that researchers should not simply conduct a reliability analysis of the PEU scale (e.g. Chenhall and Morris, 1986; Fisher, 1996) but also verify through confirmatory factor analysis that the items load on one dimension prior to aggregating the items into a single scale. This is particularly important if the instrument is used in a non-manufacturing context. Gerloff *et al.* (1991) provide evidence on the multi-dimension nature of the PEU construct used by Chenhall and Morris (1986) and Fisher (1996). Gerloff *et al.* (1991) argued that to meaningfully unravel the complex effects of PEU, it is imperative that PEU be separated into its components. The present study supports and provides further evidence for this argument. An interesting and potentially fruitful avenue for future research would be to consider the interaction effects between the PEU factors and their effects on BSC and other variables. Another potentially insightful research avenue would be to consider the appropriateness of the PEU instrument used in this and other studies especially in light of changes in environmental conditions since the first development and use of the various PEU instruments by management accounting researchers. Perhaps it is time to develop a refined instrument.

While the results of this study provide general support for the application of contingency relationships to the service sector, they must be interpreted in light of the study's limitations. First, the results may not be generalizable to other types of service organizations such as utilities (hospitals) and professional business. Fitzgerald *et al.* (1991) discuss differences in the design and use of MCS in three different types of service firms, viz, professional services, service shops, and mass services. Second, this study investigated the budgetary aspect of MCS in hotels. Other non-financial and non-quantitative control mechanisms are likely to operate in conjunction with budgetary controls. Some of these control mechanisms are the culture of the organization, philosophy of management, non-financial business process controls, customer satisfaction and so on. However, Collier and Gregory (1995) show that hotels are increasingly gathering strategic information encompassing financial, non-financial and non-quantitative information that are subsequently formalized into budgets. Thus, this study is limited to the extent that the budgetary process does not capture other types of controls operating along side the formal budget. Third, because a limited set of variables was studied for manageability purposes, the model examined was incomplete. The level of variances explained by the contextual variables and the relatively large unanalysed effects suggest the presence of other contextual variables that may influence BSC. Some of these suggested variables include organizational objectives (Otley, 1980), strategy (Simons, 1987), and managerial style (Ezzamel, 1990). Finally, all respondents were part of high-level management; responses from lower levels may indicate different relationships. The limitations present opportunities for future research.

Acknowledgements

I gratefully acknowledge the support of the Queensland Hotel Association and the Queensland Motel and Accommodation Association in making this study possible. The participation of various hotels is also acknowledged. I am also thankful to Christine Munro for her research assistance, the editor Michael Bromwich for his comments, two anonymous reviewers, David Otley, seminar participants at the Faculty of Business and Hotel Management (Griffith University—Gold Coast Campus), particularly, Chris Guilding, and the Department of Commerce, University of Saskatchewan, particularly, Murray Lindsay and Daryl Lindsay.

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