

HOSPITALITY COST SYSTEM DESIGN: THE IMPACT OF STRATEGY AND USE OF DATA

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ABSTRACT

This study examines the relation between cost system functionality and contingent factors in the hospitality industry. An empirical survey via questionnaires was conducted on a sample of 100 leading hotels enterprises in Greece. The analysis of the gathered data led us to the conclusion that the majority of hotels' cost systems do not provide qualitative cost data. Results indicate that the level of cost system functionality is significant positively associated with the low cost strategy and the extent of the use of cost data.



Cost system design, contingent factors, management accounting, hotels, Greece

INTRODUCTION

Evidence about cost accounting and its use in tourism enterprises and especially in hotels is rather limited (Pellinen, 2003). However, there is an active interest in hospitality management and particularly in cost and management accounting practices of hotels and tourism enterprises (Harris & Brown, 1998). Potter and Schmidgall (1999) believe that little innovation has occurred in hospitality cost and management accounting practices and there are many issues that deserve research attention.

To explain the diversity of management accounting practices researchers have adopted contingency theory to demonstrate how specific aspects of an accounting system are associated with various contextual variables (Emmanuel *et al.*, 1990). The contingency approach to management accounting is based on the premise that there is no universally appropriate accounting system applying equally to all organizations in all circumstances. Rather, it is suggested that the particular

features of an appropriate cost accounting system will depend upon the specific circumstances in which an organization finds itself. How effective the design of a cost system is depends on its ability to adapt to changes in external circumstances and internal factors. Contingency theory contends that a firm's strategy, organizational structure, and environment dictate its choice of control system (Chenhall, 2003). Any associated benefits or drawbacks are a function of the degree of alignment between the design of a firm's cost system and the specific set of circumstances the firm faces. Benefits or drawbacks are not solely attributable to the absolute level of cost-system functionality

Accounting literature identifies at least five critical attributes of cost system design: the level of detail provided, the ability to disaggregate costs according to behavior, the frequency with which information is reported, the accuracy of cost data and the extent to which variances are calculated. The first attribute, the level of detail, refers to the system's ability to supply data about cost objects that vary in size from entire divisions to individual products, components, and services. Chenhall and Morris (1986), Feltham (1977), Kaplan and Norton (1992), and Karmarkar *et al.* (1990) incorporated level of detail in their characterizations of cost-system design.

The second characteristic of cost-system design, the ability to disaggregate costs according to behavior, closely relates to the first. To supply detail, the system must first separate and classify costs according to behavior. The ability to disaggregate costs and classify them according to their behavior directly supports the ability to provide useful detailed cost information. Basic cost classifications explored in the literature include fixed/variable costs, direct/ indirect costs, and controllable/non-controllable costs (Feltham & Xie, 1994; Johnson, 1992; Karmarkar *et al.*, 1990; Khandwalla, 1972). In fact, several researchers contend that correctly identifying cost behavior is the first step in supplying accurate cost information at all levels of detail (Cooper & Kaplan, 1991, McGown, 1998; Shank & Govindarajan, 1993, Swenson, 1995).

The third attribute, cost reporting frequency enables managers to expediently address problems and identify opportunities for improvement (Hilton, 1979; Karmarkar *et al.*, 1990; Simons, 1987). Cost-reporting frequency enables managers to expediently address problems and identify opportunities for improvement. Chenhall and Morris (1986) measured the frequency of cost reports and contended that more frequent reporting provides managers with feedback on decisions and information on recent events that they can use to guide future courses of action. They found that more frequent reporting was believed to be particularly useful to managers who operate in highly uncertain environments. More frequent reporting may also indicate that information is provided on a more timely basis. For example, if cost information is reported monthly rather than quarterly, managers can address concerns that arise between quarters, rather than wait until the end of the quarter.

The fourth characteristic of cost-system design is the accuracy of cost data. Inaccurate cost accounting information is not relevant or useful for decision making (Atkinson *et al.*, 2001). Designers of cost systems have to develop a system that leads to the most accurate information possible (Copper & Kaplan, 1992). More accurate product cost can be obtained by using systems that trace cost more directly from support activities to products/services. The final cost-system trait, variance analysis, highlights differences between budgeted and actual outcomes and seeks to explain such differences (Karmarkar *et al.*, 1990; Simons, 1987). Proponents of variance analysis contend that it aids in managerial decision making by identifying corrective managerial action (Johnson & Kaplan, 1987).

More functional cost systems are those that can provide greater detail, better classify costs according to behavior, report cost information more frequently, provide accurate cost data to a great extent, and calculate more variances. This study investigates associations between cost system design and contingent factors in the hospitality industry using a sample of 100 hotels in Greece. The remainder of the paper is organized as follows. The next section briefly sets out the review of the literature. The research hypotheses are presented in Section 3. This is followed by details of the research method. The fifth section contains the survey results. Conclusions, limitations and implications for future research are presented in a final section.

1. LITERATURE REVIEW

Studies in cost and management accounting applied in the lodging industry have been conducted both in the fields of tourism management and accounting. They cover various aspects of the tourism industry. Apparently, however, most of the studies have focused on hotels (Harris & Brown, 1998). The topics of the previous research cover the whole field of cost and management accounting. As far as hotels are concerned, there are studies on strategic management accounting (Collier & Gregory, 1995), the structure of cost accounting system (Brignall *et al.*, 1991; Brignall, 1997), the general and relative importance of the knowledge in accounting techniques in hotel management (Damitio & Schmidgall, 1990), the use of management accounting information for decision making (Downie, 1997), the roles of and participation of controllers in hotel management (e.g. Burgess, 1996), the links between managerial accounting and corporate management (Mongiello & Harris, 2006), the pricing practices and their relationship to cost accounting (Pellinen, 2003), the acceptance and usage of Uniform Systems of Accounts for the Lodging Industry (Kwansa & Schmidgall, 1999), the budgeting and budgetary control practices (e.g. Schmidgall *et al.*, 1996; Schmidgall & Ninemeier, 1987) and the use of financial and non-financial measures for performance evaluation (e.g. Atkinson & Brander Brown, 2001).

Mia and Pattier (2001) investigate use of management accounting systems by general managers and department managers in luxury hotels. The results indicate that general managers and department managers make equal use of management accounting systems (MAS) for both short and long term decisions. However, a detail analysis of the data by manager groups indicates that general managers differ from department managers with respect to their use of MAS for making decisions. Furthermore, general managers, compared to department managers, are found to be more satisfied with the frequency in which MAS is available to them. On the issue of department managers' performance evaluations by general managers, the results reveal that general managers put more emphasis on financial than on non-financial performance indicators.

From the literature review, we make sure that there is little empirical research in management accounting systems and no evidence linking internal, organizational factors and external factors to control-system design in the hospitality industry, like those which have been accomplished to other service industries, such as hospitals (Pizzini, 2006; Hill, 2001; Hill & Johns, 1994; Eldenburg, 1994; Lawrence, 1990).

2. HYPOTHESIS DEVELOPMENT

2.1 Extent of the use of cost data

The scope of a cost system is expressed in terms of its use in order to support strategic and operational decision needs. Brinker (1992) discusses cost system scope in terms of coordinating a set of activities that are necessary for meeting customer demands in addition to maintaining an organization's own economic viability. Cooper and Kaplan (1991) also identify such activities as those required for product pricing, product design, budgeting, process improvements, while also meeting traditional performance measurement and evaluation needs. The coordination of these activities produces information that can support strategic and operational decisions and therefore assists in the implementation of strategy relating to those decisions. Cost system scope is an important concept that reflects the use of cost information in a number of decision areas or activities of the organization (Nicolaou, 2001). Analytical models of single-firm settings find that more detailed, accurate and frequent cost data are more useful in decision making (Feltham, 1977; Hilton, 1979). Chenhall (2003) reports that the cost system design is associated with the demands that its users have for information. Thus, the following hypothesis is tested:

H1: There is a positive relationship between the extent of use of cost data and the cost system functionality

2.2 Low cost strategy

Using Porter's framework (1980, 1985), strategy can be measured along two dimensions: product differentiation and low-cost production. Contingency theory contends that a firm's strategy, its choice of control system (Chenhall, 2003). Product differentiation companies use more management accounting systems that enhance companies' ability to differentiate their products and to satisfy their customers (Hoque & James, 2000; Chenhall & Langfield-Smith, 1988; Ittner & Larker, 1997; Atkinson *et al.*, 1997; Kaplan & Norton, 1996). On the other hand, low cost strategies are using more management accounting systems that enhance companies' ability to control costs (Chenhall & Langfield-Smith, 1988; Johnson & Kaplan, 1987). However, it has been suggested in the management accounting literature that highly sophisticated systems are suitable for companies that adopt low cost strategy (Chenhall & Langfield-Smith, 1988). The following hypothesis is therefore tested:

H2: There is a positive relationship between the low cost strategy and the cost system functionality

3. RESEARCH METHODOLOGY

3.1 Sample characteristics and data collection

The sample surveyed included the leading Greek hotel enterprises. The criteria used for the selection of the hotels were their sales revenues, as well as their net profit for the year 2003, selected from the ICAP's Directory 2002 (Gallup's subsidiary in Greece).

The research was realized in two phases. In the first phase a participation form was sent to the selected companies accompanied by a cover letter, which included a brief reference of the main goals of the study. Financial managers were asked to indicate the type(s) of cost and management accounting practice(s) used by their hotels, as well as to state correspondence information in order to address the survey questionnaire, in case they were interested. In the second phase of the research, the survey questionnaire was designed and sent to the sampled hotels. Before the finalization of the questionnaire, a pilot test took place. More specifically, interviews were conducted with four Chief Accountants who had a long experience in cost and management accounting practices in order to make sure that the questionnaires' content was easy to understand. Through this testing we managed to account for omissions or vagueness in the expressions used to formulate the questions.

The participation form was sent to 196 hotel companies and 112 firms responded positively in the first phase of the survey (57% response rate). Respondents were

asked to complete the questionnaire from the perspective of the firm where they employed. For the companies that did not show interest in the research, the main reasons they cited were the lack of time and the fact that answering questionnaires was not one of their top priorities. Following, the questionnaire was sent to those hotels that completed the participation forms. 100 completed questionnaires were finally received during the second phase of the survey. The response rate was 51%. The questionnaires were answered at a percentage of 96% by executives in the top hierarchy of the financial departments (financial managers and chief accountants) that have firm knowledge of the cost and management accounting information used within their companies. Thus, we believe that the answers are reliable.

The financial, geographical and company characteristics for the final sample of hotel enterprises are shown in Tables 1 and 2.

Table 1. Financial profile of the participated hotel enterprises

	<i>Mean</i>	<i>Std. Deviation</i>	<i>Max</i>	<i>Min</i>
Sales revenue for the year 2003 (€ mil)	9.2	11.4	3.2	99

Table 2. Category, geographical area, number of beds, management status and type of hotels that participated in the survey

	<i>N</i>	<i>%</i>
Categories		
5 -stars	34	34
4- stars	58	58
3 -stars	8	8
Geographical Area		
Athens	17	17
Crete	30	30
Aegean islands	27	27
Ionian islands	10	10
Macedonia	9	9
Other	7	7
No of beds		
Up to 300	8	8
300 -350	10	10

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	<i>N</i>	<i>%</i>
350-500	13	13
Over 200	69	69
Company management status		
Private company	53	53
Member of national chain	30	30
Member of multinational chain	17	17
Type of Hotel		
Resort	45	45
City hotel	54	54

3.2 Variable measurement

3.2.1 Extent of use of cost data (USE)

The extent of use of cost data was measured using an instrument developed on this study and based on the literature. It comprises an eleven-item five-point Likert-scaled instrument anchored by (1) to no extent (5) to a great extent which respondents were asked to indicate the extent of the use of cost data. A factor analysis is shown in Table 3, revealed that all items loaded on a single factor. The Cronbach alpha for the five-item measure is 0.90. Descriptive statistics for the instrument are presented in Table 4.

Table 3. Factor analysis of the use of cost data

Items	Factor Loadings	Eigenvalue	Percent of variance
Service pricing			
Customer profitability analysis	0.868		
Service mix	0.875		
Performance evaluation	0.832		
Budgeting	0.864		
Output	0.798		
Cost reduction	0.834		
Service design	0.905		
Acceptance– rejection sales packages from tour- operators	0.812 0.892		
Benchmarking	0.834	9.34	85.7
Business process re-engineering	0.736		

Table 4. Descriptive statistics of the variables in the study

<i>Variable</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Actual Minimum</i>	<i>Actual Maximum</i>
Extent of use of cost data	100	29.9	9.12	13	53
Low cost strategy	100	12.31	3.97	5	25

3.2.2 Low cost strategy (COST)

Low cost strategy was measured using an instrument developed on this study and based on the literature. It comprises a five-item five-point Likert-scaled instrument anchored by (1) to strongly disagree (5) to strongly agree which respondents were asked to indicate the if the firm is being cost oriented. A factor analysis, as shown in Table 5 revealed that all items loaded on a single factor with an eigenvalue of 4.2 explaining 70.1% of the variance in the underlying variable. The Cronbach alpha of 0.84 suggests that its internal consistency is satisfactory. Table 4 provides descriptive statistics for the measure.

Table 5. Factor analysis of low cost strategy

Items	Factor Loadings	Eigenvalue	Percent of variance
The hotel follows a policy oriented to the cost decrease in order to increase its revenues	0.820	4.2	70.1
The hotel provides services in low cost so as to have a competitive advantage	0.785		
The hotel's policy is to provide motives to the departments which manage to lower their costs	0.812		
The increase of the productivity-efficiency is vitally connected with these motives	0.794		
The hotel develops cost control programs of its activities	0.834		

3.2.3 Cost- system functionality (FUNC)

The survey asked 13 questions relating to cost system attributes using binary (dichotomous) variables. That instrument developed on this study and based on the literature. These attributes have been classified in 5 categories which are *accuracy*, *detail*, *classification*, *frequency* and *variance*. Descriptive statistics for the variables is presented in Table 6.

Regarding the validity scale measurement that concerns the accuracy of the cost data, which are provided by the cost systems, a proxy variable has been used. The

respondents have been asked to record the allocation bases number which is used by cost systems. According to Cooper and Kaplan (1998), the cost data accuracy is linked to the number of the allocation bases which are being used. This variable is positively and significantly correlated to the binary variable, which refers to whether the hotel's cost system provides accurate cost data to a high rate ($r= 0.46$, $p<0.01$), and through which we reach the conclusion that the scale measurement of the binary variable is valid.

Likewise, as regards the scale measurement validity which concerns the cost reports supply frequency, one more proxy variable has been used that was named *timely*. This variable is measured using a five item seven-point Likert scale ranging from (1)=to strongly disagree to (5)= to strongly agree, in which respondents were asked to indicate if they receive cost accounting information from their cost accounting system in a timely manner (in time). *Timely* is positively and significantly correlated to the binary variable which is monthly mentioned in the supply cost reports by the cost system ($r= 0.43$, $p<0.01$) and according to which we conclude that the scale measurement of the binary variable is valid, too.

None of the correlation coefficients of the independent variables in this study are high thus suggesting that multicollinearity is not an issue. Lewis-Beck (1990) reported that intercorrelations need to be 0.8 or above before they are of concern.

4. RESEARCH FINDINGS

From the data analysis we have inferred that 24 hotel units out of the 100 which participated in the research have adopted more functional cost systems. In contrast, 76% of the sample uses less functional cost systems or simplistic costing systems. More analytically, 24 cost systems of the hotels which took part in the research survey, supply cost by individual service, by customer, room, agency, room night and classify cost into fixed and variable cost, direct and indirect, controllable and non controllable. These cost systems provide monthly cost data to their users in the form of reports and calculate efficiency, price and mix variances. In addition, the finance managers of these hotels believe that the cost accounting information which is provided from the above costing systems is characterized by a great extent of accuracy. On the contrary, the cost systems of the rest of the hotels, do not examine both the cost per cost object and their behaviour analytically. The cost accounting information which is provided by these cost systems is not quite accurate and it is given to their users through annual reports. These cost systems did not calculate efficiency, price and mix variances.

According to the answers which they have given about the cost system's attributes, the hotel units have been classified into 2 groups: to the ones which have adopted a more functional system (this group contains of 24 hotels) and to those with a less functional system (this group contains of 76 hotels). To be classified into the first

group, a hotel must have all the attributes of the cost system that have been recorded. In the opposite situation, a hotel unit is classified into the second group that uses a less functional cost system.

Table 6: Critical attributes of cost system functionality

<i>Detail</i>	N
cost by individual service (N=100)	24
cost by customer (N=100)	24
cost by room night (N=100)	24
cost by room (N=100)	24
cost by tour operator /travel agent (N=100)	24
<i>Frequency</i>	
monthly (N=100)	24
<i>Classification</i>	
fixed/variable cost (N=100)	24
direct/indirect cost (N=100)	24
controllable/non- controllable cost (N=100)	24
<i>Accuracy</i>	
great degree of accuracy of cost data (N=100)	24
<i>Variance</i>	
efficiency variances (N= 100)	24
price variances (N= 100)	24
mix variances (N= 100)	24

In order to test the hypothesis specified in Section 3 the following model was applied:

$$Y = b_1 + b_2 USE + b_3 COST + e$$

where Y: the dichotomous variable of more functional cost systems and less function cost systems. Therefore, binary logistic regression is used and the applied to 100 hotels, that has established formal costing systems. The above model contains 2 independents variables. Table 7 presents the results of the binary logistic regression. The two finals columns of the table present the collinearity statistics. It can be seen the variance inflation factors well below the generally accepted critical threshold of 10 (an indication of high levels of multicollinearity) and tolerances are above 0.2 (represent a more conservative estimate that multicollinearity maybe a problem) (Hair *et al.*, 1998). Table 7 also indicates that the following variable is statistically significant: The extent of the use of cost data ($p < 0.01$) and Low cost strategy ($p < 0.01$).

A positive sign for the logistic regression coefficient indicates that the variable is positively related to more functional cost systems whereas a negative sign indicates that as the variable increases, a hotel is less likely to adopt highly functional cost

systems. All of the significant variables listed above are in the direction predicted. The Chi-square statistics shown in Table 8 is comparable to the overall F-statistics in multiple regression. The model is significant at the 0.000 level. The Hosmer and Lemeshow goodness of fit value (0.771) measures the correspondence of the actual and predicted values of the dependent variable. This statistic tests the hypothesis that the observed data are significantly different from the predicted values. Thus, a non-significant statistics indicates that the model does not differ significantly from the undeserved data (Hair *et al.*, 1998). Nagelkerke R square (0.55) attempts to quantify the proportion of explained “variation” in the logistic regression model. It is similar in intent to the R² in a linear regression model (Norusis, 2000). The final entry in Table 7 indicates that the model correctly classified 86% of the respondents as more or less functional cost systems adopters.

Table 7. Logistic regression analysis with the dichotomous variable more/less functional cost systems as the dependent variable (N=100)

	Expected sign	B (Logistic coefficient)	Standard error	p-value	Exp.B	Collinearity statistics	
						Tolerance	VIF
Extent of the use of cost data	+	0.906	0.318	0.005	0.247	0.585	1.710
Low cost strategy	+	1.153	0.378	0.001	4.822	0.692	1.446
Constant		-2,046	0,440	0.001	0.129		
Chi-square				0.000			
Hosmer – Lemeshow goodness of fit				0.771			
Durbin Watson				1.870			
Cox & Snell R square				0.366			
Nagelkerke R square				0.549			
Per cent correctly classified				86%			

CONCLUSIONS

This study examines relations between the cost-system functionality and contingent factors in the hospitality industry using a sample of 100 hotels in Greece. The results indicate that the level of cost-system functionality used is low. The majority of cost systems followed by the hotels do not provide quality cost data. Those cost systems do not classify cost based on the hotels' actions, they do not calculate variances between budgeted and actual outcomes, and they do not provide detailed cost information per cost object. They provide its users with cost reports in an annual basis and their cost data are not characterized by a great degree of accuracy. These systems provide cost information which can be used more for the published annual financial statements preparation and less for decision making, budgeting, control and performance evaluation.

Evidence was presented to support the acceptance of two of the two hypotheses presented. The level of cost-system functionality is significant positively associated with the low cost strategy and the extent of the use of cost data. More specifically, the survey results demonstrate that the hotels emphasizing cost control and are cost oriented have more functional cost systems because managers require more information for motoring cost. This is confirmed by previous research in hospitals (Hill, 2001). Moreover, hotel enterprises which use more cost data for pricing decisions, customer profitability analysis (CPA), service mix designs, outsourcing decisions, cost reduction, budgeting, performance evaluation, benchmarking, business process re-engineering use more functional cost-systems. Hence, it appears that there is a relation between cost system design and the degree of the use of cost data to plan, control and make decisions. This confirms the findings appearing in the cost system design literature (Chenhall, 2003).

The findings are subject to a number of limitations. Cross-sectional studies as this can establish associations, but not causality. Another factor that may affect these results is the noisiness of the measures. A mail survey prevents an assessment of the survey respondent's actual knowledge of the cost accounting system, although the surveys were mailed to chief financial managers. A mail survey also presents the respondent from effectively clarifying his or her understanding of the questions. Moreover, the data were collected from hotels in Greece, thus, caution is needed in generalizing the results to other countries. Finally, the sample size was small, less than 100 firms, and we could not split it for validation purposes into analysis and holdout samples. The more functional cost systems group contains a little more than the minimum size of 20 observations required for logistic regression (Hair *et al.*, 1998). Thus, we develop the function on the entire sample and then we use the function to classify the same group used to develop the function. This procedure results in an upward bias in the predictive accuracy of the function, but is certainly better than no testing the function at all.

Despite these limitations, this study has important implications for research in hospitality cost and management accounting. The results provide the first empirical evidence of the relation between cost system functionality and contingent factors in the hospitality industry. Future research should consider incorporating other important variables from contingency theory that are likely to influence the level of functionality of cost system design, such as size, level of competition, top management support, satisfaction of the existing cost system, quality of information technology, lack of a perceived need by management accounting function to develop more functional cost systems, number of services variant and hotel management status. Could also be examined associations between cost system functionality and actual performance in the lodging industry.

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