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Using fuzzy cognitive map and structural equation model for market-oriented hotel and performance

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Firms are different from markets, resources and managerial expertise. Many studies strongly advocate that firms adopt a market orientation to achieve competitive advantage and can transform firm assets into superior performance. A paucity of research exists on how to develop market-oriented hotel and performance and is lacking an integrated framework to establish them. For establishing a guideline enabling systematic approaches to understand them, find or choose which combinations of changes in factors that would lead to the most desirable outcomes in order to adapt to the objectives of the hotel and to fill some research gaps. This study adopts concept of Total Quality Management (TQM's) IPO (Input-Processing-Output) and Resource-Based View to construct research model and use the Fuzzy Cognitive map and Structural Equation Model. By these objective methods make the decision maker has a clear picture of building competitive advantages in the hotel industry, identify and assess a lot of hypothetical situations which might occur in reality and to detect a group of the most desirable outcomes in limited hotel resource.

Key words: Competitive advantage, market orientation, resource-based view, structural equation model, fuzzy cognitive map.

INTRODUCTION

The hotel market is very similar, often easily substitutable service offerings. It is difficulties for hotel managers to differentiate an individual hotel from its competitors (Reid and Sandler, 1992). From Resource-Based View, firms should strive for developing and maintaining resources that help the firms develop capabilities for implementing value-creating strategies (Chatterjee and Wernerfelt, 1991; Hunt and Morgan, 1995). It is important in explaining the development of competitive advantages (Wernefelt, 1984; Barney, 1991; Bharadwaj et al., 1993), which are difficult to duplicate by competitors. Many studies strongly advocate that adopting market orientation can achieve or build competitive advantage. Market orientation can transform firm assets into superior performance (Hult and Ketchen, 2001; Hult et al., 2005; Zhou et al., 2005). Therefore, building market-orientated

environment will strengthen competitive advantages of enterprise (Barney, 1991). But a paucity of research exists on how to develop a firm's market orientation (Wrenn, 1997; Han et al., 1998). Literature is lacking an integrated framework to help organizations establish a market orientation (Martin and Martin, 2005), or to become market-oriented (Greenley, 1995; Harmsen and Jensen, 2004).

Market orientation depends on other constructs to strengthen its relationship with performance (Menguc and Ash, 2006). These constructs may arise as to where the influencing factors that may determine market orientation come from (Avlonitis and Gounaris, 1997). In the competitive market environment, the quality is regarded as the basic consuming condition. If firms have customer information without translating into quality products may affect selling. Total Quality Management (TQM) is seen as a means to increase marketing's preponderance and implementation within the organization through enhancing customer focus acquires within overall management system (Santos-Vijande et al., 2009), can be thought of

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of as interrelated sets of dyads between internal customers and suppliers (Goetsch and Davis, 1997) and is as organizations strive for a competitive advantage in markets (Sureshchandar et al., 2001). Some scholars have suggested that in order to develop a market orientation, a firm shall focus its internal customers and suppliers who in turn serve external customers (Hauser et al., 1996; Gronroos, 1990). But a lack of coordination or rivalries and distrust among departments is not unusual. Causing partial enterprises that have conducted TQM has not properly used it in marketing making top managers not to understand marketing topics. One-third of TQM-adopting enterprises still have prejudice (Witcher, 1995). Moreover, TQM demands a large amount of time that may be one of the reasons why TQM is not easily implemented and do not deliver much positive results (Ramayah and Saad, 2006). A lack of information regarding TQM or barriers to developing market orientation exists in the hotel and hospitality industry (Gray et al., 2000; Harris and Watkins, 1998; Lazari and Kanellopoulos, 2007). These factors may also cause hotels not to adopt an integrated framework to understand linkages between external market information and internal activities' quality situations, even help organizations develop a market-oriented hotel.

Some firms have some weakness such as limited markets, resources and lack of managerial expertise. Some managers are also lack ability of analyzing relation of all factors at the same time and usually tend to asses individually or two or three factors simultaneously at best (Kang et al., 2004), can not easily quantify the strength and direction of the interrelationships among factors depend on subjective or nondeterministic to evaluate and determine. A great extent TQM is not applied because executives have not dealt with it or consider it unnecessary in the hotel (Lazari and Kanellopoulos, 2007). A lot of controversies exist on elements made by the different researchers and professionals about TQM (Gehani, 1993). These elements of TQM will always be the guidelines to appraise the effectiveness of implementing TQM and results. Nevertheless, these elements have different importance weights in terms of their final contribution to the results (Montes et al., 2003). Do they separately affect market orientation? That is to say. Do these elements of TQM help to develop market-oriented hotel environment? On the other hand, Folyey and Fahy (2009) point out that examining the elements of a multidisciplinary model of market orientation combine how to create competitive advantage is a key to understand the relationship with performance. But prior empirical results are equivocal about the relationship between market orientation and performance (Gray and Hooley, 2002; Langerak, 2003). For establishing a guideline enabling systematic approaches to develop market-oriented hotel, find or choice which combinations of changes in factors that would lead to the most desirable outcomes in order to adapt to the objectives of the hotel and to fill above

some gaps. This study adopts TQM's IPO (Input-Processing-Output) concept model of Longo and Cox (1997) and Youssef et al (1996) and Resource-Based View to construct research model.

Fuzzy cognitive map is a kind of using soft computing technique and is similar to human reasoning and the human decision-making process to identify the most relevant design factors in order to enhance outcome variables (Stylios et al., 2008). The proposed map can successfully represent knowledge and human experience and can help the decision maker has a clear picture of affecting factors and their relation in the hotel to resolve a given decision-making problem. In addition to, for more objective method gained to quantify the causality coefficients and build an adjacency matrix to perform a FCM simulation. In this paper, we use SEM to understand the causality between variables or among multiple variables.

LITERATURE REVIEW

The relation of all variables

According to the Resource based view (RBV), competitive advantage stems from a firm's unique resources that are valuable, rare, and inimitable (Barney, 1991). The RBV of the business can sustain a competitive advantage in respect of its competitors by owning certain resources (Barney, 1991; Grant, 1991; Wernefelt, 1984). The Competitive advantage positively affects organization performance and represents an important, yet missing, component in existing market orientation research (Ketchen et al., 2007). Market orientation places the highest priority on the profitable creation and maintenance of superior customer value (Slater and Narver, 1998), is borrowing from the management and strategy domains (Foley and Fahy, 2009) and much of the market orientation literature has emerged from the RBV (Gray and Hooley, 2002). Many studies strongly advocate that firms adopt a market orientation to achieve competitive advantage and market orientation can transform firm assets into superior performance (Hult and Ketchen, 2001; Hult et al., 2005; Zhou et al., 2005). Therefore, the RBV is proposed as providing a meaningful framework to develop understanding of market orientation (Wernefelt, 1984; Barney, 1991; Fahy et al., 2000), implementation of the marketing orientation is the highest stage of development for organizations and critical component of the successful business performance (Kobylanski and Szulc, 2011). Building market-orientated environment will strengthen competitive advantages of enterprise (Barney, 1991).

Market orientation reflects the firm's propensity to adopt the marketing concept. It is typically measured by assessing firms' commitment on customer-oriented market intelligence (Day, 1994; Jaworski and Kohli, 1993; Slater and Narver, 1995). During the 1990s, the study of

market orientation has two major streams of research. The first stream is involved the refinement of the market orientation measures and refine the measurement scales of market orientation. The operationalization of market orientation is reflected in the activities and behaviors of an organization or as an organizational culture. Thereby market orientation definitions within the research community differ (Deshpande et al., 1993; Kohli and Jaworski, 1990; Narver and Slater, 1990), but their basic concept remains gathering information from customers, sharing this information internally, and responding appropriately to the changing needs of the market. Several scales for measuring market orientation are available. Kohli et al. (1993) develop a valid measure that includes intelligence generation, dissemination and responsiveness. Gray et al. (1998) suggested a parsimonious model of market orientation from Narver and Slater (1990), Jaworski and Kohli (1993), Deng and Dart (1994), comprising five dimensions: customer orientation, competitor orientation, inter-functional coordination, responsiveness, and profit emphasis. Anwar (2008) determined that market orientation should include customer focus, competitive focus, environmental scanning, strategy implementation, and development of new service. Different firms may adopt different strategies. Market orientation culture does not automatically lead to superior performance. It must first enable certain organization wide behaviors or activities, which in turn foster firm performance (Zhou et al., 2005). Therefore market orientation shall include information generation and dissemination, shared interpretation, and organization responsiveness.

The second stream is involved studying the antecedents and consequences of market orientation. In fact, the antecedents of market orientation as proposed by some researchers, have a been a number of studies linking various factors such as such as top management (that is, emphasis, risk aversion), interdepartmental dynamics (that is, conflict, connectedness), organizational systems (that is, formalization, centralization, departmentalization and reward systems) (Jaworski and Kohli, 1993), quality orientation (Sittimalakora and Hart, 2004), interdepartmental environment and rules for job execution (Vieira, 2010), leadership style (Farrell, 2000), training (Ruekert, 1992; Lovelock and Weinberg, 1984), process management (Anderson et al, 1994) and learning environment (O'Driscoll et al., 2001). They show that market orientation is borrowing from the management and strategy domains and clearly makes sense not to take an isolationist perspective, but to acknowledge the broader (Dobni and Luffman, 2003; Stoelhorst and van Raaij, 2004). Market orientation may lead to success without the inclusion of other complemented capabilities when analyzing the effect of its value (Day, 1994; Slater and Narver, 1995). That is to say, market orientation depends on other constructs to strengthen its relationship with performance (Menguc and

Ash, 2006). These constructs may arise as to where the influencing factors that may determine market orientation come from (Avlonitis and Gounaris, 1997).

Total Quality Management (TQM) is seen as a means to increase marketing's preponderance and implementation within the organization via the enhanced focus that customer orientations acquires within overall management system (Santos-Vijande et al., 2009), can be thought of as interrelated sets of dyads between internal customers and suppliers (Goetsch and Davis, 1997) and is as organizations strive for a competitive advantage in markets (Sureshchandar et al., 2001). Some scholars have suggested that in order to develop a market orientation, a firm shall focus its internal customers and suppliers who in turn serve external customers (Hauser et al., 1996; Gronroos, 1990). However, from Saraph et al.'s (1989), many studies have tried to develop an appropriate set of critical quality management constructs representing an integrated approach to TQM implementation in a business unit (Ahire et al., 1996a, b; Anderson et al., 1995; Flynn et al., 1995; Grandzol and Gershon, 1998, Rao et al., 1999). TQM system accords to the IPO (Input-Processing-Output) concept model to display the relationships between the TQM system and participants (Longo and Cox, 1997; Youssef et al., 1996). Input is defined as that which enlarges the process and involves both the internal and external environments. Processing is aimed at the needs of the customer in both the present and future when top management must combine input with the organizational capability of coping with desired goals. Output is defined as all participants (that is, an organization's members and departments, suppliers and customers) to deliver designed services as reliably and economically as possible to ensure profitability and customer satisfaction. TQM involves developing an enhanced interdepartmental dialogue within the organization, has pervaded organization management levels to a far greater extent than market orientation, and focuses on the internal processes to improve the implementation of the marketing concept (Mohr-Jackson, 1991). Moreover, market orientation is gathering, sharing, and responding appropriately to the changing needs of the market to achieve organizational goals and satisfy the needs and wants of customers. Therefore, market orientation can be regarded as a processing variable in the IPO model of TQM.

The elements of TQM will always be the guidelines to appraise the effectiveness of implementing TQM and lead to different implementing results. Nevertheless, these elements have different importance weights in terms of their final contribution to the results (Montes et al., 2003). Grandzol and Gershon (1998) have addressed that elements of TQM include customer focus, continuous improvement, leadership, internal/external cooperation, employee fulfillment, learning, and process management. In the hotel industry, firms reach collaboration with internal and external departments or units, introduce

process improvement and invest in continuous improvement that can help them to achieve higher performance (Dale and Plunket, 1990; Claver-Cortés et al., 2006). Enhancing the morale of employee fulfillment will result in the increase of a hotel's efficiency (Lazari and Kanellopoulos, 2007), along with the means for implementing the mechanism effectively such as reward and performance management system. Leadership and guest focus are the principles most commonly incorporated into TQM programs of hotels (Breiter and Bloomquist, 1998; Eliza et al., 2007). Learning involves company-wide training that acquires a strategic value for hotels (Boudreau et al., 2001; Claver-Cortés et al., 2006; Tihanyi et al., 2000) and enhances both the skill level of staffs and their degree of commitment to provide excellent service (Costa, 2004; Haynes and Fryer, 2000). Therefore, this study proposes that seven elements of TQM will help to develop a work environment directed to the adopting of the market orientation.

The consequences of market orientation are organized into four categories: organizational performance, customer consequences, innovation consequences, and employee consequences (Jaworski and Kohli, 1996). Market orientation provides a firm with market-sensing and customer-linking capabilities that lead to superior organizational performance (Day, 1994; Hooley et al., 2005), enhance customer-perceived quality of the organization's products and services by helping create and maintain superior customer value (Brady and Cronin 2001), in turn customer satisfaction and loyalty (Slater and Narver, 1994). However, prior studies assess hotel performance through the lodging index (Wassenaar and Stafford, 1991), revenue growth rates (Van Doren and Gustke, 1982), both objective and perceptual (Haber and Reichel, 2005), or financial and non-financial performance (Banker et al., 2000, 2005). Objective is measured by occupancy rate per room, gross operative profit and gross operative profit per available room per day. Perceptual contains competitive performance, and stakeholder satisfaction. Any organization wants to continue operations need finance performance support. To maximize its long-run performance, the business knows it must build and maintain a mutually beneficial relationship with its buyer (Narver and Slater, 1990). Therefore, hotel performance is measured by Moorman and Rust (1999) and Narver and Slater (1990), which including financial and customer-based performance in this paper.

Several research findings indicate that there is no significant direct relationship between market-orientated management and financial performance such as market share, return on equity, profitability, growth rate (Jaworski and Kohli, 1993; Pelham, 1997; Becker and Homburg, 1999; Sittimalakorn and Hart, 2004; Agarwal et al., 2003). But others find to have direct effect (Pelham and Wilson, 1996; Slater and Naver, 1994, 2000; Siguaw et al., 1994; Jaworski and Kohli, 1993; Naver and Slater, 1990). However, effective information acquisition and dissemination produced a high level of market orientation which is essential for creating and managing closer customer relationships with a good understanding of what customer value and firms consistently and quickly deliver high quality products and services in responding to changing market conditions (Ahire et al., 1996a). This study pro-poses that a market-oriented hotel can afford better pro-duct or service quality based on consumer data in order to achieve greater customer satisfaction and finance performance.

Fuzzy cognitive map (FCM)

Cognitive map (CM)

Cognitive map (CM) is commonly considered best methods of solute problems where experts can afford diverse opinions to gain a correct answer. The concept of CM is first proposed and applied by Axelrod (1976), is a representation of the causal relationships among the elements of a given environment or object and problem. A cognitive map is composed of nodes that may represent variables, states, events, inputs and output which are the key elements of the problem and are essential to model a system, arrows that indicate different causal relationships among factors and causality factors on each arrow indicating a negative (or positive) strength with which a node affects another. The graphical representation of a CM is given as an example in Figure 1 (Kardaras and Karakostas, 1999). The variables X, W, Y, Z and F are represented as nodes; and the causal relationships as directed graphs between variables, thus constructing a signed digraph. A path between two variables X and Y in a CM is a sequence of all nodes that are connected by an arrow from the first node X to the last node Y. There are two kinds of path. One is XWY. Another is XFZY. The total effect of variable X to variable Y is the sum of the indirect effect of X to Y through the paths XWY and XFZY. Both indirect effects are positive, which means that the total effect is also positive (+).

More specific and information rich cognitive maps are achieved by replacing those signs by positive or negative numbers, showing not only the direction but also the magnitude of the change. It can yield insights into indirect effects among nodes. Such indirect effects can be understood only after the entire map is displayed. But CM describes experts' perceptions about the subjective world rather than objective reality. It is difficult to determine and gauge the precise strength of the interrelationships among factors by experts. To quantify causality coefficients objectively is difficult. CM can be generalized into fuzzy cognitive map (FCM) by fuzzy edge values or causality values.

Fuzzy cognitive map (FCM)

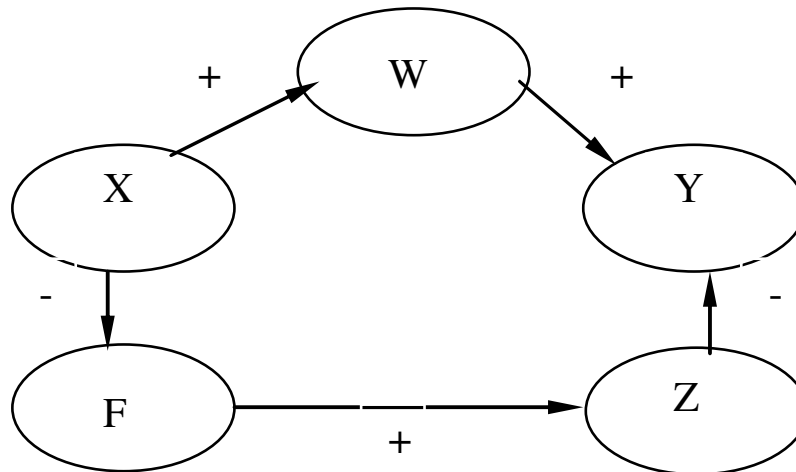FCM is fuzzy-graph structures for representing causal

Figure 1. Cognitive map.

reasoning (Kosko, 1986). FCM is consisted by nodes and weighted arcs. Nodes of the graph stand for the concepts that are similar to CM. Weighted arcs represent the causal relationships that exist between the concepts. Each concept is characterized by a number B_i that it results from transformation of the fuzzy real value of the system's variable. Between concepts, the edge e_{ij} form the causal concept B_i to concept B_j measures how much B_i causes B_j. When the weight is positive which the relationship between the two nodes is positive, zero when there is not any correlation, and a negative number when the relationship is negative. Therefore, if specific nodes are stimulated, the resulting activities can resonate through other nodes on the map along positively or negatively weighted connections (Lee and Ahn, 2009).

FCM is described by the connection matrix and the activation levels of its nodes can be represented as a state vector (Kosko, 1992). The matrix is formed by a number of causality coefficients on paths among factors. It is called the adjacency matrix that is composed of row and column factors, and corresponding causality coefficients between them. Row factors are perceived to cause factors and column factors are construed to effect factors. The values of nodes B_1, B_2,.....B_n together represent the state vector B which is called 'What-if' that is performed by decision maker's intention. The value of each element of the input vector can be 1 or 0 according to whether one element is enhanced or not. For example, an FCM state vector B (01101) means that the five nodes that form the FCM, the 2nd, 3rd and 5th nodes are activated, the 1st and 4th nodes are inactive at that particular time. Therefore, through what–if simulations, decision makers can identify a set of relevant decision variables and their acceptable values intended results. In order to compute an FCM state vector B at time step (t+1) the connection matrix F is multiplied by the state vector B (t). Kosko (1992, 1994) found that a threshold function was then applied so as to normalize the state

value, as $B(t+1) = S〔B(t).F〕$. Where B (t) is the state vector (1×n) of concept at some time step t. F is the FCM connection matrix (n×n). An FCM is constructed based on knowledge from a number of experts in regard to the same issue can be combined. Each expert's FCM is additively superimposed, whereby Kosko (1992, 1997) address the equation is used, as seen below, where F_i represented the augmented FCM matrix for expert i, n is equal to the number of experts, w_i is equal to the credibility weight of expert i.

$$F = \sum_{t=1}^{n} w_i F_i$$

FCM is a soft computing technique that follows an approach similar to human reasoning and the human decision-making process (Stylios et al., 2008). FCM closely corresponds to humans perceive and is easily altered to incorporate new phenomena (Rodriguez-Repiso et al., 2007). Therefore, it is a dynamic modeling tool (Irani et al., 2002) and is easily understandable, which can be used to analysis, test the influence of para-meters and predict behavior of the system (Rodriguez-Repiso et al., 2007), provide an inference mechanism that enables the fuzzy causal relations among factors to be identified and their impact to be constructed (Lee and Ahn, 2009) and accommodates this knowledge-base building property (Papageorgiou et al., 2009). Clearly FCM is significantly more flexible, valuable, and efficient than CM, and is a proven vehicle for representing such causal knowledge (Lee and Kim, 1997; Noh et al., 2000). It has been applied in Web-log data containing useful or meaningful information (Lee et al., 2002), design of agents (Miao et al., 2002), relationships management (Kang et al., 2004), support urban design (Xirogiannis et al., 2004), design of EDI controls (Lee and Lee, 2007),

Table 1. Construct measurement.

Construct	Construct definition	Construct sources
Customer Focus	Hotel's customers perceive their needs being met by the way hotel's products and services.	
internal/external cooperation	Hotel engages in noncompetitive activities among employees and externally among suppliers.	
Continuous improvement	Hotels pursue incremental and innovative improvements of its processes, products and services.	
Leadership	Senior executives establish and lead a long-term vision for the whole organization, driven by changing customer requirements, as opposed to internal management control.	Grandzol and Gershon (1998)
Employee fulfillment	Employees of the hotel feel the degree which hotel satisfies their needs.	
Learning	Hotel recognizes and supports the development of employees' skills, abilities, and knowledge	
Process management	Hotel has the set of technical and behavioral practices emphasizing the management of processes, or means of actions	
Market Orientation	A series of market information handle including information generation and dissemination, shared interpretation, organization responsiveness.	Kohli, Jaworski, and Kumar (1993) Huber (1991)
Finance performance	To assess the hotel's strategic market and financial outcomes, such as market growth and ROI	Moorman and Rust (1999)
Customer performance	To assess the firm's customer-based performance, including its customer satisfaction and customer retention	Narver and Slater (1990)

for medical decision support systems (Stylios et al., 2008), for the design of controls in business-to-consumer e-commerce web-based systems (Lee and Ahn, 2009), cotton yield management in precision farming (Papageorgiou et al., 2009).

METHODOLOGY

Questionnaire development and pilot test

The main method used in this study was a survey research. To do so, a questionnaire was designed. All the focal constructs of the model were measured using multiple items based on validated scales derived from Grandzol and Gershon (1998), Kohli et al. (1993), Huber (1991), Moorman and Rust (1999) and Narver and Slater (1990). Table 1 summarizes the constructs, the definition and sources of scales.

The questionnaire was first developed in English, but as the survey was conducted in Chinese, we used hotel managers and academicians to aid in the process of translation. The wording and interpretation of items and the extent which respondents would feel them posses the necessary knowledge to provide appropriate responses scrutinized until a final draft of the questionnaire.

After the draft questionnaire was developed, used respondent

anonymity, meaning anonymity of the measurement items and pilot-tested by 60 hotels' managing directors in order to correct possible defects and doubts. The result of pilot-test is that all variables' dimensions reliability is greater than Hair et al. (1998) suggested standard value 0.7. Items that do not significantly contribute to the reliability and have lower reliability are eliminated. The questionnaire included 45items that are retained for the main study (shows in Appendix A). Items were measured on the 7-point Likert-type scale ranged from strongly disagree to strongly agree.

Sample and data collection

The Tourism Bureau, M.O.T.C. Republic of China are responsible for the administration of domestic and international tourism policy making, execution and development in R.O.C. Our sampling frame derives from Tourism Bureau in Dec. 30th, 2009 statistics and displays 2,613 hotels. Owing to managers are widely believed to know the degree of development of all managerial factors, thereby them can provide the best information about hotels' business. The questionnaire survey was mailed to them. A personalized cover letter and a pre-paid envelope accompanying each questionnaire explained the purpose of the study and assured confidentiality of the responses. On the other, hand to obtain a high level of participation, the study also offered respondents an executive summary of the findings on completion of the study. The effective

Table 2. Construct reliability and convergent validity coefficients.

Construct	Number of Items	SFL[1] (min-max)	t-value[1] (min-max)	α[1]	CR[1]	AVE[1]
Total quality management	7					
Customer focus (TQM1)	3	0.91-0.93	37.15~37.62	0.94	0.94	0.85
Internal/External cooperation (TQM2)	5	0.84-0.90	26.30~30.20	0.94	0.94	0.76
Continuous improvement (TQM3)	3	0.91-0.93	37.29~37.74	0.94	0.94	0.85
Leadership (TQM4)	4	0.91-0.92	38.19~38.98	0.96	0.96	0.84
Employee fulfillment (TQM5)	3	0.92~0.93	38.09~38.22	0.95	0.95	0.86
Learning (TQM6)	4	0.73-0.79	16.93~17.49	0.85	0.85	0.60
Process management (TQM7)	6	0.91-0.93	38.0~40.67	0.97	097	0.85
Market orientation (2nd order CFA)	4	0.65-0.75	10.98-11.54	0.90	0.80	0.50
Information generation (MO1)	2	0.90-0.94	17.71-19.98	0.92	0.92	0.85
Information dissemination (MO2)	2	0.91-0.93	18.67-20.47	0.93	0.92	0.85
Shared interpretation (MO3)	2	0.89-0.94	17.70-21.52	0.92	0.91	0.84
Organization responsiveness (MO4)	3	0.87-0.97	17.63-21.68	0.94	0.95	0.85
Hotel performance	2					
Customer performance (HP1)	4	0.90-0.91	39.32~40.72	0.96	0.95	0.82
Finance performance (HP2)	4	0.90~0.93	38.66~41.19	0.96	0.95	0.93

SFL, standardized factor loading; α, Cronbach's alpha coefficient; CR, composite reliability; AVE, average variance extracted.

sample size for this analysis is 588. The overall response rate is 22.5% (588/2,613). The sample size of 588 is adequate for models with four constructs by Hair et al. (2006) recommended guidelines.

As in any type of survey research, non-response bias shall be test. In this paper, we adopt Armstrong and Overton (1997) concept that suggests to test for non-response bias in mail surveys and to assume non-respondents to be late respondents. The dataset was divided into two according to the number of days from initial mailing until receipt of the returned questionnaire. Early respondents were compared with late respondents along questionnaire items of each of the scales and used t-test procedure finds indicate no significant differences between the early and late respondent group variances which show non-response bias is not a problem and don't influence in this research. In addition, all measurement items are filled by a single respondent easily have Common Method Variance (CMV) problem (Podsakoff and Organ, 1986), which is one of the main sources of measurement error. Measurement error threatens the validity of the conclusions about the relationships between measures (Nunnally, 1978; Spector, 1987; Bagozzi and Yi, 1991). We use Harman's single-factor to test CMV (Andersson and Bateman, 1997; Aulakh and Gencturk, 2000). All factors were extracted with the first factor accounting for 34.252% of the total variance. It is lower than 0.50 (Peng et al., 2006). Clearly the observed relationships among constructs are not largely accounted for by the systematic variance associated with the measurement technique.

Research approaches

Causality is one of explanation form of events. The prior researchers used for the statements of decision makers, Neural network, or ask experts to suggest overall causality coefficients for each causal relationship (Eden et al., 1979; Caudill, 1990; Lee and Kim, 1997). Causal relationships can also use FCM (Huff, 1990). FCM allows a set of identified causality coefficients to form an adjacency matrix and yield a simulation. This simulation enables designers to

identify the most relevant design factors to enhance outcome variables and help the decision maker has a clear picture of affecting factors and their relation in the hotel performance. But this map is difficult to gauge their strength. And each map has less accuracy and reliably, the results cannot precisely describe (Kang et al., 2004; Lee and Ahn, 2009). For more objective method required to quantify the causality coefficients, build an adjacency matrix and indicate the significance of causal links to perform a FCM simulation. In this paper, we use SEM to understand the causality between variables or among multiple variables.

RESULTS AND ANALYSES

Reliability and validity analyses

A two-step structural equation modeling was used to test the hypothesized model. Maximum likelihood was used for all parameter estimation with Amos 16. The first confirmatory factor analysis (CFA) is conducted to evaluate the measurement model for modeled constructs. CFA enables performance of tests regarding the reliability, convergent validity and discriminate validity of the measurement model. To assess reliability and internal validity of the measurement model is examined by calculating the composite reliability (CR) and average variance extracted (AVE). As seen in Table 2, the composite reliability coefficients of all the constructs are acceptable, being larger than 0.6 (Bagozzi and Yi, 1988; Hair et al., 1998). The AVE of each measure is more than 50% of the variance as suggested by Bagozzi and Yi (1988) and indicates that the variance captured by the construct is greater than the variance due to measurement error (Fornell and Laker, 1981). Therefore, the internal validity of the measurement

Table 3. Discriminate validity coefficients [a]

	TQM1	TQM2	TQM3	TQM4	TQM5	TQM6	TQM7	MO1	MO2	MO3	MO4	HP1	HP2
TQM1	0.92												
TQM2	0.421	0.87											
TQM3	0.418	0.444	0.92										
TQM4	0.422	0.353	0.371	0.92									
TQM5	0.429	0.478	0.431	0.404	0.93								
TQM6	0.396	0.356	0.383	0.399	0.373	0.77							
TQM7	0.456	0.368	0.333	0.392	0.334	0.386	0.92						
MO1	0.341	0.198	0.252	0.366	0.305	0.236	0.244	0.92					
MO2	0.321	0.288	0.243	0.236	0.392	0.224	0.228	0.382	0.92				
MO3	0.185	0.136	0.129	0.174	0.170	0.100	0.187	0.301	0.314	0.92			
MO4	0.217	0.207	0.160	0.232	0.175	0.170	0.151	0.347	0.369	0.259	0.92		
HP1	0.392	0.327	0.394	0.348	0.372	0.300	0.325	0.386	0.403	0.172	0.261	0.91	
HP2	0.347	0.357	0.365	0.347	0.338	0.341	0.354	0.321	0.284	0.230	0.243	0.646	0.96

[a] Diagonal elements (bold) are the square root of average variance extracted (AVE) between the constructs and their measures. Off-diagonal elements are correlations between constructs.

model is adequate.

Convergent validity is a measure of the degree which two observed variables to measure the same construct correlated and is expected when each measurement's estimated pattern coefficient on its underlying construct factor is significant. Items have a factor loading over 0.45 (Jöreskog and Sörbom, 1996). In this paper, the convergent validity result of each latent variable is presented in Table 2. Standardized factor loading of each sub-dimension is all above 0.45 and significant. Therefore, convergent validity was achieved for all the study constructs.

Discriminate validity was assessed according to Fornell and Larcker's (1981) suggested approach. By examining AVE for each of the latent constructs and comparing this to the squared correlations among the constructs, the shared variance among any two constructs (that is, the square of their inter-correlation) was always less than the average variance explained by the construct, which suggests that discriminate validity has been achieved. In this paper the result of discriminate validity shows in Table 3. Given the discriminate validity, we conclude that all measures exhibit construct validity. Based on all of the reliability and validity analysis, the scale for the constructs appears to exhibit satisfactory measurement qualities and is adequate.

FCM simulation

For establishing a guideline enabling systematic approaches to develop market-oriented hotel, helps the decision maker has a clear picture of affecting factors and their relation in the hotel industry. It is necessary to devise a systematic way to estimate the causal relationships among customer focus, internal/external cooperation, continuous improvement, leadership, employee

fulfillment, learning and process management, market orientation, finance and customer performance. Although experts can assign numbers to the causal relationship but it is difficult to gauge their strength and has less accuracy and reliability, the resulting combined map cannot precisely describe the actual state of the hotel performance. For more objective method gained to quantify the causality coefficients to perform a FCM simulation. In this paper, we use SEM to understand the causality between variables or among multiple variables. This approach can validate the significance of causal links.

SEM analysis was performed and SEM results depicted in Figure 2 are χ^2=2064.93, df=731, X^2/df=2.82; GFI=0.86, RMSEA=0.056, AGFI=0.82, NFI=0.910, CFI=0.94, RFI=0.91, IFI=0.940, PNFI=0.86, PGFI=0.72. The results show in Figure 2 that the structural model exhibits a good fit with the data, with fit indices of fulfilling the respective benchmarks (Bagozzi and Yi, 1988; Doll et al., 1991; Hair et al., 1998) and the path coefficients for the model and their significance levels. Figure 2 shows that customer focus, internal/external cooperation, continuous improvement, leadership, employee fulfillment, training and process management positively affected to market orientation. Market orientation positively affected to finance and customer performance.

The fuzzy cognitive map (FCM) yields an adjacency matrix where is organized in the enhancement of some factors causes an effect on other factors. It includes important information such as direct effects as well as indirect effects from SEM model. Table 4 shows adjacency matrix that is derived from the standardized estimates effect as suggested in Figure 2 and Table 5. Row factors are perceives as cause factors and column factors are construed as effect factors.

Therefore, this study categorized eight factors such as customer focus, internal/external cooperation, continuous
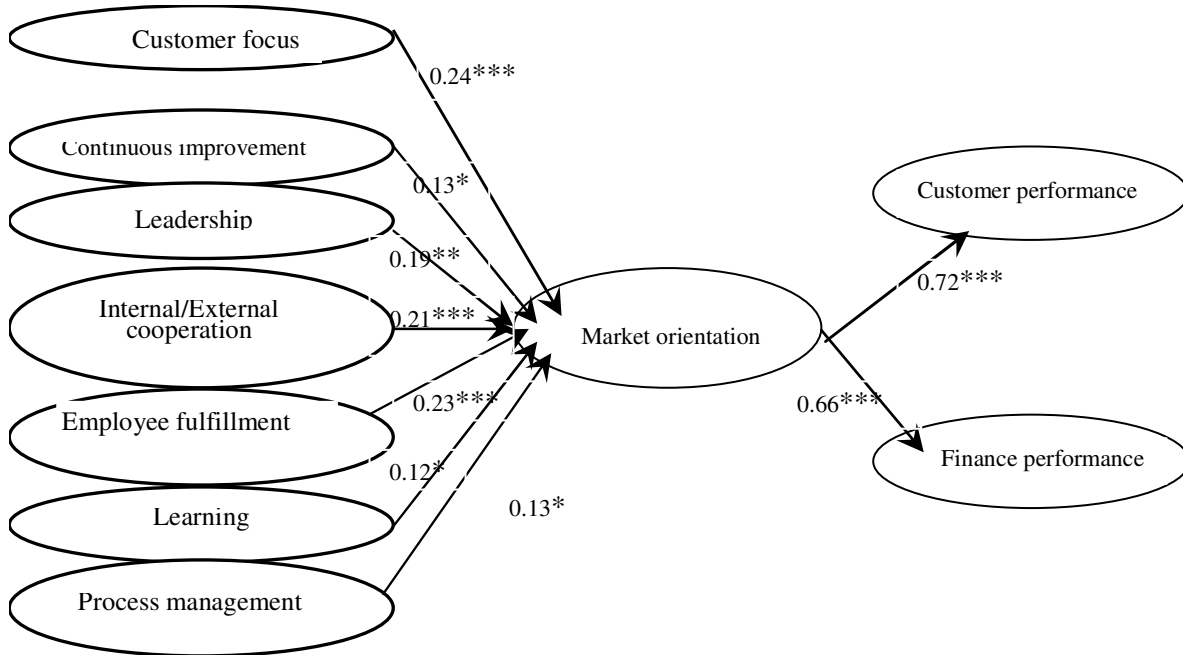
Figure 2. Causal effects among factors.
*p<0.05, **p<0.01, ***p<0.001.
χ^2=2064.93, df=731, X^2/df=2.82; GFI=0.86, RMSEA=0.056, AGFI=0.82, NFI=0.910, CFI=0.94, RFI=0.91, IFI=0.940, PNFI=0.86, PGFI=0.72.

Table 4. Adjacency matrix.

Cause	Effect		
	Market orientation	**Customer performance**	**Finance performance**
Customer focus	0.24	0.17	0.16
Internal/external cooperation	0.13	0.09	0.08
Continuous improvement	0.19	0.13	0.12
Leadership	0.21	0.15	0.14
Employee fulfillment	0.23	0.17	0.15
Learning	0.12	0.09	0.08
Process management.	0.13	0.09	0.09
Market Orientation	-	0.72	0.66

improvement, leadership, employee fulfillment, learning, process management and market orientation are located on row. Three factors such as market orientation, customer performance and finance performance as the effect side factors. The adjacency matrix shows that the enhancement of some factors causes an effect on other factors and hotel performance.

'What-if' simulation is multiplying an input vector with adjacency matrix, which yields an ordered list of consequences and diagnoses. The value of each input vector can be 1 or 0 according to whether one element is enhanced or not. That is to say, what-if simulation is performed by depend on decision maker's intention. Through what-if simulations, decision makers can identify a set of relevant decision variables and their acceptable values intended results. In this paper, there are 63 combinations of input. The result is showed Appendix B. Decision makers can find which combinations of changes in seven design factors of TQM would lead to the most desirable outcomes in terms of market orientation, customer performance and finance performance. For instance, the effect of enhancing customer focus, internal/external cooperation, continuous improvement, leadership which are set in an input vector to 1: C_1 = (1 1 1 1 1 0 0 0 0). We start the what-if simulation. Multiply it with E denoting the adjacency matrix in Table 4. The results in the output vector: C_1 * E= (0.77 0.54 0.50) =C_2, where E is 8×3 matrix, and C_2 is 3×1 matrix. The level of

Table 5. Estimates of direct and indirect effects.

Causal path		Standardized coefficient	t value
customer focus → market orientation	Direct effect	0.24	3.86 ***
internal/external cooperation → market orientation	Direct effect	0.13	2.15*
continuous improvement → market orientation	Direct effect	0.19	3.28**
leadership →market orientation	Direct effect	0.21	3.66***
employee fulfillment →market orientation	Direct effect	0.23	3.88***
learning →market orientation	Direct effect	0.12	2.11*
process management → market orientation	Direct effect	0.13	2.33*
market orientation →Customer performance	Direct effect	0.72	11.38***
market orientation →Finance performance	Direct effect	0.66	10.90***
customer focus →Customer performance	Indirect effect	0.17	-
internal/external cooperation →Customer performance	Indirect effect	0.09	-
continuous improvement →Customer performance	Indirect effect	0.13	-
leadership →Customer performance	Indirect effect	0.15	-
employee fulfillment →Customer performance	Indirect effect	0.17	-
learning →Customer performance	Indirect effect	0.09	-
process management →Customer performance	Indirect effect	0.09	-
customer focus →Finance performance	Indirect effect	0.16	-
internal/external cooperation →Finance performance	Indirect effect	0.08	-
continuous improvement →Finance performance	Indirect effect	0.12	-
leadership →Finance performance	Indirect effect	0.14	-
employee fulfillment →Finance performance	Indirect effect	0.15	-
learning →Finance performance	Indirect effect	0.08	-
process management →Finance performance	Indirect effect	0.09	-

*$p<0.05$, **$p<0.01$, ***$p<0.001$.

market orientation is 0.77. By enhancing customer focus, internal/external cooperation, continuous improvement, leadership positively affect customer performance (that is, the level is 0.54) and finance performance (that is, the level is 0.50). It shows that enhancing customer focus, internal/external cooperation, continuous improvement and leadership improve customer performance more than finance performance. Therefore, the purpose of the 'what-if' simulation is to find the stimulus vector that may lead to highest customer and finance performance. It is necessary to compare outcomes among input vector. Decision makers can also find or choice which combinations of changes in design factors that would lead to the most desirable outcomes in terms of customer and finance performance in their limited organization resource. For instance, when the number of factors that are enhanced is five, the result in the highest hotel performance is input #54. Thus, managers should focus on and invest limited organizational resources for customer focus, internal/external cooperation, continuous improvement, leadership and employee fulfillment.

Conclusions

The RBV of the business can sustain a competitive advantage in respect of its competitors by owning certain resources (Barney, 1991; Grant, 1991; Wernerfelt, 1984), much of the market orientation literature has emerged from the RBV (Gray and Hooley, 2002). Some studies strongly advocate that firms adopt a market orientation to achieve competitive advantage and market orientation may represent an important capability that can transform firm assets into superior performance (Hult and Ketchen, 2001; Hult et al., 2005; Zhou et al., 2005). Therefore, building market-orientated environment will strengthen competitive advantages of enterprise (Barney, 1991).
This study found that:

1. Successful implementation of market orientation required some capability such as customer focus, continuous improvement, leadership, internal/external cooperation, employee fulfillment, learning, and process management that are the elements of TQM. The results were consistent with Zhou et al. (2008) that market orientation alone may not be a unique strategic resource. It requires some complementary resources such as leadership, employees, coordination and so on (Zhou et al., 2008). We also might posit that TQM offers a holistic and systematic approach to develop a work environment directed to the adopting of the market orientation behaviors (Yam et al., 2005).
2. A lot of controversies exist on elements made by the different researchers and professionals about TQM

(Gehani, 1993). These elements of TQM will always be the guidelines to appraise the effectiveness of implementing TQM and results. Nevertheless, these elements have different importance weights in terms of their final contribution to the results (Montes et al., 2003). In this paper, the result was showed that customer focus was the biggest weights to affect market orientation, customer performance and finance performance, follow as employee fulfillment and internal/external cooperation.

3. Prior empirical results are equivocal about the relationship between market orientation and performance (Gray and Hooley, 2002; Langerak, 2003). In this paper, we found that market orientation positively affected customer performance and finance performance. They are consistent with Pelham and Wilson (1996), Slater and Naver (1994, 2000), Siguaw et al. (1994), Jaworski and Kohli (1993), Naver and Slater (1990) and Agarwal et al. (2003). They might be effective information acquisition, dissemination and sharing information produced a high level of market orientation which was quickly responding to change market conditions and lead to enhance hotel performance.

4. Managers are lack ability of analyzing relation of all factors at the same time and usually tend to asses individually or two or three factors simultaneously at best (Kang et al., 2004). In addition, managers depend on subjective or nondeterministic to evaluate and determine the interrelationships among factors. We use FCM and SEM. In this paper, we found that managers could find or choice which combinations of changes in design factors that would lead to the most desirable outcomes in terms of market orientation and hotel performance. For instance, when the number of factors that were enhanced is five, the result in the highest hotel performance is input #54. Hotel managers should focus on customer focus, internal/external cooperation, continuous improvement, leadership, employee fulfillment and market orientation.

Theoretical and managerial implications

1. Current portrayals of the RBV make clear that a resource of competitive advantage is valuable to customers or enables the creation of value for customers. Market orientation can achieve competitive advantage and may enhance hotel performance. But it may not be a unique strategic resource and requires complementary resources. According to the result, hoteliers shall be aware that changes in consumer perception and competitor activities are important for the hotel. Hoteliers must continuously educate and train employees to detect and to understand such changes. Furthermore, sharing information of customers and competitors within the hotel fulfills customer needs and expectations with new solutions. In addition, hoteliers should more effectively reinforce customer focus, continuous improvement, leadership, internal/external cooperation, employee fulfillment, learning, and process management to facilitate

the implementation of the market orientation values and beliefs, which will enable it to successfully respond to the external challenges.

2. In this paper, the proposed map helps decision makers have a clear picture of building competitive advantages in the hotel industry, identify and assess a lot of hypothetical situations that might occur in reality and to detect a group of the most desirable outcomes in limited organization resource. It proves that FCM is a very usefully technique for capturing specify understanding of managers and their perceptions in the hotel industry, offer a lot of opportunities for objectively identifying the relative strength and direction of research variables and simulate comprehensive models which integrate practice and theoretical approaches.

RESEARCH LIMITATIONS AND RECOMMENDATIONS

1. For more objective method gained to quantify the causality coefficients and build an adjacency matrix to perform a FCM simulation. In this paper, we use questionnaire survey, respondent anonymity, meaning anonymity of the measurement items and Harman's single-factor to eliminate and to test CMV. Beside this study adopt SEM to understand the causality between variables or among multiple variables. It suggests that the questionnaire could be divided into half items and filled out marketing directors, general managers or by multiple participants separately to eliminate measurement errors. On the other hands, more simulation results will be compared the other methods can be showed in the future.

2. Hotel business must consider environment factors' moderating effects. In the future, we suggest that the following researcher can use FCM probe it and add more relevant factors in view of the hotel industry for enhancing customer or finance performance.

REFERENCES

Agarwal S, Erramilli MK, Dev CS (2003). Market orientation and performance in service firms: role of innovation. J. Serv. Mark., 17: 68-82.

Ahire SL, Golhar DY, Waller MMA (1996a). Development and validation of TQM implementation constructs. Decis. Sci. J., 27(1): 23-56.

Ahire SL, Waller MMA, Golhar D (1996b). Quality management in TQM versus non-TQM firms: an empirical investigation. Int. J. Qual. Reliab. Manage., 13(8): 8-27.

Anderson JC, Rungtusanatham M, Schroeder RG (1994). A theory of quality Management underlying the Deming management method. Acad. Manage. Rev., 19(3): 472-509.

Anderson JC, Rungtusanatham M, Schroeder RG, Devaraj S (1995). A path analytic model of a theory of quality management underlying the Deming management method: preliminary empirical findings. Decis. Sci. J., 26(5): 637-658.

Andersson LM, Bateman TS (1997). Cynicism in the workplace: Some causes and effects. J. Organ. Behav., 18: 449-469.

Anwar SA (2008). A factor analytic investigation of the construct of market orientation. Int. J. Manage., 25(1): 186-197.

Armstrong JS, Overton TS (1997). Estimating nonresponse bias in mail surveys. J. Mark. Res., 14(3): 396-402.

Aulakh PS, Gencturk EF (2000). International principal–agent relationships-control, governance and performance. Ind. Mark.

Manage., 29: 521-538.

Avlonitis GJ, Gounaris SP (1997). Marketing orientation and company performance. Ind. Mark. Manage., 26(1): 385-402.

Axelrod R (1976). Structure of decision: The cognitive maps of political elites. Princeton University Press.

Bagozzi RP, Yi Y (1988). On the evaluation for structural equation models. J. Acad. Mark. Sci., 16(1): 74-94.

Bagozzi RP, Yi Y (1991). Multitrait–multimethod matrices in consumer research. J. Consum. Res., 17: 426-439.

Banker RD, Potter G, Srinivasan D (2000). An empirical investigation of an incentive plan that includes nonfinancial performance measures. Account. Rev. 75(1): 65-92.

Banker RD, Potter G, Srinivasan D (2005). Association of nonfinancial performance measures with the financial performance of a lodging chain. Cornell Hotel Restaurant Adm. Q., 46(4): 394-412.

Barney J (1991). Firm resources and sustained competitive advantage. J. Manage., 17(1): 99-120.

Becker J, Homburg Ch (1999). Market-oriented management: a systems-based perspective. J. Mark. Focused Manage., 4(1): 17-41.

Bharadwaj SG, Varadarajan PR, Fahy J (1993). Sustainable competitive advantage in service industries: a conceptual model and research propositions. J. Mark., 57: 83-99.

Boudreau JW, Boswell WR, Judge TA (2001). Effects of personality on executive career success in the United States and Europe. J. Vocat. Behav., 58: 53-81.

Brady MK, Cronin JJ (2001). Effects on customer service perceptions and outcome behaviors. J. Serv. Res., 3: 241-51.

Breiter D, Bloomquist P (1998). TQM in American hotels: an analysis of application. Cornell Hotel Restaur. Adm. Q., 39(1): 26-33.

Caudill M (1990). Using neural nets: fuzzy cognitive maps. Artif. Int. Expert, 6: 49-53.

Chatterjee S, Wernerfelt B (1991). The link between resources and type of diversification: theory and evidence. Strateg. Manage. J., 12: 33-48.

Claver-Cortés E, Tarí-Guillo' JJ, Pereira-Moliner J (2006). Does quality impact on hotel performance? Int. J. Contemp. Hosp. Manage., 18(4): 350-358.

Costa J (2004). The Portuguese tourism sector: key challenges for human resources management. Int. J. Contemp. Hosp. Manage., 16(7): 402-407.

Dale BG, Plunkett JJ (1990). Managing Quality. Philip Allan: Hemel Hempstead.

Day GS (1994). The capabilities of market-driven organizations. J. Mark., 58 (4): 37-52.

Deng S, Dart J (1994). Measuring market orientation: A Multi-factor, Multi-item Approach. J. Mark. Manage., 10(8): 725-742.

Deshpande R, Farley JU, Webster FWJr (1993). Corporate culture, customer orientation and innovativeness in Japanese firms: A quadrad analysis. J. Mark., 57: 23-37.

Dobni CB, Luffman G (2003). Research notes and commentaries: determining the scope and impact of market orientation profiles on strategy implementation and performance. Strat. Manage. J., 24(6): 577-585.

Doll WJ, Xia W, Torkzadeh G (1994). A confirmatory factor analysis of the end-user computing satisfaction instrument. MIS Q., 18(4): 453-462.

Eden C, Jones S, Sims D (1979). Thinking in Organizations. London: Macmillian.

Eliza LL, Tse CY, Xie L (2007). Hotel general manager profile in China: a case of Guangdong Province. Int. J. Contemp. Hosp. Manag., 19(3): 263-274.

Fahy J, Hooley G, Cox T, Beracs J, Fonfara K, Snoj B (2000). The development and impact of marketing capabilities in Central Europe. J. Int. Bus. Stud., 31(1): 63-81.

Farrell MA (2000). Developing a market-oriented learning organization. Aust. J. Manage., 25(2): 210-222.

Flynn BB, Schroeder RG, Sakakibara S (1995). The impact of quality management practices on performance and competitive advantage. Decis. Sci. J., 26(5): 659-692.

Folyey A, Fahy J (2009). Seeing market orientation through a capabilities lens. Eur. J. Mark., 43(1/2): 13-20.

Fornell C, Laker DF (1981). Evaluating structural equation models with

unobservable variables and measurement error. J. Mark. Res., 18(1): 39-50.

Gehani RR (1993). Quality value-chain: a meta-synthesis of frontiers of quality movement. Acad. Manage. Exec., 7: 29-42.

Goetsch DL, Davis SB (1997). Introduction to Total Quality. New Jeresy: Prentice-Hall.

Grandzol JR, Gershon M (1998). A survey instrument for standardizing TQM modeling research. Int. J. Qual. Sci., 3(1): 80-105.

Grant RM (1991). The resource-based theory of competitive advantage: Implications for strategy formulation. Calif. Manage. Rev., 33(1): 114-135.

Gray BJ, Hooley GJ (2002). Market orientation and service firm performance-a research agenda. Eur. J. Mark., 36(9/10): 980-988.

Gray BJ, Matear S, Boshoff C, Matheson PK (1998). Developing a better model of market orientation. Eur. J. Mark., 32(9): 884-903.

Gray BJ, Matear SM, Matheson PK (2000). Improving the performance of hospitality firms. Int. J. Contemp. Hosp. Manage., 12(3): 149-155.

Greenley GE (1995). Market orientation and company performance empirical evidence from UK companies. Br. J. Manage., 6(1): 1-13.

Gronroos G (1990). Service management and marketing: Managing the moments of truth in services Competition. Lexington, MA: Lexington Books.

Haber S, Reichel A (2005). Identifying performance measures of small ventures-the case of the tourism industry. J. Small. Bus. Manage., 43(3): 257-286.

Hair JF, Anderson RE, Tatham RL, Black WC (1998). Multivariate Data Analysis with Readings. New York: Macmillan Publishing.

Hair JF, Black WC, Babib BJ, Anderson RE, Tatham RL (2006). Multivariate Data Analysis. 6th ed. New Jersey: Prentice-Hall.

Han JK, Kim N, Srivastava RK (1998). Market orientation and organizational performance: is innovation a missing link? J. Mark., 62(4): 30-45.

Harmsen H, Jensen B (2004). Identifying the determinants of value creation in the market: a competence-based approach. J. Bus. Res., 57(5): 533-47.

Harris LC, Watkins P (1998). The impediments to developing a market orientation: an exploratory study of small UK hotels. Int. J. Contemp. Hosp. Manage., 10(6): 221-226.

Hauser JR, Simester DI, Wernerfelt B (1996). Internal customers and internal suppliers. J. Mark. Res., 33: 268-280.

Haynes P, Fryer G (2000). Human resources, service quality and performance: a case study. Int. J. Contemp. Hosp. Manage., 12(4): 240-248.

Hooley GJ, Greenly GE, Cadogan JW, Fahy J (2005). The performance impact of marketing resources. J. Bus. Res., 58(1): 18-27.

Huber GP (1991). Organizational learning: the contributing processes and the literatures. Organ. Sci., 2: 88-115.

Huff AS (1990). Mapping strategic thought. New York: John Wiley and Sons.

Hult GTM, Ketchen DJ Jr. (2001). Does market orientation matter? A test of the relationship between positional advantage and performance. Strateg. Manage., J. 22(9): 899-906.

Hult GTM, Ketchen DJ Jr, Slater SF (2005). Market orientation and performance: an integration of disparate approaches. Strateg. Manage. J., 26(12): 1173-1181.

Hunt SD, Morgan RM (1995). The comparative advantage theory of competition. J. Mark., 59: 1-15.

Irani Z, Sharif A, Love PED, Kahraman C (2002). Applying concepts of fuzzy cognitive mapping to model: the IT/IS investment evaluation process. Int. J. Prod. Econ., 75: 199-211.

Jaworski BJ, Kohli AK (1993). Market orientation: antecedents and consequences. J. Mark., 57: 53-70.

Jaworski BJ, Kohli AK (1996). Market orientation: review, refinement, and roadmap. J. Mark. Focused Manage., 1(2): 119-135.

Jöreskog KG., Sörbom D (1996). LISREL 8: User's reference guide. Chicago: Scientific Software.

Kang I, Sangjae L, Choi J (2004). Using fuzzy cognitive map for the relationship management in airline service. Expert Syst. Appl., 26: 545-555.

Kardaras D, Karakostas B (1999). The use of fuzzy cognitive maps to simulate the information systems strategic planning process. Inform. Software. Technol., 41: 197-210.

Ketchen DJ Jr., Hult TGM, Slater SF (2007). Toward greating understanding of market orientation and the resource-based view. Strateg. Manag. J. 28(9): 961-964.

Kobylanski A, Szulc R (2011). Development of marketing orientation In small and medium-sized enterprises evidence from Eastern Europe. Int. J. Manage. Mark. Res., 4(1): 49-59.

Kohli AK, Jaworski BJ (1990). Market orientation: the construct, research propositions, and managerial implications. J. Mark., 54(April): 1-18.

Kohli AK, Jaworski BJ, Kumar A (1993). MARKOR: a measure of market orientation. J. Mark. Res., 30: 467-477.

Kosko B (1986). Fuzzy cognitive maps. Int. J. Man. Mach. Stud., 24: 65-75.

Kosko B (1992). Neural networks and fuzzy systems: a dynamical systems approach to machine intelligence. New Jersey: Prentice-Hall.

Kosko B (1994). The New Science of Fuzzy Logic: Fuzzy thinking. London: HarperCollins.

Kosko B (1997). Fuzzy Engineering. New Jersey: Prentice -Hall.

Langerak F (2003). An appraisal of research on the predictive power of market orientation. Eur. Manage. J., 21(4): 447-64.

Lazari CG, Kanellopoulos DN (2007). Total quality management in hotel restaurants: a case study in Greece. J. Eng. Appl. Sci. 2(3): 564-571.

Lee K, Kim H (1997). A fuzzy cognitive map-based bi-directional inference mechanism: an application to stock investment analysis. Int. J. Intel. Syst. Account. Financ. Manage., 6: 41-57.

Lee KC, Kim JS, Chung NH, Kwon SJ (2002). Fuzzy cognitive map approach to webmining inference amplification. Expert Syst. Appl., 22: 197-211.

Lee KC, Lee S (2007). Causal knowledge-based design of EDI controls: an explorative study. Comput. Hum. Behav., 23(1): 628-663.

Lee S, Ahn H (2009). Fuzzy cognitive map based on structural equation modeling for the design of controls in business-to-consumer e-commerce web-based systems. Expert Syst. Appl., 36: 10447-10460.

Longo CRJ, Cox MAA (1997). Total quality management in financial services: Beyond the fashion the reality has to take off. Total Qual. Manage. Bus. Excel., 8(6): 323-333.

Lovelock CH, Weinberg CB (1984). Marketing for Public and Nonprofit Managers. New York: John Wiley and Sons.

Martin BA, Martin JH (2005). Building a market-oriented organizational environment: an implementation framework for small organizations. Mid. Am. J. Bus., 20(2): 45-73.

Menguc B, Auh S (2006). Creating a firm-level dynamic capability through capotalising on market orientation and innovativeness. J. Acad. Mark. Sci., 34(1): 63-73.

Miao CY, Goh A, Miao Y, Yang ZH (2002). Agent that models, reasons and makes decisions. Know. Based Syst., 15: 203-211.

Mohr-Jackson I (1991). Broadening the market orientation: an added focus on internal customers. Hum. Resour. Manage., 30(4): 455-467.

Montes FJL, Jover AV, Ferna´ndez LMM (2003). Factors affecting the relationship between total quality management and organizational performance. Int. J. Qual. Reliab. Manage., 20(2): 189-209.

Moorman C, Rust RT (1999). The Role of Marketing. J. Mark., 63: 180-197.

Narver JD, Slater SF (1990). The effect of a market orientation on business profitability. J. Mark., 5: 20-35.

Noh JB, Lee KC, Kim JK, Lee JK, Kim SH (2000). A case-based reasoning approach to cognitive map-driven tacit knowledge management. Expert Syst. Appl., 19: 249-259.

Nunnally JC (1978). Psychometric theory (2nd ed.). New York: McGraw-Hill.

O'Driscoll A, Carson D, Gilmore A (2001). The competence trap: exploring issues in winning and sustaining core competence. Irish J. Manage., 22(2): 73-90.

Papageorgiou EI, Markinos A, Gemptos T (2009). Application of fuzzy cognitive maps for cotton yield management in precision farming. Expert Syst. Appl., 36: 12399-12413.

Pelham AM (1997). Market orientation and performance: the moderating effects of product and customer differentiation. J. Bus. Ind. Mark., 12(5): 276-296.

Pelham AM, Wilson DT (1996). A longitudinal study of the impact of market structure, firm structure, strategy and market orientation

culture on dimensions of small-firm performance. J. Acad. Mark. Sci., 24(1): 27-43.

Peng TK, Kao YT, Lin CC (2006). Common method variation in management study: Question essence, influence, test and remedy. J. Manage., 23(1): 77-98.

Podsakoff PM, Organ DW (1986). Self-reports in organizational research: problems and prospects. J. Manage., 12(4): 531-544.

Ramayah NST, Saad NM (2006). TQM practices, service quality, and market orientation: some empirical evidence from a developing country. Manage. Res. News, 29(11): 713-728.

Rao SS, Solis LS, Raghu-Nathan TS (1999). A framework for international quality management research: development and validation of a research instrument. Total. Qual. Manage., 10(7): 1047-75.

Reid RD, Sandler M (1992). The use of technology to improve service quality. Cornell Hotel Restaur. Adm. Q., 33(3): 68-73.

Rodriguez-Repiso L, Setchi R, Salmeron JL (2007). Modelling IT projects success ith fuzzy cognitive maps. Expert. Syst. Appl., 32: 543-559.

Ruekert RW (1992). Developing a market orientation: an organizational strategy perspective. Int. J. Res. Mark., 9: 225-46.

Santos-Vijande ML, Álvarez GL (2009). TQM's contribution to marketing implementation and firm's Competitiveness. Total Qual. Manage., 20(2): 171-196.

Saraph JV, Benson PG, Schroeder RG (1989). An instrument for measuring the critical factors of quality management. Decis. Sci. J., 20(4): 457-478.

Siguaw JA, Gene B, Robert E, Widing II (1994). The influence of market orientation of the firm on sales force behavior and attitudes. J. Mark. Res., 31: 106-116.

Sittimalakora W, Hart S (2004). Market orientation versus quality orientation: sources of superior business performance. J. Strateg. Mark., 12(4): 243-253.

Slater SF, Narver JC (1994). Does competitive environment moderate the market orientation-performance relationship? J. Mark., 58: 46-55.

Slater SF, Narver JC (1995). Market orientation and the learning organization. J. Mark., 59: 63-74.

Slater SF, Narver JC (1998). Customer-led and market-orientation: let's not confuse the two. Strateg. Manag. J., 19(10): 1001-1006.

Slater SF, Narver JC (2000). The positive effect of a market orientation on business profitability: A balanced replication. J. Mark., 62: 99-111.

Spector PE (1987). Method variance as an artifact in self-reported affect and perceptions at work: Myth or significant problem. J. Appl. Psychol., 72: 438-443.

Stoelhorst JW, van Raaij EM (2004). On explaining performance differentials: marketing and the managerial theory of the firm. J. Bus. Res., 57(5): 462-77.

Stylios CD, Georgopoulos VC, Malandraki GA, Chouliara S (2008). Fuzzy cognitive map architectures for medical decision support systems. Appl. Soft Comput., 8: 1243-1251.

Sureshchandar GS, Rajendran C, Anantharaman RN (2001). A holisticmodels for total quality service. Int. J. Serv. Ind. Manage., 12(4): 378-412.

Tihanyi L, Ellstrand AE, Daily C, Dalton DR (2000). Composition of the top management team and firm international diversification. J. Manage., 26(6): 1157-77.

Van Doren CS, Gustke LD (1982). Spatial analysis of the US lodging industry. Ann. Tour. Res., 9(4): 543-63.

Vieira VA (2010). Antecedents and consequences of market orientation: a Brazilian Meta-Analysis and an International Mega-Analysis. BAR. 7(1): 40-58.

Wassenaar K, Stafford ER (1991). The lodging index: an economic indicator for the hotel/motel industry. J. Travel Res., 30(1): 18-21.

Wernefelt B (1984). A resource-based view of the firm. Strateg. Manage. J., 5(2): 171-80.

Witcher B (1995). Marketing and total quality management. Eur. J. Mark., 29(5): 23-24.

Wrenn B (1997). The market orientation construct: Measurement and scaling issues. J. Mark. Theo. Pract., 5(3): 31-54.

Xirogiannis G, Stefanou J, Glykas M (2004). A fuzzy cognitive map approach to support urban design. Expert Syst. Appl., 26: 257-268.

Yam CM, Tam Y K, Tang PY, Mok CK (2005). TQM: A change

management model or market orientation. Total Qual. Manage. Bus. Excel., 16(4): 439-461.

Youssef MA, Boyd J, Williams E (1996). The impact of total quality management on firms' responsiveness: An empirical analysis. Total. Qual. Manage., 7(1): 127-144.

Zhou KZ, Yim CK, Tse DK (2005). The effects of strategic orientations in technology- and market-based breakthrough innovation. J. Mark., 69(2): 42-60.

Zhou KZ, Li JJ, Zhou N, Su C (2008). Market orientation, job satisfaction, product quality, and firm performance: evidence from China. Strateg. Manage. J., 29: 985-1000.

APPENDIX

Appendix A. Questionnaire items.

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[1] Total quality management
Customer focus
1. Our activities are centered on satisfying our customers.
2. Satisfying our customers, and meeting their expectations, is the most important thing we do.
3. Senior executives behave in ways that lessen the importance of customers.

Internal/External cooperation
1. Managers emphasize activities that lead to a lack of cooperation between our hotel and our suppliers.
2. Managers, supervisors, and employees from different departments work independently to achieve their own department's goals.
3. In the hotel, teamwork is commonplace - the expected way of doing business.
4. Employees are hesitant to voice their opinions, make suggestions, or inquire about any of the actives of the hotel.
5. In the hotel, everyone participates in improving our products, services, and processes.

Continuous improvement
1. Employees usually don't get an opportunity to suggest changes or modifications to existing processes.
2. The hotel encourages continual study and improvement of all its products, services and processes.
3. The hotel has received recent compliments and recognition for improving its products/services/processes.

Leadership
1. Senior executives share similar beliefs about the future direction of this organization.
2. Activities and investments that have long-term benefits receive little support from management.
3. Managers and supervisors rarely allow employees to take necessary action on their own.
4. Senior executives anticipate change and make plans to accommodate it.

Employee fulfillment
1. My work duties and responsibilities contribute little to satisfying my need to create quality products/services.
2. I like my job because I'm doing what I want to do.
3. Employees in the hotel are dedicated to their jobs.

Learning
1. Managers and supervisors ensure that all employees receive training that helps them understand how and why the hotel does what it does.
2. Managers and supervisors participate in specialized training on how to conduct business, whether dealing with employees or external customers.
3. Many employees in the hotel do not possess sufficient knowledge about the basics of our industry.
4. Few employees in the hotel understand the basic processes used to create our products/services.

Process management
1. Preventing defective products/services from occurring is a strong attitude in the hotel.
2. The processes used in the hotel do not include in-process measures of quality.
3. The processes for designing new products/service in the hotel ensure quality.
4. Explaining the variation in processes is rarely used as an analysis technique in the hotel.
5. Senior executives look at the total costs of products and service, including indirect an overhead costs.
6. Managers and supervisors understand how to motivate employees and encourage them to perform at their highest levels.

[2] Market orientation
Information generation
1. We are fast to detect changes in our customers' product preferences.
2. We are fast to detect fundamental shifts in our industry (e.g., competition, technology).).

Appendix A. Contd

Information dissemination

1. When something important happens to major customers, the whole hotel knows about it shortly.
2. When one unit finds out something important about competitors, it is fast to alert other units.

Shared interpretation

1. We develop a shared understanding in our hotel of the available market information.
2. We develop a shared understanding in our hotel of the implications of a marketing activity.

Customer performance

1. Customer is loyal.
2 Customer is satisfied.
3 Our products/service bring for customer lifetime value.
4 Customer is willing to retain.

Finance performance

1. Our market share is growth.
2. Our sales are growth.
3. Our selling cost is reducing.
4. Our ROI is growth.

Appendix B. Inference results using various input cases.

Stimuli vectors	Changes in design factors							Outputs		
	TQM1	TQM2	TQM3	TQM4	TQM5	TQM6	TQM7	MO	CP	FP
Input#1	1	0	0	0	0	0	0	0.24	0.17	0.16
Input#2	0	1	0	0	0	0	0	0.13	0.09	0.08
Input#3	0	0	1	0	0	0	0	0.19	0.13	0.12
Input#4	0	0	0	1	0	0	0	0.21	0.15	0.14
Input#5	0	0	0	0	1	0	0	0.23	0.17	0.15
Input#6	0	0	0	0	0	1	0	0.12	0.09	0.08
Input#7	0	0	0	0	0	0	1	0.13	0.09	0.09
Input#8	1	1	0	0	0	0	0	0.37	0.26	0.24
Input#9	1	0	1	0	0	0	0	0.43	0.30	0.28
Input#10	1	0	0	1	0	0	0	0.45	0.32	0.30
Input#11	1	0	0	0	1	0	0	0.47	0.34	0.31
Input#12	1	0	0	0	0	1	0	0.36	0.26	0.24
Input#13	1	0	0	0	0	0	1	0.37	0.26	0.25
Input#14	0	1	1	0	0	0	0	0.32	0.22	0.20
Input#15	0	1	0	1	0	0	0	0.34	0.24	0.22
Input#16	0	1	0	0	1	0	0	0.36	0.26	0.23
Input#17	0	1	0	0	0	1	0	0.25	0.18	0.16
Input#18	0	1	0	0	0	0	1	0.26	0.18	0.17
Input#19	0	0	1	1	0	0	0	0.4	0.28	0.26
Input#20	0	0	1	0	1	0	0	0.42	0.30	0.27
Input#21	0	0	1	0	0	1	0	0.31	0.22	0.20
Input#22	0	0	1	0	0	0	1	0.32	0.22	0.21
Input#23	0	0	0	1	1	0	0	0.44	0.32	0.29
Input#24	0	0	0	1	0	1	0	0.33	0.24	0.22
Input#25	0	0	0	1	0	0	1	0.34	0.24	0.23
Input#26	0	0	0	0	1	1	0	0.35	0.26	0.23

Appendix B. Contd.

Input#27	0	0	0	0	1	0	1	0.36	0.26	0.24
Input#28	0	0	0	0	0	1	1	0.25	0.18	0.17
Input#29	1	1	1	0	0	0	0	0.56	0.39	0.36
Input#30	1	1	0	1	0	0	0	0.58	0.41	0.38
Input#31	1	1	0	0	1	0	0	0.6	0.41	0.39
Input#32	1	1	0	0	0	1	0	0.49	0.35	0.32
Input#33	1	1	0	0	0	0	1	0.5	0.35	0.33
Input#34	0	1	1	1	0	0	0	0.53	0.37	0.34
Input#35	0	1	1	0	1	0	0	0.55	0.39	0.35
Input#36	0	1	1	0	0	1	0	0.44	0.31	0.28
Input#47	1	1	1	0	0	0	1	0.69	0.48	0.45
Input#48	0	1	1	1	1	0	0	0.76	0.54	0.49
Input#49	0	1	1	1	0	1	0	0.65	0.46	0.42
Input#50	0	1	1	1	0	0	1	0.66	0.46	0.43
Input#51	0	0	1	1	1	1	0	0.75	0.54	0.49
Input#52	0	0	1	1	1	0	1	0.76	0.54	0.50
Input#53	0	0	0	1	1	1	1	0.69	0.50	0.46
Input#54	1	1	1	1	1	0	0	1	0.71	0.65
Input#55	1	1	1	1	0	1	0	0.89	0.63	0.58
Input#56	1	1	1	1	0	0	1	0.9	0.63	0.59
Input#57	0	1	1	1	1	1	0	0.88	0.63	0.57
Input#58	0	1	1	1	1	0	1	0.89	0.63	0.58
Input#59	0	0	1	1	1	1	1	0.88	0.63	0.58
Input#60	1	1	1	1	1	1	0	1.12	0.8	0.73
Input#61	1	1	1	1	1	0	1	1.13	0.89	0.74
Input#62	0	1	1	1	1	1	1	1.01	0.72	0.66
Input#63	1	1	1	1	1	1	1	1.25	0.89	0.82