THE IMPACT OF MARKET FOCUS ON OPERATIONS PRACTICES

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ABSTRACT

A key element of successful organizations is the alignment of their strategy and tactics. This study explores the relationship between a firm's competitive strategy and its operations practices in the context of a developing economy. Two competitive strategies are examined; a niche market strategy characterized by targeting specific market segments, and a broad market strategy characterized by serving a wide range of market segments. Three sets of operations practices consistent with the adoption of lean manufacturing, total quality management, and relationship development in a supply chain context, are explored. Using survey data from senior managers in Thailand, results show that for firms adopting a niche market strategy, competitive strategy directly influences process management and relationship development, which in turn affect workforce commitment. Only workforce commitment has a direct influence on operational performance. In contrast, for firms adopting a broad market strategy, competitive strategy directly influences workforce commitment, which in turns influences process management and relationship development practices. It is the latter practices that directly influence operational performance.

Keywords: Competitive Strategy, Market Focus, Process Management, Workforce Commitment, Relationship Building, Operational Performance, Empirical Study, Cluster Analysis.

INTRODUCTION

The notion that competitive strategy is formulated at the top of the firm but executed from the bottom up amplifies the need to align operations strategy with competitive strategy (Shah and Ward, 2007). While vision, planning, and directives flow from senior leadership, individuals at all levels of the firm must act in concert to ensure that high level objectives are achieved. Alignment between competitive and operations strategies is thus vital to the effective execution of strategic plans and the enhancement of business performance. Unfortunately, many firms fail to allocate resources in a manner consistent with competitive strategy, a fact discussed in the operations strategy literature as early as 1969 (Skinner, 1969) but which continues to be a prevailing theme (e.g., Swink *et al.*, 2005, Brown *et al.*, 2007, Karim *et al.*, 2008). In recent years, the challenge has been compounded by a changing business landscape characterized by complex organizational structures, globalization, new regulations, and the pressure to innovate rapidly. Successful creation and execution of competitive strategy requires not only the vision and commitment of top management but a consistent operations strategy, particularly as it relates to processes, human resources, and supply chain relationships.

Companies are increasingly restructuring their processes, human resources, and supply chain practices to be consistent with evolving long-term company objectives. Operations practices alone are insufficient to sustain a firm's competitive edge. Similarly, competitive strategy does not equate to competitiveness absent matching processes, human resource practices, and effective relationships with supply chain members. Linkages between competitive strategy and operations strategy have been studied widely (e.g., Ward and Duray, 2000, Fynes *et al.*, 2005, Brown *et al.*, 2007). However, the effect of the alignment between competitive strategy

and operations strategy, and in particular how operations strategy is deployed via specific practices, on firm performance has received relatively less attention.

One dimension of competitive strategy is the choice of markets to serve, commonly referred to as market focus. We explore the relationship between a firm's market focus as it relates to the breadth of markets and customers it serves, operations practices, and operational performance. Two market foci are examined; a niche market focus characterized by targeting specific customer/market groups, and a broad market focus characterized by serving a broad range of customers and market segments (Liao and Cheung, 2002). Three sets of operations practices consistent with the philosophy of continuous improvement are examined; process management practices based on lean manufacturing principles (Shah and Ward, 2003), workforce related practices consistent with the principles of total quality management (Rahman and Bullock, 2005), and inter-organizational relationship development practices based on the underlying premise of supply chain management to leverage information and goods/services flows (Tan, 2001). All three are consistent with the notion that sustainable value creation depends not only on improving internal processes – both technical and social – but on building the necessary infrastructure with suppliers that enables them to serve the needs of the focal firm.

LITERATURE REVIEW

Manufacturing Strategy, Competitive Strategy, and Market Focus

Firms implement a variety of competitive strategies to achieve advantage in the market place. Porter (1980) defined focus as one such strategy, referring to it as the strategic choice to focus on a specific type of customer, product, or geographic market. Miller (1988) contended

that rather than representing a particular strategic orientation, focus can be characterized as a continuum, making the distinction between a niche market and a broad market focus. The choice of competitive strategy based on a niche versus a broad market focus has important implications for operations practices since the latter must act in concert with the firm's competitive strategy. Within the manufacturing strategy literature, the notion of aligning manufacturing strategy with corporate and marketing strategy has a long history (e.g., Hayes and Schmenner, 1978, Hayes and Wheelwright, 1979). Several articles have also explored the issue of market focus. Bozarth (1993) characterized market focus as the consistency of product demand on a plant. The implication was that a consistent, limited set of demands on a plant, whether based on product characteristics or customer preferences, has a positive impact on manufacturing consistency and performance. A conceptual model revealed two key results related to market focus. First, market focus is positively related to manufacturing performance (Bozarth and Edwards, 1997, Bozarth and McCreery, 2001). In particular, the number of major customers served and product lines offered by a plant are inversely correlated with manufacturing performance. Second, increases in focus are positively correlated with increases in performance (Bozarth and McCreery, 2001).

Ward and *et al.* (1996) identified characteristics of manufacturing strategy consistent with niche and broad market focused strategies. Building on prior research, they argued that niche focused firms maintain flexibility to respond to environmental change and the need for product customization. In contrast, broad market focused firms need to maintain both flexibility and output predictability. Liao and Cheung (2002) explored differences between broad and narrowly focused strategies with respect to technology deployment. They found that firms with a broad

market focus emphasized leveraging research and development more than those with a narrow market focus.

Strategy and Practice

The implication of prior research is that choices regarding competitive strategy drive manufacturing strategy. A corollary is that competitive strategy influences choices regarding specific manufacturing practices. This will in turn influence manufacturing performance. Our focus is on three sets of manufacturing practices that, according to prior research, drive performance; process management based on the philosophy of lean manufacturing, workforce commitment, and relationship development in the supply chain. These practices are consistent with established manufacturing and quality improvement models. Moreover, according to a recent study of lean manufacturing practices (Shah and Ward, 2007), they transcend manufacturing philosophies such as Total Quality Management (TQM), Just in Time (JIT), and the Toyota Production System (TPS). Several empirical studies have also explored relationships between TQM, JIT, and supply chain management practices, supporting the assertion that the dimensions of interest are core to the execution of manufacturing strategy. Flynn *et al.* (1995a), for example found TQM and JIT practices to be not only mutually supportive, but that their synergy contributed positively to performance. The constructs in their study included workforce management, supplier relationships, and setup time and lot size reductions. Sakakibara *et al.* (1997) suggested that JIT practices affect performance as a result of the strategic, quality focused infrastructure needed to support them. The infrastructure they described again included the dimensions of workforce management, setup time reduction, the use of maintenance, and supplier relationships. Kannan and Tan (2005) not only found positive correlations between a

firm's adoption of TQM and JIT practices in the context of managing their supply chains, they demonstrated the presence of direct relationships between practices and performance. Items they considered included those related to setup and lot size reductions, maintenance, workforce training and empowerment, and the development of relationships within the supply chain. In summary, regardless of the paradigm driving manufacturing strategy, process management, workforce commitment, and supply chain relationship development appear to be common themes.

The literature on lean manufacturing dates back three decades, typically under the guise of JIT. While the expressions JIT and lean manufacturing are often used synonymously, JIT is in fact a subset of the broader lean manufacturing philosophy. Indeed, the early focus on the JIT dimension of the Toyota Production System which underlies lean manufacturing, has led, in the U.S. context, to JIT being viewed as being the system itself (Womack *et al.*, 1990, Shah and Ward, 2007). In reality, JIT is but one lean practice identified from a review of key literature on high performance/lean/JIT manufacturing systems (Shah and Ward, 2003). Of twenty one practices identified, several, including quick changeover techniques, preventive maintenance, and process reengineering, relate directly to daily management of the manufacturing process, and ensuring its integrity. Several articles, drawn primarily from the literature on JIT systems, have empirically showed that these practices, used as part of a broader execution strategy, can positively impact various measures of manufacturing and financial performance (e.g., Flynn *et al.*, 1995a, Nakamura *et al.*, 1998, Fullerton and McWatters, 2001).

Research on quality management distinguishes between soft and hard elements of TQM (Rahman and Bullock, 2005). Elements of soft TQM are typically human resource related, such as

commitment and teamwork, whereas elements of hard TQM are typically process related, such as preventive maintenance and modular designs. The literature is replete with evidence that both are critical components of a cohesive improvement program (e.g., Anderson *et al.*, 1995, Flynn *et al.*, 1995b, Samson and Terziovski, 1999). It is sometimes argued that soft TQM practices affect performance indirectly. By creating an environment conducive to the seamless diffusion and implementation of hard TQM practices, soft TQM practices affect operational performance in a way similar to that of traditional human resource management practices (e.g., Kochan *et al.*, 1995). Indeed, Rahman and Bullock (2005) argued that it is appropriate to first investigate the direct impact of soft TQM on the diffusion of hard TQM, before assessing the subsequent impact of hard TQM on operational performance. Their study showed positive relationships between soft and hard elements of TQM, and indirect relationships between soft TQM practices and performance.

Several studies have highlighted the importance of relationships in effectively leveraging supply chain partnerships in support of achieving competitive edge (e.g., Carr and Pearson, 1999, Martin and Grbac, 2003, Kannan and Tan, 2005). By leveraging supplier capabilities, firms not only exploit supplier expertise but focus on their own core competencies. While an extensive literature base, drawn from both the purchasing and logistics dimensions of the supply chain, exists, evidence of linkages between supply chain practices and strategy is limited.

While lean manufacturing, TQM, and supply chain management have been shown to be important dimensions of manufacturing strategy, evidence of the relationship between specific practices within each of these dimensions and competitive strategy, is limited. Specifically, there is little evidence of their relationships with niche and broad market focused strategies. Ward *et*

al., (1996) identified several desirable attributes of manufacturing strategy and manufacturing choices associated with niche and broad market based competitors, but stopped short of addressing tactics. Our objective is to address this gap in the literature by examining the relationship between competitive strategy, manufacturing strategy, and operational performance in the context of Thailand.

The ASEAN region, and in particular Thailand, is an area with significant potential for growth and development (Wang and Chien, 2007). Rising production costs and shrinking product life cycles have forced many multinational corporations from the United States, European Union, and Japan to relocate their manufacturing facilities to Thailand to exploit low labor costs, proximity to raw materials, and new consumer markets (Phusavat and Kanchana, 2008). The economic importance, drive for global competitiveness, and growth potential of Thailand make it a compelling area for academic research. Little has been written about the role of manufacturing strategy in developing economies, and in particular, Thailand. However recent articles are beginning to highlight the challenges manufacturers in these environments face (Laosirihongthong *et al.*, 2003, Laosirihongthong and Dangayach, 2005).

RESEARCH MODEL AND HYPOTHESES

We propose that market focus oriented competitive strategy drives operations strategy as executed through processes, human resources, and supplier relationships (Figure 1). To attain sustainable competitive advantage, firms must formulate and execute an operations strategy that exploits its unique capabilities in processes, human resources, and supplier relationships. This must however reflect the strategic orientation of the firm in the marketplace, whether it

seeks to serve a broad base of customers or more narrowly defined customer segments.

Specifically, we test the hypotheses

H₁: For firms with a niche market focus, process management, workforce commitment, and relationship development practices directly affect operational performance.

H₂: For firms with a broad market focus, process management, workforce commitment, and relationship development practices directly affect operational performance.

Insert Figure 1

SURVEY INSTRUMENT AND RESPONDENT PROFILE

Survey Instrument

Pre-tested constructs from past empirical studies were used to ensure the validity and reliability of the survey instrument (Tata *et al.*, 1999). The process management scale was adapted from Shah and Ward (2003), and included key elements of lean implementation; total preventive maintenance, JIT, and single minute exchange of dies (Womack *et al.*, 1990, Shah and Ward, 2003). Specifically, the scale included items on preventive maintenance, cycle time reduction, use of new process equipment or technologies, quick changeover techniques, and error proofing/Poka-Yoke. The workforce commitment scale (soft TQM) was derived from Rahman and Bullock (2005). It captured several key aspects of soft TQM components such as internal communication, involvement of employees, and training and education. These elements address not only TQM implementation but a firm's commitment to developing an organizational culture consistent with quality-oriented behavior (Anderson *et al.*, 1995, Dow *et al.*, 1999). The relationship development scale was adapted from Tan (2002) and includes the desire to

determine customers' future expectation and needs, establishing close and good relationship with suppliers and customers, information sharing/communication, and the involvement of customers and suppliers. The scale reflects inter-organizational relationship development practices consistent with the underlying premise of developing relationships to leverage information sharing (Davis, 1993, Power *et al.*, 2001, Kannan and Tan, 2005).

The market focus construct was adapted from Liao and Cheung (2002). The niche market focus scale incorporates three items that target product development with a focus on value added, low cost, and differentiation to meet specific market segments. The scale for broad market focus includes similar items but is oriented to a wide range of commercial and industrial uses for a broad market segment. To measure operational performance, criteria used in previous empirical studies in the TQM, supply chain management, and lean production literature were adapted (e.g., Kannan and Tan, 2005, Rahman and Bullock, 2005). Performance measures such as on time delivery, production efficiency, and customer satisfaction were used.

Constructs used in this research were measured using five-point Likert scales (Appendix). Competitive strategy, process management, workforce commitment, and relationship development practices were measured by the extent of implementation of the corresponding item ("not at all" [1] to "to a great extent" [5]) whereas operational performance was measured based on comparisons with industry peers ("lowest" [1] to "highest" [5]).

Data Collection

Survey data was collected from manufacturing companies in Thailand. The manufacturing sector in Thailand is heterogeneous in terms of sub-sectors and product/process complexity. The literature has shown that the three sets of operations practices of interest to this study have

been widely implemented in Thailand, particularly in the automobile parts and components, electronics, electrical appliances, textiles, and food sectors (Laosirihongthong and Dangayach, 2005). Data collection was conducted in three stages. In the first stage, 270 survey questionnaires were administered to participants of training courses organized by the Thai-Japan Technology Promotion Association, the largest training organization in Thailand. These courses focused on manufacturing strategy, operational excellence, and continuous improvement. Participants were mid or senior managers from a cross section of manufacturing firms. A total of 215 questionnaires were completed and returned within a week of completing the course. In the second stage, 85 questionnaires were administered to graduate students enrolled in the International Executive MBA program at Thammasat University, a leading Southeast Asian university located in Bangkok. Students were industry professionals with several years of work experience in manufacturing. Seventy completed responses were received. In the third stage, 75 questionnaires were administered to graduate students enrolled in the Masters of Engineering Program at Thammasat University. Only students who had several years of work experience in multinational manufacturing firms were invited to participate in the study, thus a relatively small sample of 44 surveys were returned. A total of 329 usable cases were collected, resulting in an overall response rate of 76.5%. A profile of respondents is presented in Table 1.

Insert Table 1

STATISTICAL ANALYSES

Reliability Analysis and Factor Analysis

Validity and reliability tests were conducted for the six constructs (Tables 2 – 7). Reliability analysis was conducted by examining the value of Cronbach's α (Cronbach, 1951) for each construct. Results showed that in each case, values of α exceeded the suggested threshold value of 0.6 (Nunnally, 1988). Since Cronbach's α may under-estimate errors caused by external factors such as differences in testing situations and respondents over time, composite reliability and average variance extracted were also examined since they are more parsimonious measure of reliability (Podsakoff *et al.*, 2003). Statistics for composite reliabilities for the six constructs exceeded the required threshold value of 0.60, providing further evidence of scale reliability. All average variances extracted also exceeded the threshold level of 0.50.

Principal components analysis using Varimax rotation was used to examine the unidimensionality of the constructs. Factor loadings of all items within each scale were above 0.70, providing support for the validity of measuring the latent variables using the respective sets of indicators. Values of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) in excess of 0.50 (Kaiser, 1974) indicated that the use of factor analysis was appropriate, and that extracted factors were distinct and reliable. This is re-affirmed by the fact that for each scale, Bartlett's Sphericity Test for the null hypothesis that the correlation matrix is an identity matrix, was rejected ($\alpha = 5\%$).

Insert Tables 2 – 7

Hierarchical Cluster Analysis and Multiple Linear Regression

Hierarchical cluster analysis was used on the premise that firms could be separated into two distinct clusters based on market focus. The two factor scores extracted from the six measured variables (Appendix, A2, A4, A6 versus A1, A3, A5) were used to cluster the cases. The first cluster yielded 185 cases (57.6%) and the second yielded 136 cases (42.4%, Table 8). Eight cases were discarded due to missing responses in the market focus questions A1 to A6.

Insert Table 8

Independent samples t-tests were used to examine the focus of each cluster. Levene's test showed that variances between the two clusters were equal. Firms in cluster one (indicators A2, A4, and A6) yielded higher group mean values than those in cluster two (indicators A1, A3, and A5). This is consistent with these firms having a *niche market focus*. Similarly, firms in cluster two yielded higher group mean values than those in cluster one. This is consistent with these firms having a *broad market focus* (Table 9). Table 10 presents descriptive statistics of each indicator for each cluster.

Insert Table 9

Insert Table 10

Multiple linear regression was used to examine relationships between operations practices and operational performance for each cluster. The hierarchical multiple regression model for the *Niche Market Focus* cluster was statistically significant ($\alpha = 5\%$), with 25.1% of variation in the data explained by the model (Table 11). However, only workforce commitment ($\beta = .386$) yielded a significant relationship with operational performance, hence hypothesis H₁ is only partially supported. The model for the *Broad Market Focus* cluster was again significant, with 34.5% of variation in the data explained by the model. Interestingly, this model exhibited significant relationships between performance and both process management and relationship development. However, there was no significant relationship between performance and workforce commitment. Hence, hypothesis H₂ was also only partially supported.

Insert Table 11

The absence of significant relationships between either process management or relationship development and operational performance for *Niche Market Focus* firms, and between workforce commitment and performance in *Broad Market Focus* firms, is inconsistent with the literature. The literature consistently demonstrates that these constructs are positively related to performance (Bozarth and Edwards, 1997, Sakakibara *et al.* (1997), Bozarth and McCreery,

2001, Kannan and Tan, 2005). However, the literature has not used market focus as a contingency variable, nor has it made the distinction between direct and indirect relationships. To explore these issues, a structural equation model was used to examine whether relationships between these variables and performance might be indirect. Since process management and relationship development were insignificant in the linear regression model for firms with a *Niche Market Focus*, we suspect that they influence operational performance indirectly via workforce commitment. This is true in a job shop environment where highly skilled labor is required to produce specific products to meet the demands of a niche market, using small lot sizes and a wide range of general purpose equipment. General purpose equipment supports the workforce, but it is the workers that directly affect performance. Moreover, close and cooperative relationships with suppliers are crucial in correctly determining their needs. Similarly, the insignificant relationship between workforce commitment and operational performance for firms with a *Broad Market Focus* may be due to workforce commitment influencing performance indirectly via process management and relationship management. Thus, the following additional hypotheses were examined:

H₃: A Niche Market Focus affects process management and relationship development.

H₄: For firms with a Niche Market Focus, process management and relationship development affect operational performance indirectly via workforce commitment.

H₅: A Broad Market Focus affects workforce commitment.

H₆: For firms with a Broad Market Focus, workforce commitment affects operational performance indirectly via process management and relationship development.

Figure 2 summarizes hypotheses H₃ to H₆.

Insert Figure 2

Structural Equation Modeling

The two-stage structural equation modeling technique was used (Anderson and Gerbing, 1988). Each measurement model was tested prior to testing the structural equation model. Measurement models address the reliability and validity of indicators in measuring latent variables or hypothetical constructs, thereby providing an assessment of convergent and discriminant validity. The structural model specifies direct and indirect relations among latent variables and describes the amount of explained and unexplained variance in the model. Moreover, it gives an assessment of predictive validity. Models were checked to ensure parameter estimates exhibited the correct sign and size, and were consistent with underlying theory. All parameters shown were statistically significant ($\alpha = 0.05$). The χ^2/df statistics and other fit indices in Table 12 indicated that the structural equation models fit the sample data well (Anderson and Gerbing, 1988).

Results provide support for hypotheses H₃ and H₄. The structural equation model for the *Niche Market Focus* cluster (Figure 3) shows that market focus directly affects process management ($\gamma = .89$) and relationship development ($\gamma = .70$), which subsequently affects operational performance via workforce commitment ($\beta = .58$). For the *Broad Market Focus* cluster (Figure 4), market focus directly affects workforce commitment ($\gamma = .60$), which subsequently affects operational performance via both process management ($\beta = .22$) and relationship development ($\beta = .57$). This provides support for hypotheses H₅ and H₆. These results

suggest that the relationship between operations strategy and operational performance is a function of market focus, and that workforce commitment appears to be the link between strategy and operational performance.

Insert Figure 3

Insert Figure 4

Insert Table 12

DISCUSSION AND MANAGERIAL IMPLICATIONS

The underlying premise of the study was that the influence of competitive strategy on operational performance for manufacturing firms in Thailand comes by virtue of how strategy is deployed via operations practices. Partial support for hypotheses H_1 and H_2 demonstrates that operations practices affect operational performance differently for manufacturing firms with a niche rather than a broad market focus. Of greater significance however are the results of the structural equation models and subsequent support for hypotheses H_3 - H_6 . These illustrate that relationships between competitive strategy, operations practice, and operational performance, are not only a function of the strategy adopted, but that the impact of specific practices on performance is in several instances indirect in nature. This is significant for two reasons. First, it provides managers direction in how to deploy resources. For firms with a niche market focus, the implication is that strategy should drive internal manufacturing processes and efforts to integrate

with suppliers. This in turn drives efforts to engage the workforce which directly influences performance. In contrast, for firms adopting a broad market focus, developing the human resource infrastructure should be the starting point in translating strategy to practice. Second, it highlights the need to view execution of strategy from an integrative perspective. In the case of a niche market focus for example, managing manufacturing processes alone is not what drives performance. Leveraging the workforce in a manner consistent with processes that reflect the firm's objectives in the market place, is what drives performance. This in turn suggests the need to hire, train, motivate, and reward the workforce in a manner aligned with the firm's competitive focus.

The results are also important in that they provide evidence of the role of strategy and its execution via operations in a developing economy. Most of what is known about strategy, both at the corporate and operations levels comes from studies of highly developed economies such as those of the U.S., Japan, and Western Europe. As the economies of developing nations in Asia, South America, and Eastern Europe continue to expand and gain in sophistication, the importance of understanding what drives operational performance and improvement efforts in an emerging economy becomes of greater significance. This study provides specific insights into the relationships between market focus, process management, workforce commitment, relationship development, and operational performance for manufacturers in Thailand. Results suggest that firms wishing to enhance their performance should increase the implementation of the variables identified in tables 2 - 7. For example, to improve process management, firms should expand the use of quick changeover techniques, new process equipment and technologies, preventive maintenance, cycle time reduction, and error proofing techniques.

While the results do not show process management and relationship development to be significant predictors of operational performance for firms with a niche market focus or workforce commitment to be a significant predictor of performance for firms with a broad market focus, they nevertheless play a vital role. The implication is that Thai firms must ensure that good process management, workforce commitment, and relationship development programs are in place. Using Skinner's analogy (1969), firms with a niche market focus that fail to recognize the effects of process management and relationship development, or those with a broad market focus that disregard the impact of workforce commitment, demonstrate a missing link between competitive strategy and performance. Failing to allocate adequate resources to any of these programs in a manner consistent with competitive strategy is likely to compromise operational performance.

The research is not without limitations. First, while this study involves a large sample study of manufacturing firms across several sectors, it is still based on firms in a single emerging economy. The results should thus not be generalized across manufacturers in developed nations. Moreover, there might be other contextual constructs that influence operational performance. The study also suffers from the usual pitfalls of empirical research, such as the reliance on a single respondent from a firm. This precluded assessment of inter-rater reliability. It also precluded analysis of the impact of variables such as country, industry, position in the supply chain, and relative power of supply chain participants on the research model. This however represents an opportunity for further research.

APPENDIX

A. Competitive Strategy – adapted from Liao and Cheung (2002)

To what extent are the following practices/activities implemented in your company?

(I) Niche Market Focus

- A2. The firm seeks to develop products with higher-added value focusing on specific markets and/or customer groups only.
- A4. The firm seeks to supply products at lowest costs to specific markets and/or customer groups only.
- A6. The firm seeks to differentiate products and supply specific markets and/or customer groups only.

(II) Broad Market Focus

- A1. The firm seeks to develop products with higher-added value in a wide range of commercial and industrial uses.
- A3. The firm seeks to supply products at lowest costs to a broad range of market segments.
- A5. The firm seeks to differentiate products and supply to a broad range of market segments.

B. Process Management (Lean Practices) – adapted from Shah and Ward (2003)

To what extent are the following practices/activities implemented in your company?

- B1. Implementing preventive maintenance activities
- B2. Cycle time reduction
- B3. Using new process equipment or technologies
- B4. Using quick changeover techniques
- B5. Using error proofing techniques/Poka-Yoke

C. Workforce Commitment (Soft TQM Practices) – adapted from Rahman and Bullock (2005)

To what extent are the following practices/activities implemented in your company?

- C1. Ideas and suggestions from production operators are actively used
- C2. Has effective “top-down” and “bottom-up” communication
- C3. Encourage change and a culture of trust and innovation
- C4. The concept of the “internal customer” is well understood
- C5. Unity of purpose and eliminated barriers between people
- C6. Employee flexibility, multi-skilling and training are used
- C7. All employees believe that quality is their responsibility

D. Relationship Development (Supply Chain Management Practices) -adapted from Tan (2001)

To what extent are the following practices/activities implemented in your company?

- D1. Determining customers’ future expectation and needs
- D2. To maintain close and good relationship with supplier
- D3. To maintain close and good relationship with customer
- D4. Using formal information sharing with suppliers and customers
- D5. Creating a compatible information systems
- D6. Communicating your future strategic needs to your suppliers and customers
- D7. Involving customers and suppliers for work improvement in your firm

E. Operational Performance – Adapted from Fynes, Voss and Búrca (2005)

To what extent are your following business results compared with your competitors?

- E1. Ability to delivery on time
- E2. Overall efficiency
- E3. Overall customer satisfaction

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Figure 1: Research Framework

Figure 2: Proposed Structural Equation Model

Figure 3: Structural Equation Model for Niche Market Focus Cluster

Figure 4: Structural Equation Model for Broad Market Focus Cluster

Table 1: Respondent Profile

Characteristics of Respondent (Sample Size, n = 329)		Frequency
Number of Employees	1 – 200	68
	More than 200	258
	Missing response	3
Years of Working Experience	Less than 2 years	74
	2 – 5 years	117
	5 – 10 years	82
	More than 10 years	50
	Missing response	6
Type of Ownership	Joint Venture	123
	Foreign-Owned	129
	Thai-Owned	65
	Missing response	12
Industry Classification	Automotive	115
	Electronic	81
	Food	16
	Textile	18
	Chemical	47
	Construction	49
	Missing Response	3
Type of International Standards for Management Systems Adopted (Majority of the responding firms adopted more than one type of standards)	ISO 9001	247
	ISO 14001	208
	ISO/TS 16949	94
	Others	68

Table 2: Niche Market Focus Competitive Strategy

Focus of Niche Market Competitive Strategy (Cronbach's α = .661; Composite Reliability = .817; Average Variance Extracted = .598; Variance Explained = 59.77%)	Loadings
A4. The firm seeks to supply products at lowest costs to specific markets and/or customer groups only.	.775
A6. The firm seeks to differentiate products and supply specific markets and/or customer groups only.	.775
A2. The firm seeks to develop products with higher-added value focusing on specific customer groups only.	.770
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.661
Bartlett's Test of Sphericity: Approx. Chi-Square	136.471
df	3
Sig. 59.77	.000

Table 3: Broad Market Focus Competitive Strategy

Focus of Broad Market Competitive Strategy (Cronbach's α = .813; Composite Reliability = .890; Average Variance Extracted = .731; Variance Explained = 73.05%)	Loadings
A1. The firm seeks to develop products with higher-added value for a wide range of commercial and industrial uses.	.888
A3. The firm seeks to supply products at lowest costs to a broad range of market segments.	.846
A5. The firm seeks to differentiate products and supply a broad range of market segments.	.829
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.700
Bartlett's Test of Sphericity: Approx. Chi-Square	338.914
df	3
Sig. 73.05	.000

Table 4: Process Management (Lean Practices)

Process Management Practices (Cronbach's α = .835; Composite Reliability = .884; Average Variance Extracted = .605; Variance Explained = 60.50%)	Loadings
B4. Using quick changeover techniques	.821
B3. Using new process equipment or technologies	.788
B1. Implementing preventive maintenance activities	.788
B2. Cycle time reduction	.768
B5. Using error proofing techniques/Pokayoke	.721
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.830
Bartlett's Test of Sphericity: Approx. Chi-Square	587.639
df	10
Sig. 60.5	.000

Table 5: Workforce Committee (Soft TQM)

Workforce Commitment Practices (Cronbach's α = .889; Composite Reliability = .914; Average Variance Extracted = .604; Variance Explained = 60.43%)	Loadings
C3. Encourage change and a culture of trust and innovation	.831
C5. Unity of purpose and eliminated barriers between people	.825
C4. The concept of the "internal customer" is well understood	.792
C2. Has effective "top-down" and "bottom-up" communication	.780
C7. All employees believe that quality is their responsibility	.754
C1. Ideas from production operators suggestion are actively used	.728
C6. Employee flexibility, multi-skilling and training are used	.725
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.896
Bartlett's Test of Sphericity: Approx. Chi-Square	1131.458
df	21
Sig.60.43	.000

Table 6: Relationship Management (Supply Chain Management Practices)

Relationship Management Practices (Cronbach's α = .904; Composite Reliability = .926; Average Variance Extracted = .641; Variance Explained = 64.07%)	Loadings
D4. Using formal information sharing with suppliers and customers	.850
D2. To maintain close and good relationship with supplier	.840
D3. To have closely activities for good relationship with customer	.824
D6. Communicating your future strategic needs to your suppliers and customers	.800
D5. Creating the compatible information systems	.799
D7. Involving all members by representative of firm, customer & suppliers for work improvement	.759
D1. Determining customers' future expectation and needs	.723
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.890
Bartlett's Test of Sphericity: Approx. Chi-Square	1345.664
df	21
Sig.64.07	.000

Table 7: Operational Performance

Operational Performance (Cronbach's α = .754; Composite Reliability = .866; Average Variance Extracted = .683; Variance Explained = 68.25%)	Loadings
E2. Overall efficiency	.874
E3. Overall customer satisfaction	.851
E1. Ability to delivery on time	.749
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.660
Bartlett's Test of Sphericity: Approx. Chi-Square	272.344
df	3
Sig.68.25	.000

Table 8: Centroid Method Hierarchical Cluster Analysis – Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	185	56.2	57.6	57.6
	2	136	41.3	42.4	100.0
	Total	321	97.6	100.0	
Missing	System	8	2.4		
Total		329	100.0		

Table 9: Group Statistics and Independent t-test of Broad versus Niche Market Focus

Competitive strategy		N	Mean	Std. Dev.	Std. Error Mean	Independent t-test		
						t	df	Sig (2-tailed)
Niche Market Focus (Cluster 1)	Cluster 1	185	.3004	.8220	.0604	6.626	319	.000
	Cluster 2	136	-.4033	1.0806	.0927			
Broad Market Focus (Cluster 2)	Cluster 1	185	-.4755	.9400	.0691	-11.862	319	.000
	Cluster 2	136	.6439	.6669	.0572			

Table 10: Descriptive Statistics of the Clusters

Competitive strategy	Cluster 1, N=185			Cluster 2, N = 136		
	Mean	Std Error	Std Dev	Mean	Std Error	Std Dev
A2. Develop products with higher-added value focusing on specific customer groups only	4.14*	.078	1.059	2.93	.105	1.221
A4. Supply products at lowest costs to specific markets and/or customer groups only	3.60*	.103	1.400	2.80	.101	1.179
A6. Differentiate products and supply specific markets and/or customer groups only	3.26*	.101	1.367	3.13	.106	1.238
A1. Develop products with higher-added value and wide range of commercial and industrial uses	2.95	.108	1.473	4.14*	.079	.920
A3. Supply products at lowest costs to a broad range of market segments	2.63	.100	1.362	3.93*	.089	1.034
A5. Differentiate products and supply a broad range of market segments	2.39	.086	1.175	3.85*	.091	1.060

* indicates statistically higher mean value at $\alpha = 5\%$.

Table 11: Multiple Linear Regression Models

Niche Market Focus Competitive strategy (Cluster 1)

Performance =	– .061	+	.073 X ₁	+	.386 X ₂	+	.082 X ₃
(t-value)	-.935		.868		4.422		.931
(Sig.)	.351		.378		.000		.353

Broad Market Focus Competitive strategy (Cluster 2)

Performance =	– .045	+	.183 X ₁	+	.146 X ₂	+	.400 X ₃
(t-value)	.621		2.018		1.506		4.271
(Sig.)	.536		.046		.135		.000

Where X₁ = Process Management
X₂ = Workforce Commitment
X₃ = Relationship Development

Table 12: Fit Indices for Niche and Broad Market Focuses

GOODNESS OF FIT STATISTIC	NICHE MARKET FOCUS	BROAD MARKET FOCUS
$\chi^2/\text{degrees of freedom } (\chi^2/\text{df})$	1.3247	1.4064
RMSEA	0.042	0.055
p-value for (RMSEA < 0.05)	0.87	0.26 (too low)
GFI	0.87	0.82
AGFI	0.84	0.78
NFI	0.95	0.92
NNFI	0.98	0.97
CFI	0.98	0.97
IFI	0.98	0.97
RFI	0.94	0.91