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Quality ambidexterity, competitive strategies, and financial

performance: An empirical study in industrial firms

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Abstract

Purpose –The purpose of this paper is to examine the relationship between quality ambidexterity, competitive strategies (cost leadership, differentiation, and focus), and firm performance in Palestinian industry, and to analyze the combination of quality exploitation and quality exploration (quality ambidexterity) associated with different levels of each competitive strategy.

Design/methodology/approach – Using data collected through a survey of 205 Palestinian industrial firms, the study conducted Structural Equation Modeling to test the proposed relationships. Additional statistical analyses were applied to the combinations of quality exploitation and quality exploration for each competitive strategy.

Findings – The results show a positive and significant relationship between quality ambidexterity and three competitive strategies, and between competitive strategies and financial performance, focus strategy excepted. Balanced combination with similar levels of quality exploitation and quality exploration is found to be more suitable for higher levels of competitive strategies implementation, whereas an excess of quality exploration over quality exploitation is associated with lower levels of strategies implementation.

Research limitations/implications – Although Palestine has two regions, the West Bank and the Gaza Strip, all survey respondents were from the West Bank. The data used in this study come from the industrial sector only.

Originality/value – This study is the first empirical test to examine the impact of quality ambidexterity on financial performance through competitive strategies. The study results

may help managers to implement quality exploitation and quality exploration practices in order to allocate resources effectively and ultimately improve financial performance.

Keywords Quality Management, Ambidexterity, Cost leadership, Differentiation, Focus, Competitive advantage.

Paper type Research paper.

1. Introduction

March (1991) identifies two kinds of learning activities within an organization: exploration of new possibilities and exploitation of old certainties. Although scarce resources and limitations on managerial scope might suggest that firms develop one activity at the expense of the other, an emerging line of research proposes that viewing exploration and exploitation as complementary leads to better results than implementation of only one (Chandrasekaran et al., 2012; Kristal et al., 2010; Salvador et al., 2014). Unstable and hostile environments demand that organizations engage in both exploration and exploitation, thereby becoming ambidextrous organizations (Benner and Tushman, 2003; Raisch and Birkinshaw, 2008; Tamayo-Torres et al., 2014, 2017). Ambidexterity, a firm's ability to pursue both exploration and exploitation simultaneously (O'Reilly and Tushman, 2004), is a complex task. By failing to manage the conflict between these activities, famous companies such as Motorola, Ericsson, and Samsung have lost their competitive advantage. Motorola's failure, for instance, to improve products for current and future cell phone markets simultaneously, caused its cell phone division to lose \$394 million, leading the firm to eliminate over 3000 jobs (Chandrasekaran et al., 2012). Toyota, in contrast, exemplifies how to embrace the contradictions and paradoxes of exploratory and exploitative activities simultaneously to obtain successful results (Adler et al., 2009).

The recent Operations Management literature analyzes the ambidextrous orientation from such different perspectives as ambidextrous supply chain strategy (Kristal et al., 2010), innovative ambidexterity (Kortmann et al., 2014; McDermott and Prajogo, 2012), and product configuration ambidexterity (Salvador et al., 2014). To analyze the ambidextrous orientation, this paper focuses on a QM perspective due to the importance of quality as an operations-competitive variable. This research thus advances the contributions by Zhang et al. (2012) that classify QM practices into quality exploitation (QEI) practices¹ and quality exploration (QER) practices.² This study analyzes the concept of Quality Ambidexterity (QAMB), defined as a firm's ability to simultaneously carrying out quality exploration and quality exploitation practices.

To observe the real effectiveness of QAMB, this paper first analyzes QAMB's relationship to the three generic competitive strategies—cost leadership, differentiation, and focus (Porter, 1985)—since these strategies may help companies maintain their positions in competitive environments and lead to business success (Porter, 1985). Some authors agree on a positive relationship between QM and competitive strategies (Fuentes et al., 2006; Herzallah et al., 2014; Reed et al., 1996). There is no evidence, however, to support a relationship between an ambidextrous orientation in QM and competitive strategies. Some researchers show that process management and ISO 9000 training increase exploitative activities at the expense of exploratory ones (Adler et al., 2009). The ambidexterity literature argues, however, that organizations can successfully develop exploratory and exploitative activities simultaneously (Adler et al., 2009; Chandrasekaran et al., 2012; Kristal et al., 2010). Thus, the first research question is: *Is QAMB positively related to traditional competitive strategies: cost leadership, differentiation and focus?*

¹ QEI practices are defined as “QM practices that aim to control stable and familiar processes and improve the efficiency and consistency of manufacturing or service processes” (Zhang 2009, p.121).

² QER practices are defined as “QM practices that are used to get new insights about process innovation and exploration of the unknown” (Zhang 2009, p.121).

Not all the studies find positive relationships between QM and competitive strategies. Some authors find no significant relationship between QM and cost leadership strategy (e.g., Jung et al., 2009; Prajogo and Sohal, 2006). For Zhang et al. (2014), QM obtains mixed results on success because it is sometimes implemented without customizing its orientation to include contextual factors. One must customize the QM orientation by combining QER and QEI practices in a way that takes both organizational and contextual factors into account (Eriksson et al., 2016; Zhang et al., 2012, 2014). It is extremely difficult, however, for companies to achieve the right mix of exploration and exploitation. Inability to manage both activities may result in a “success trap (too much exploitation at the expense of exploration) or a failure trap (too much exploration at the expense of exploitation)” (Chandrasekaran et al., 2012, pp. 134; see also Kristal et al., 2010; Levinthal and March, 1993). This study “opens the box” of QAMB by analyzing the levels of QEI and QER practices for each competitive strategy. The next research question of this paper is thus: *What is the best combination of QER and QEI for each competitive strategy?*

The research was performed on the industrial sector in Palestine, a small country in the Arab world with limited supplies of natural resources and an economy facing many problems. Palestine has devised and is implementing a comprehensive social and economic reform agenda to build a modern state based on economic vitality with substantial potential for growth and social stability. Industry is playing an important role in the economic development and social welfare of Palestinian society. Compared to the other sectors, industry contributes significantly to the country's GDP. However, Palestinian industrial firms currently face the challenge of effective introduction of the QM approach to increase efficiency and improve their ability to respond to international

competition (Sabella et al., 2014). Studying these relationships is thus of particular interest to Palestinian and other developing countries industrial firms.

This study contributes first to the QM literature by analyzing QM from an ambidextrous orientation. It defines and analyzes the concept of QAMB and discusses how QAMB is positively related to competitive strategies and financial performance. To the extent of our knowledge, no study has ever analyzed the relationship between QAMB and competitive strategies, although some researchers have tested the relationships between QEI and QER practices and cost leadership and differentiation strategies separately (e.g. Linderman et al., 2009; Zhang, 2009). Second, this study reaches significant conclusions about what constitutes the right combination of QER and QEI when implementing competitive strategies. Our results support studies proposing that firms should avoid emphasis on one practice at the expense of the other by showing that higher levels of QER than of QEI practices (“failure trap”) correspond to lower levels of competitive strategies. Finally, from a practical point of view, this study helps firms understand how QAMB increases performance and how QER and QEI can be enhanced simultaneously. Managers in industrial firms may consider the proposed model when assessing the firm and its competitive strategies at the business level.

2. Theoretical background

2.1. Ambidexterity

March (1991, p. 71) defines the term *exploration* as “search, variation, risk taking, experimentation, play, flexibility, discovery, innovation” and *exploitation* as “refinement, choice, production, efficiency, selection, implementation and execution.” His study summarizes the key differences between exploitation and exploration strategies as follows: “The essence of exploration is experimentation with new alternatives. Its returns

are uncertain, distant and often negative. The essence of exploitation is the refinement and extension of existing competencies, technologies and paradigms. Its returns are positive, proximate and predictable” (March, 1991, p. 85).

Maintaining a suitable combination of exploration and exploitation –that is, becoming an ambidextrous organization-, is essential to its survival and success. (O’Reilly and Tushman, 2004). Management research considers combining exploration and exploitation as very important for achieving the best performance and success in the long term (Benner and Tushman, 2003; Gibson and Birkinshaw, 2004; Gupta et al., 2006; March, 1991; Tamayo-Torres et al., 2017).

2.1.1. *QM and ambidexterity*

QM is defined as “a holistic management philosophy that strives for continuous improvement in all functions of an organization” (Kaynak and Hartley, 2005, p. 256). This philosophy has been applied to improve activities and performance in terms of quality, productivity, customer satisfaction, and profitability (Kaynak and Hartley, 2008). Drawing on the management literature (Sitkin et al., 1994; Wu et al., 2011; Zhang et al., 2012), this study differentiates two orientations of QM—Quality Exploitation (QEI) and Quality Exploration (QER)—and uses four QM practices to describe both orientations—customer focus, process management, teamwork, and training (Zhang et al., 2012). To resolve the problem that different studies use different practices to measure QM (e.g., Ahire et al., 1996; Kaynak, 2003; Saraph et al., 1989), Zhang et al. (2012) performed a comprehensive literature review and proposed that these four practices are associated with the three main QM principles—customer focus, process focus, and teamwork—and are thus relevant for theory and practice. Based on these concepts, this study defines quality ambidexterity (QAMB) as a “firm’s ability to simultaneously carrying out quality

exploration and quality exploitation practices.” Table 1 presents the definitions of all constructs.

Insert Table 1 about here

2.2. *Competitive strategies*

Porter (1985) identifies three generic competitive strategies: cost leadership, differentiation, and focus. Cost leadership strategy refers to the “integrated set of actions taken to produce goods or services with features that are acceptable to customers at the lowest cost, relative to that of competitors” (Hitt et al., 2011, p. 109). This strategy aims to achieve the minimum possible cost in an industry while avoiding defects and waste (Belohlav, 1993; Chung et al., 2010) by reducing production and operational costs and increasing the organization’s capacity and efficiency (Fuentes et al., 2006; Porter, 1980).

Differentiation strategy is defined as “an integrated set of actions taken to produce goods and services – at an acceptable cost – that customers perceive as being different in ways that are important to them” (Hitt et al., 2011, p. 109). Differentiation strategy aims to provide better products or services to meet customers’ needs (Belohlav, 1993; Chung et al., 2010) and includes producing distinct products or services that differentiate a firm from its competitors. Such products and services must be accepted by customers as unique, special, and different from any similar products or services that serve the same goal in the market (Porter, 1980). Differentiation strategy has two dimensions: innovation and marketing (Miller, 1986). Innovation in differentiation relies on appearance to distinguish new products and technologies and leads competitors in innovation; it may impose high prices (Miller, 1986). The marketing dimension, in contrast, offers an attractive package—a good product or service and product image, and suitable locations (Miller, 1986). This study includes both dimensions of differentiation strategy.

Finally, focus strategy aims to fulfill the needs of a specific group of customers. It concentrates on serving a subset of customers, market segment, and geographical area

(Porter, 1980). When employing this strategy, an organization defines its marketing goal precisely and fulfills that market's satisfactions and needs, whether through low cost, differentiation, or both. This strategy is based on an organization's potential to serve its goal or strategy—a narrow market—more efficiently than its competitors while still covering the whole market (Porter, 1980; Yamin et al., 1997).

3. Hypothesis development

3.1. Quality ambidexterity and cost leadership strategy

Firms implementing a cost leadership strategy concentrate on strict cost controls and efficiency in all phases of operation (Porter, 1980). This focus requires both exploitative and exploratory behaviors. First, QM exploitative activities focus on understanding and responding to customers' needs (Wu et al., 2011). A QEI customer focus can adapt existing products and services to customers' and clients' expectations, both increasing the latter's satisfaction and reducing complaints, reworks, defective products, and waste to diminish production costs. QEI process management uses techniques such as statistical process control of manufacturing processes to reduce variance, keeping the cost of scrap, spoilage, rework, re-inspection, and warranty fees to a minimum (Patel et al., 2012; Zairi and Baidoun, 2003). QEI training focuses on the skills employees need in their current job, increasing their work efficiency by helping them to understand their job requirements (Adler et al., 2009; Zhang et al., 2014). Teamwork encourages employees to engage in collaboration to increase processes efficiency and reduce waste (Ravichandran and Rai, 2000). QEI teamwork encourages employees within functions to work closely together as a team to reduce problems (Zhang et al., 2012), thereby decreasing costs.

Second, developing new products to fulfill customer needs is one of the main tasks of exploration. A QER customer focus aims to involve customers in the product design process and to identify new customers and needs (Salvador et al., 2014; Zhang et al., 2014). Identifying these new aspects of product development properly will reduce unnecessary costs. Further, to ensure that firms do not remain static but learn from their manufacturing process experiences (Adler et al., 2009; Zhang et al., 2014), QER process management explores how to improve new products and processes (Zhang et al., 2012), that may lead to cost reductions. QER training fosters multi-task training in which employees learn actively from one another, increasing the knowledge and skills available to each (Wu et al., 2011). Such training increases employee productivity and decreases defects and waste, ultimately decreasing cost (Asif and de Vries, 2014). Finally, QER teamwork enhances cross-functional cooperation. By considering different opinions, team members reach more creative solutions (Zhang et al., 2014) that can increase employees' productivity, decrease work problems, and reduce costs.

To summarize, firms combining QEI and QER practices—in other words, developing QAMB—will increase process efficiency and employee productivity, thereby decreasing total cost and supporting a cost leadership strategy. In view of the foregoing, the following hypothesis is proposed:

H1a. Quality ambidexterity is positively related to cost leadership strategy.

3.2. Quality ambidexterity and differentiation strategy

When implementing a differentiation strategy, information from customers is essential (Porter, 1980), because it enables firms to know what factors and features of a product imbue it with high value for the customer (Dean and Bowen, 1994; Fuentes et al., 2006). An exploitative orientation in customer focus allow firms to take feedback about

their preferences regarding existing products and services. Because differentiation is based on such issues as efficiency and quality (Fuentes et al., 2006), QEI process management aims to exploit and increase control and consistency of current processes and resources (Zhang et al., 2014) to establish processes with great potential for producing differentiated products and services. Furthermore, QEI training for existing skills and QEI teamwork within functions increases employees' efficiency. As their knowledge increases through training and teamwork practices, they become more efficient in their tasks, develop capabilities, exchange opinions, and solve problems (Ahire et al., 1996; Cole, 1993). These benefits may result in improved, high quality products that differentiate the firm's products from those of its competitors.

Second, one essential task of the exploratory orientation is to develop new products that meet customers' needs (March, 1991). To identify new customer needs, a QER customer focus attempts to consult customers early in product design (Zhang et al., 2014). Customers who are partners in product design will satisfy their needs by obtaining a unique product. To achieve such a consumer-based orientation, QER process management aims to improve new products and processes that enhance a firm's ability to offer customers high-quality, differentiated products or the best service (Zhang et al., 2012). QER training thus focuses on multiple tasks and multi-task training to increase variety of employee skills and help employees solve problems that arise (March, 1996). Multiple skills can be leveraged, for instance, to develop innovative products (Asif and de Vries, 2014). Employees must work interactively and coordinate their activities so that they encounter the variety of opinions that enables them to generate more creative solutions (Wu et al., 2011). Cross-functional cooperation exemplifies the kind of teamwork on which QER focuses. All of these practices increase employees' knowledge,

promote development of new products that satisfy customers' needs, and differentiate a firm from its competitors.

In sum, both QEI and QER practices are necessary for improving processes, differentiating products, and meeting market and customer needs (Chandrasekaran et al., 2012; Gupta et al., 2006; March, 1991). In view of the foregoing, the following hypothesis is established:

H1b. Quality ambidexterity is positively related to differentiation strategy.

3.3. Quality ambidexterity and focus strategy

A focus strategy also requires both exploitative and exploratory quality practices. Firms that decide to apply a focus strategy must exploit their assets to raise their market share in their segment of the market (Porter, 1980; Miller, 1986; Ruiz-Ortega, 2010). An exploitative customer focus seeks to understand customer needs and adapt existing products and services to promote loyalty of customers. QEI customer focus may ensure that they fulfill specific customer expectations (Wu et al., 2011). QEI process management exploits current processes to increase their reliability and serve target markets better (Zhang et al., 2014). QEI training provides required job skills to help employees better understand their job requirements and become more productive in their current jobs (Zhang et al., 2012). Such increased knowledge helps employee identify the needs of the target market (Ahire et al., 1996). Further, teamwork generates suggestions to increase product quality and improve the efficiency and reliability of processes (Cole, 1993), all enabled by QEI teamwork through the interaction between employees within functions. Consequently, both QEI training and QEI teamwork help employees to serve elite customers by providing special products and services that meet their needs (Zhang et al., 2014).

For QER, meeting the needs of specific new customer groups also requires investigating new paths and ideas through capability development and resource allocation (Ruiz-Ortega, 2010). QER customer focus involves customers in the early stages of product design to identify new customer needs. This approach is consistent with the “design for quality” notion that customer input plays an important role in the design process (Zhang et al., 2014). Whereas process management leads to improvements that can provide better products and services to targeted customers (Dean and Bowen, 1994), QER process management focuses on improving new products and processes for this purpose (Zhang et al., 2012). Multi-task training for QER enables employees to learn from each other and to deal better with elite customers (Wu et al., 2011). Such training enhances employees’ ability to perform a variety of tasks related to specific customers and to enable employees to gather information about customers and the market (Zhang et al., 2014). Finally, QER teamwork helps employees cooperate between functions (Zhang et al., 2014), increasing the possibility of developing new solutions (Ahire et al., 1996).

In sum, QEI practices encourage firms to improve current products and services for specific customers, while QER practices explore new methods that generate new solutions and identify new target customers. In view of the foregoing, the following hypothesis is proposed:

H1c. Quality ambidexterity is positively related to focus strategy.

3.4. Competitive strategies and financial performance

Cost leadership emphasizes production efficiency and can be achieved by eliminating defects and waste (Prajogo and Sohal, 2006). The lowest cost strategy increases the possibility for greater profit margins (Yamin et al., 1997), while also offering customers good products and services at competitive prices to decrease prices,

to match or beat competitors, and still make profits (Li and Li, 2008). In view of the foregoing, the following hypothesis is proposed:

H2a. Cost leadership strategy is positively related to financial performance.

A differentiation strategy relies on innovative products and a differentiated brand image to create customer value, enabling a firm to set the best prices (Li and Li, 2008). Innovative firms that offer differentiated products achieve both higher sales and profits (Hurley and Hult, 1998), as increasing a firm's perceived value by offering products that attract customers' attention can increase profits, reduce customer acquisition costs, and decrease chances of customers bolting to competitors (Morgan et al., 2004). In view of the foregoing, the following hypothesis is proposed:

H2b. Differentiation strategy is positively related to financial performance.

Because focus strategy is based on the idea that efforts to gain a specific market position lead to higher performance (Yamin et al., 1997; Parnell, 2011), firms adopting focus strategy choose a narrow range of consumers in a specific sector and establish a specialized strategy to serve them. Such firms enjoy a high level of customer loyalty, which discourages other firms from competing directly with them and thus enables them to achieve high returns by targeting certain segments (Hsieh and Chen, 2011). In view of the foregoing, the following hypothesis is proposed:

H2c. Focus strategy is positively related to financial performance.

Insert Figure 1 about here

4. Research methodology

4.1. Measurement instrument

Data for the analyses were obtained using a questionnaire developed after an extensive review of the literature on QER and QEI practices, competitive strategies, and performance. QAMB was analyzed by adapting the scales for QER and QEI practices from Zhang et al. (2012). Items to measure competitive strategies were adapted from Miller's study (1986) and items for financial performance from Kaynak and Hartley (2008). Each item included a Likert-type 1-to-7-point scale to record responses (1='strongly disagree', 7='strongly agree'). The competitive strategies items asked respondents about their firm's position vis-à-vis its leading competitors. The financial performance items asked respondents to rate their site's performance during the past three years relative to that of their main competitors. All scales are included in Appendix.

4.2. Sample and data collection

The empirical research was conducted at Palestinian industrial firms. The target group was firms with more than twenty employees, a sample size similar to that used in previous QM studies (e.g., Samson and Terziovski, 1999), since a smaller number of employees does not guarantee solid QM implementation (Herzallah et al., 2014). The database of the Palestinian Ministry of National Economy, which contains about 13,000 firms in Palestine, was used to identify organizations appropriate for this study (Palestinian Ministry of National Economy, 2015).

Palestine's environment is representative of other developing countries whose economies are becoming industrial and service-based. In the past, most firms in such economies operated in environments with limited competition, price controls, and government subsidies (Amoako-Gyampah and Acquah, 2008). These firms have now entered international competition and begun to change their policies. Today, Palestinian industrial firms face many challenges as they try to survive the intense international

competition, especially from Israeli and Chinese companies, in local markets. Palestinian industrial firms are thus working to introduce QM to become more competitive in international markets (Sabella et al., 2014). Despite the problems these firms face, many have obtained ISO and other international certifications (Palestinian Ministry of National Economy, 2015). Palestine thus represents a suitable context in which to study how QM is implemented in developing countries and to analyze the potential to enhance national and international competitiveness.

A total of 350 structured questionnaires with closed questions were sent to firms. Three weeks after the initial mailing, a follow-up email was sent to those who had not yet responded. Ultimately, 228 questionnaires were completed and returned, of which 23 were excluded because they were incomplete, leaving 205 usable questionnaires, for a response rate of 58.66%. This response rate provides a good representation of the population, since a rate of 50%-65% is acceptable for business surveys (Willimack et al., 2002). To test for nonresponse bias for early respondents (those who answered the first request) and late respondents (those who answered after the follow-up letter), sample t-test procedures were performed for the variables analyzed. The t-tests show no significant differences in observed variables between early and late respondents. The possibility of common method variance (CMV) was also tested. First, the questionnaire was pre-tested by four quality managers to eliminate ambiguities and errors. According to Podsakoff et al. (2012), pre-testing the questionnaire is a remedy to avoid CMV. Further, Harman's one-factor test was performed to determine whether a one-factor model has poor fit with the data. The results of this test showed poor fit ($\chi^2/df = 4.09$; GFI = 0.446; AGFI = 0.497; RMSEA = 0.123; NFI = 0.493), CMV is not a problem for this study (Podsakoff et al., 2012).

By industrial sector, the total of 205 firms was composed of 31.70% from metal industries, 20.00% from mining and construction, 20.00% from the food and beverage industry, 18.53% from the textile, leather, and shoe industries, and 9.75% from miscellaneous industries. The breakdown by number of employees showed 49.26% of firms with 20-40 employees, 29.75% with 40-80, and 20.97% with over 80 employees. Finally, by annual sales volume, 45.36% of the firms had less than 1 million euros, 44.39% 1-7 million, and 10.24% 7-40 million.

4.3. Measurement analysis

The scales used in this study were validated based on the essential psychometric requirements (Hulland, 1999; Hair et al., 2010), but for accuracy their validity was demonstrated again in this study. QAMB contains eight practices: four QEI practices—Customer focus (CFI), Process management (PMI), Teamwork (TWI), Training (TRI)—and four QER practices—Customer focus (CFE), Process management (PME), Teamwork (TWE), Training (TRE). Competitive strategies include cost leadership (CL), differentiation (DIF), and focus (FOC). Differentiation strategy is divided into its two dimensions: Innovation (DI) and Marketing (DM). Performance includes one scale for financial performance (FP).

For content validity, all scales were derived from previous, related studies that have been validated (Hair et al., 2010). To test the reliability of individual factors, a Confirmatory Factor Analysis (CFA) was performed using AMOS 20.0 (Carr and Pearson, 1999; Kim et al., 2012). As a result, the following items were eliminated: CFI3, TRE2, CL4, DM3, DI3, and FP2. The final scales consisted of 23 items for QAMB practices, 16 items for competitive strategies, and 4 items for financial performance. The model's internal consistency was calculated by Cronbach's alpha, composite reliability, and variance extracted tests. The results show that all scales meet the criteria for internal

consistency (see Tables 2 and 3). In testing convergent validity, Hair et al. (2010) considered a significant factor loading as >0.3 , a high important loading as >0.4 , and a highly significant loading as ≥ 0.5 . In addition, individual reliability values (R^2) must exceed 0.4 (Carr and Pearson, 1999; Kim et al., 2012). The results of the tests show that the final scales met all criteria for individual reliability and convergent validity (see Table 2). Finally, to establish discriminant validity, Maximum Shared Squared Variance (MSV) and Average Shared Squared Variance (ASV) must be less than the AVE (Hair et al., 2010). The results show that these values are acceptable (see Table 3).

Insert table 2 about here

Insert table 3 about here

5. Results

5.1. Structural Equation Modelling (SEM)

The proposed hypotheses were tested with SEM using AMOS 20.0 software. Table 4 illustrates the results obtained. These results lead us to accept hypotheses H1a, H1b, H1c, H2a, and H2b (z-values for path coefficients greater than 1.65 are positive and significant at $p < 0.1$, while those greater than 1.96 are significant at $p < 0.05$ and those greater than 2.58 significant at $p < 0.01$; Kaynak and Hartley, 2008; Kim et al., 2012). The results do not support Hypothesis H2c, however, as the path coefficient is significant but negative. Final results show good fit for the structural model (see Table 5).

Insert Table 4 about here

Insert Table 5 about here

5.2. QEI and QER combination and competitive strategies

Following confirmation of the positive relationships between QAMB and competitive strategies, this section analyzes what combinations of QEI and QER suit each competitive strategy. Cost leadership strategy needs continual search for all possible ways to decrease costs, such as reducing production costs, reducing inventory, increasing equipment utilization, and increasing capacity utilization (Ward and Duray, 2000; Zhang, 2009). Consequently, it would be logical to consider the importance of QEI practices as different from that of QER practices. QEI and QER practices can also differ in their importance for differentiation strategy, which seeks a specific type of exclusivity and focuses on enhancing unique features of the products or services.

To run this analysis, the study of Chandrasekaran et al. (2012) of ambidexterity and performance in high technology organizations was taken as a reference. First, for each competitive strategy, the sample was divided into two groups: firms with high-level implementation of each competitive strategy and firms with low-level of implementation. Following Chandrasekaran et al. (2012), this classification is based on the median value of the corresponding competitive strategy. For example, scores above the median value of the cost leadership strategy indicate a high level of implementation of cost leadership, whereas scores below this median indicate low level of implementation of cost leadership. Various tables and figures were then used to analyze the QAMB and the QEI and QER practices for low and high levels of implementation of each competitive strategy. Different approaches to analyzing QAMB were considered. Specifically, the y-axes in Figures 2, 3, and 4 plot QAMB defined as a multiplicative measure of the units of the QEI and QER practices ($QEI \times QER$), the measure used by Chandrasekaran et al. (2012), He and Wong (2004), and Gibson and Birkinshaw (2004). The x-axis of the left plot of these figures provides QAMB based on the absolute differences between QEI and QER ($|QEI - QER|$), also used by Chandrasekaran et al. (2012) and Jansen et al. (2009), among

others. Finally, the x-axis of the right plot in Figures 2, 3, and 4, shows the real differences between QEI and QER ($QEI - QER$), where values of this x-axis larger than 0 indicate that the QER values are higher than the corresponding QEI values, and vice versa. Table 6 presents the descriptive statistics of all variables in the analyses.

First, Figure 2 represents QEI and QER practices for firms with low level of cost leadership strategy versus firms with high level of cost leadership strategy. Both plots in Figure 2 show that firms with high level of cost leadership strategy (represented by diamonds) tend to be located at the top of the plots, implying that these firms generally develop higher levels of QEI and QER than firms with low level of cost leadership strategy (represented by circles). The two groups' dispersion also differs. Figure 2 shows that the group of firms with high level of cost leadership strategy (diamonds) is less dispersed than the group with low level of cost leadership strategy (circles). Table 6 reinforces this result, showing that firms with low level of cost leadership strategy have more variability in QEI and QER (coefficients of variation [CV] equal to 0.21 and 0.18, respectively) than do firms with high level of cost leadership strategy (CV equal to 0.12 and 0.11, respectively). Thus, the QEI and QER values have more variability for firms with low levels of cost leadership strategy.

Second, the right plot of Figure 2 shows a higher percentage of firms in the positive quadrant of the x-axis, indicating greater implementation of QER practices than of QEI practices. Dividing this total into percentages of QER and QEI practices implemented in firms with low versus high levels of cost leadership strategy (Table 7) shows that 53.1% of firms with high level of cost leadership strategy developed more QER than QEI practices, as compared to 75.0% of firms with low level of cost leadership strategy. These results indicate clearly that QER practices are more common in firms with low levels of cost leadership strategy than in firms with high levels. This finding suggests

that similar levels of QER and QEI in a firm are associated with higher levels of cost leadership strategy. The association is reinforced by Table 8, which shows no significant difference between the means of QEI and QER in firms with high level of cost leadership strategy (t-value=0.48; p-value=0.631) and a significant difference between them in firms with low level of cost leadership strategy (t-value=2.65; p-value=0.008). This result confirms a contrast between balanced implementation (similar levels of QEI and QER) in firms with high level of cost leadership strategy, and greater implementation of QER than of QEI practices in firms with low level of cost leadership strategy.

Insert Figure 2 about here

Insert Table 6 about here

Insert Table 7 about here

Insert Table 8 about here

As to differentiation strategy, higher levels of QEI and QER correspond to firms with high level of differentiation strategy, and lower levels correspond to firms with low level of differentiation strategy (see Figure 3). Both Figure 3 and the coefficients of variation in Table 6 show higher variability in firms with high level of differentiation strategy (QEI CV=0.21; QER CV=0.18) and lower variability in firms with low level of differentiation strategy (QEI CV=0.13; QER CV=0.11). Further, the right plot of Figure 3 and Table 7 show that QER practices are more common than QEI practices in firms with low level of differentiation strategy (73.1% of the cases), whereas the percentage of QER practices is close to 50% (56%) in firms with high level of differentiation strategy. Finally, t-tests for the difference of means (see Table 8) show no significant differences in QER and QEI implementation in firms with a high level of differentiation strategy (t-value=0.82; p-value=0.413), and a significantly higher level of QER implementation in firms with a low level of differentiation strategy (t-value=2.43; p-value=0.016). Similar

results were obtained for focus strategy. Higher levels of QEI and QER and higher variability correspond to firms with high level of focus strategy and vice versa. QER practices are more common than QEI practices in firms with low level of focus strategy, whereas the two practices occur in similar levels in firms with high level of focus strategy(see Figure 4 and Tables 6, 7 and 8).

Insert Figure 3 about here

Insert Figure 4 about here

In sum, analyses of the three competitive strategies indicate, first, that firms with high-level implementation of these strategies generally develop higher levels of QEI and QER. Second, both QEI and QER practices have more variability for low levels of strategies implementation. Third, QER practices are more common than QEI practices in firms with lower levels of strategies implementation. Finally, firms with higher levels of strategies implementation tend to have more balanced implementation, that is, similar levels of QEI and QER.

6. Discussion

6.1. QAMB and competitive strategies

The first objective of this paper is to examine the relationship between QAMB and competitive strategies. The results show a significant and positive relationship between QAMB and all three competitive strategies. As one of the first analyses of these relationships, this study provides the literature with a foundation for future research. First, its findings on the relationship between cost leadership strategy and QAMB extend the results of Zhang (2009) and Linderman et al. (2009), which find positive and separate relationships of QER and QEI practices to low cost strategy. Increasing consistency and efficiency through QEI practices reduces costs in organizations and helps them to achieve

the objectives of cost leadership strategy. This strategy also demands continuous searching for all possible ways to decrease costs (production costs, inventory, equipment, and capacity utilization) (Ward and Duray, 2000; Zhang, 2009) and identify alternative QER practices that will contribute to the strategy's objective.

Second, in studying the relationship between QAMB and differentiation strategy, Yalcinkaya et al. (2007), Linderman et al. (2009), and Zhang (2009) show only a significant positive relationship between QER and differentiation strategy. Our study's results are consistent with their findings. Seeking exclusivity, firms with a differentiation strategy focus on enhancing a unique feature of their products or services to differentiate them from those of competitors (Amoako-Gyampah and Acquah, 2008). Since QER includes practices that aim to explore the unknown and implement changes, and since differentiation keeps firms flexible and open to new ideas, firms that focus more on differentiation may view QER execution as more significant (Linderman et al., 2009; Zhang, 2009). In contrast to our findings, however, Yalcinkaya et al. (2007), Linderman et al. (2009), and Zhang (2009) obtain a non-significant relationship between QEI and differentiation strategy. Because firms in highly competitive environments must pursue some form of uniqueness to differentiate themselves from their competitors, they must exploit all of their resources and activities efficiently to increase customer satisfaction and serve customers with an expert team (Miller, 1986). Since differentiation is based on issues such as efficiency or quality (Fuentes et al., 2006), increasing process efficiency will make products more reliable and differentiate them more sharply from those of competitors.

Finally, the literature shows no evidence for the relationship between focus strategy and QAMB, or even between this strategy and QER or QEI practices. As focus strategy requires a concentration of efforts, intensive resources, and experienced

employees (Hsieh and Chen, 2011), firms that adopt it must explore and implement new means of significant innovation while simultaneously and efficiently exploiting their existing capabilities to meet the firm's goals (Prajogo et al., 2008; Raisch et al., 2009).

The second objective of this paper is to determine what combinations of QEI and QER practices best suit each competitive strategy. The analyses in Section 5.2 produce interesting results. First, the figures show that higher levels of QEI and QER practices are related to higher levels of implementation of the three competitive strategies. This result agrees with the results obtained in our previous SEM analysis and strengthens its conclusions, that competitive strategies are positively related to the implementation of QEI and QER practices. Second, these analyses show that the highest levels of cost leadership, differentiation, and focus strategy are associated with balanced levels of QEI and QER practices, while the lowest levels of these strategies are associated with an unbalanced combination of QEI and QER practices characterized by higher-level implementation of QER than of QEI practices. In answer, therefore, to the second research question, the findings highlight the importance of balanced combination of similar levels of QER and QEI practices to obtaining higher levels of competitive strategies. This important contribution supports empirical evidence from the prior literature that affirms the importance of achieving a balance between exploration and exploitation for firms' long-term survival (Lewin et al., 1999; March, 1991). Moreover, the evidence shows that the two activities add value to each other to improve firm performance (He and Wong, 2004). Further, balancing QER and QEI practices reduces costs and helps firms to optimize allocation of their limited resources and obtain high efficiency from them. Simultaneous implementation of QER and QEI practices can also contribute to improving new products and services. To be successful in the future, firms must be able to perform these conflicting activities simultaneously, which means avoiding

emphasis on one at the expense of the other (Gupta et al., 2006; March, 1991). This study shows that the lowest levels of competitive strategies correspond to a failure trap—too much exploration at the expense of exploitation (Chandrasekaran et al., 2012; Kristal et al., 2010; Levinthal and March, 1993)—in which “...failure leads to search and change, which lead to failure which leads to even more search, and so on” (Levinthal and March, 1993 p. 105). Infinite and continuous searching makes it difficult for a firm to maintain its competitive position, and it explains the low-level implementation of competitive strategies. Excessive focus on exploration weakens existing resources and destroys firms’ total profits (Gibson and Birkinshaw, 2004).

6.2. Competitive strategies and financial performance

Additionally, the direct relationships between competitive strategies and financial performance were also tested. The results show a significant and positive relationship of cost leadership and differentiation strategies to financial performance, and a significant negative relationship of focus strategy to financial performance. Many studies obtain similar results, finding positive relationships between cost leadership and performance (e.g., Fuentes et al., 2006; Ruiz-Ortega, 2010; Herzallah et al., 2014), and between differentiation strategy and performance (e.g., Fuentes et al., 2006; Prajogo and Sohal, 2006; Ruiz-Ortega, 2010; Herzallah et al., 2014). In analyzing the negative relationship between focus strategy and financial performance, research affirms that successful adoption of focus strategy requires highly devoted, experienced employees (Hsieh and Chen, 2011). This finding could explain these results, as many firms, especially in developing countries such as Palestine, suffer from lack of resources, weak capabilities, poorly trained staff, and intense competition (Amoako-Gyampah and Acquaaah, 2008). Focus strategy is costly. It requires concentrating efforts and resources on a particular

market niche, and training staff is expensive and affects financial performance (Lumpkin and Dess, 2006; Collis and Montgomery, 2008). Since Palestine is a small country and its market very small and narrow, companies may have difficulty finding a large enough market niche to be profitable.

6.3. Managerial implications

These results are useful in guiding managers to identify effective elements and tools to apply in QM, tools that indicate how they must adopt QER and QEI practices. Managers must customize the allocation of scarce resources successfully between exploration and exploitation activities. They must also consider introducing new methods to prioritize resource allocation and performance across exploration and exploitation practices. QAMB must be developed effectively to implement the competitive strategies that lead to superior performance. QAMB helps managers to apply the most competitive strategies, based on available resources, to enable firms to increase their financial performance and survive long term in competitive business environments. Finally, firms from developing countries face the challenge of increasing their competitiveness through QM implementation. The results justify QM implementation and encourage managers from Palestine and similar developing countries to focus on ambidextrous orientation to strengthen their firms and capabilities so that they can compete in international markets. Additionally, managers implementing focus strategies must evaluate the benefits of this implementation to reformulate its orientation if necessary.

7. Conclusion

This study shows that QAMB is positively related to competitive strategies and that these strategies are related to financial performance, focus strategy excepted. Based on this study's findings, QAMB may be regarded as a valuable organizational resource that leads to competitive advantage. The results also highlight the importance of a

balanced combination with similar levels of QEI and QER practices for competitive success, as unbalanced combinations lead to lower competitive levels in organizations. Firms must find new ways and methods to compete in international markets, exploring and pursuing new opportunities for differentiation and innovation while simultaneously exploiting current abilities efficiently and successfully.

Like all studies, this one has limitations that should be acknowledged. First, all respondents were from industrial firms. Future studies might analyze and compare these results to results from the service sector. Second, the data came from a single respondent and were self-reported, with the attendant risk of subjectivity. Finally, data are taken from a single country, Palestine. Although this country is representative of developing countries, one must be careful in generalizing the conclusions. Future research should attempt to analyze other countries and compare results to reach more solid conclusions. Future research can extend this study in several ways. First, it is important to identify environmental conditions that ease exploration and exploitation before seeking the potential combination of the two (Ennen and Richter, 2010), for instance, by studying the proposed model under environmental uncertainty. Finally, a study with different mediators between QAMB and financial performance, such as manufacturing flexibility and dynamic capabilities, could be relevant to delve into this relationship.

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Table 1. Quality exploitation (QEI) and quality exploration practices (QER)

| QM practices | Definition | Description of Exploitation practices (Zhang et al. 2012) | Description of Exploration practices (Zhang et al. 2012) |
|------------------------------|--|---|---|
| Quality Ambidexterity (QAMB) | <i>Firm's ability to allocate the essential resources for being successful efficiently and simultaneously to engage in quality exploration and quality exploitation practices.</i> | - | - |
| Quality Exploitation (QEI) | 'QM practices that aim to control stable and familiar processes and improve the efficiency and consistency of manufacturing or service processes' (Zhang 2009, p.121). | - | - |
| Quality Exploration (QER) | 'QM practices that are used to get new insights about process innovation and exploration of the unknown' (Zhang 2009, p.121). | - | - |
| Customer focus | The degree to which the organizations continuously understand and satisfy the needs and expectations of the customer (Ahire and Ravichandran 2001; Kim et al. 2012). | Identify customers, assess customers' needs, better understand customer expectations, and respond to customer needs and expectations. | Explore new needs for customers, identify new customers, and involve customers in the early stage of product development. |
| Process management | The extent to which an organization achieves clarity of process and steps, uses preventative maintenance and employee self-inspection, and statistical techniques and automated testing are used to reduce variance in processes (Saraph et al. 1989). | Increase process control, and increase process reliability. | Explore improvement of new products and processes, and dynamic change of the organization. |
| Teamwork | "is a method to achieve employee involvement and participation and encourages the collaboration among different individuals or groups (suppliers and customers included)" (Fuentes et al. 2004,p.3). | Focus on within functional problem solving. | Focus on cross-functional cooperation. |
| Training | The degree to which an organization provides the staff with statistical training, trade training, quality-related training, and quality techniques (Saraph et al. 1989). | Conduct training on existing skills. | Conduct training on multiple skills and new skills. |

Table 2. Confirmatory factor analysis

| Indicator | Standardized | | | Indicator | Standardized | | |
|-----------|----------------|----------------|-----------|-----------|----------------|----------------|-----------|
| | Factor Loading | R ² | z-value | | Factor Loading | R ² | z-value |
| CFI1 | 0.876 | 0.766 | 12.708*** | TRE1 | 0.858 | 0.714 | 6.665*** |
| CFI2 | 0.852 | 0.744 | 14.768*** | TRE3 | 0.607 | 0.489 | 7.273*** |
| CFE1 | 0.887 | 0.791 | 17.106*** | CL1 | 0.805 | 0.623 | 11.242*** |
| CFE2 | 0.941 | 0.893 | 19.692*** | CL2 | 0.682 | 0.461 | 8.437*** |
| CFE3 | 0.871 | 0.759 | 11.698*** | CL3 | 0.767 | 0.584 | 10.051*** |
| CFE4 | 0.785 | 0.608 | 13.663*** | CL5 | 0.825 | 0.692 | 11.071*** |
| PMI1 | 0.874 | 0.759 | 16.414*** | CL6 | 0.826 | 0.696 | 10.715*** |
| PMI2 | 0.873 | 0.747 | 15.882*** | DM1 | 0.619 | 0.484 | 8.959*** |
| PMI3 | 0.915 | 0.837 | 16.718*** | DM2 | 0.616 | 0.507 | 9.967*** |
| PME1 | 0.899 | 0.779 | 11.049*** | DM4 | 0.691 | 0.506 | 7.377*** |
| PME2 | 0.807 | 0.741 | 9.728*** | DM5 | 0.815 | 0.656 | 9.342*** |
| PME3 | 0.746 | 0.606 | 12.062*** | DM6 | 0.729 | 0.543 | 8.656*** |
| TWI1 | 0.852 | 0.718 | 12.271*** | DI1 | 0.743 | 0.544 | 7.817*** |
| TWI2 | 0.867 | 0.777 | 12.875*** | DI2 | 0.779 | 0.575 | 8.024*** |
| TWI3 | 0.842 | 0.688 | 12.082*** | DI4 | 0.642 | 0.443 | 11.857*** |
| TWE1 | 0.859 | 0.721 | 11.592*** | FOC1 | 0.765 | 0.532 | 10.121*** |
| TWE2 | 0.876 | 0.769 | 12.026*** | FOC2 | 0.715 | 0.526 | 9.367*** |
| TWE3 | 0.827 | 0.706 | 12.515*** | FOC3 | 0.714 | 0.585 | 9.470*** |
| TRI1 | 0.916 | 0.837 | 14.72*** | FP1 | 0.695 | 0.461 | 9.542*** |
| TRI2 | 0.771 | 0.593 | 11.32*** | FP3 | 0.798 | 0.608 | 11.147*** |
| TRI3 | 0.853 | 0.725 | 14.073*** | FP4 | 0.878 | 0.737 | 13.399*** |

Table 3. Internal consistency

| Variable | Cronbach's α | CR ¹ | AVE ² | MSV ³ | ASV ⁴ |
|----------|---------------------|-----------------|------------------|------------------|------------------|
| CFI | .740 | 0.803 | 0.686 | 0.244 | 0.170 |
| CFE | .916 | 0.918 | 0.738 | 0.208 | 0.178 |
| PMI | .896 | 0.896 | 0.741 | 0.536 | 0.368 |
| PME | .828 | 0.830 | 0.621 | 0.449 | 0.313 |
| TWI | .843 | 0.861 | 0.684 | 0.673 | 0.464 |
| TWE | .863 | 0.867 | 0.685 | 0.449 | 0.302 |
| TRI | .852 | 0.857 | 0.682 | 0.668 | 0.464 |
| TRE | .679 | 0.693 | 0.551 | 0.342 | 0.276 |
| CL | .859 | 0.859 | 0.751 | 0.694 | 0.602 |
| DM | .828 | 0.851 | 0.659 | 0.488 | 0.145 |
| DI | .717 | 0.717 | 0.393 | 0.251 | 0.099 |
| FOC | .762 | 0.759 | 0.613 | 0.593 | 0.548 |
| FP | .867 | 0.852 | 0.591 | 0.383 | 0.317 |

CR¹: Composite Reliability, AVE²: Average Variance Extracted, MSV³: Maximum Shared Squared Variance, ASV⁴: Average Shared Squared Variance

Table 4. SEM results

| Hypotheses | Estimate | z-value |
|----------------|----------|-----------|
| H1a (QAMB-CL) | 0.995 | 10.457*** |
| H1b (QAMB-DIF) | 0.819 | 7.743*** |
| H1c (QAMB-FOC) | 0.836 | 8.585*** |
| H2a (CL-FP) | 0.670 | 5.670*** |
| H2b (DIF-FP) | 0.920 | 5.107*** |
| H2c (FOC- FP) | -0.750 | -5.002*** |

*p < 0.05; **p < 0.01; ***p < 0.005.

Table 5. Goodness of fit statistics of the structural model

| Goodness of fit statistics | Structural model | Recommended values |
|---|------------------|---|
| χ^2 (sig.) | 1896.096 | |
| Freedom degrees | 840 | |
| χ^2/df | 2.257 | < 3 ^{a,b} |
| Root mean square error of approximation (RMSEA) | 0.072 | < 0.08 ^b |
| Goodness of fit index (GFI) | 0.907 | > 0.5 ^b |
| Parsimony goodness of fit index (PGFI) | 0.824 | > 0.5 ^b |
| Parsimony normed fit index (PNFI) | 0.885 | > 0.5 ^b |
| Tucker-Lewis index (TLI; NNFI) | 0.932 | > 0.9 ^{a,b} |
| Adjusted Index of goodness of fit (AGFI) | 0.901 | > 0.5 ^b |
| Incremental fit index (IFI) | 0.947 | > 0.9 ^{a,b} |
| Comparative fit index (CFI) | 0.946 | > 0.5 ^b |
| Akaike's information criterion (CAIC) | 2508 | < saturated model and independence model ^{a,b} |
| CAIC for saturated model | 5981 | |
| CAIC for independence model | 7139 | |

Note:^aHair et al. (2010); ^bByrne (1998).

Table 6. Descriptive statistics

| Variable | | Mean | S.D. | C.V. | Min | Max |
|-----------------------|----------------------|-------------|-------------|-------------|------------|------------|
| QEI | | 5.08 | 1.00 | 0.20 | 1.46 | 6.73 |
| | High Cost leadership | 5.69 | 0.66 | 0.12 | 3.09 | 6.73 |
| | Low Cost leadership | 4.53 | 0.94 | 0.21 | 1.46 | 6.18 |
| | High Differentiation | 5.64 | 0.71 | 0.13 | 3.27 | 6.73 |
| | Low Differentiation | 4.54 | 0.95 | 0.21 | 1.46 | 6.27 |
| | High Focus | 5.50 | 0.92 | 0.17 | 3.09 | 6.73 |
| | Low Focus | 4.81 | 0.97 | 0.20 | 1.46 | 6.54 |
| QER | | 5.27 | 0.88 | 0.17 | 2.23 | 6.85 |
| | High Cost leadership | 5.74 | 0.61 | 0.11 | 3.62 | 6.85 |
| | Low Cost leadership | 4.86 | 0.88 | 0.18 | 2.23 | 6.76 |
| | High Differentiation | 5.71 | 0.65 | 0.11 | 3.15 | 6.85 |
| | Low Differentiation | 4.84 | 0.86 | 0.18 | 2.23 | 6.46 |
| | High Focus | 5.62 | 0.81 | 0.14 | 2.77 | 6.85 |
| | Low Focus | 5.05 | 0.85 | 0.17 | 2.23 | 6.54 |
| Differentiation | | 5.13 | 0.86 | 0.17 | 3.00 | 7.00 |
| Cost leadership | | 4.92 | 1.00 | 0.20 | 1.40 | 6.80 |
| Focus | | 5.18 | 1.06 | 0.21 | 1.67 | 7.00 |
| Financial Performance | | 4.86 | 1.03 | 0.21 | 1.75 | 7.00 |

Table 7. Proportion of firms where QAMB measure “QEI–QER” is lower, equal and higher than zero

| Group | QER–QEI<0 | QER–QEI=0 | QER–QEI>0 |
|----------------------|---------------------|------------------|---------------------|
| High Cost leadership | 45.8% | 1.1% | 53.1% |
| Low Cost leadership | 25.0% | 0.0% | 75.0% |
| High Differentiation | 43.0% | 1.0% | 56.0% |
| Low Differentiation | 26.9% | 0.0% | 73.1% |
| High Focus | 40.5% | 1.3% | 58.2% |
| Low Focus | 31.2% | 0.0% | 68.8% |
| Total | 34.8% | 0.5% | 64.7% |

Table 8. T-tests for the difference between two means

| Variable 1 (Group) | Variable 2 (Group) | Difference of means | t-value |
|---------------------------|---------------------------|----------------------------|----------------|
| QER (Entire sample) | QEI (Entire sample) | 0.19 | 2.08* |
| QER (Low_Cost) | QEI (Low_Cost) | 0.33 | 2.65**** |
| QER (High_Cost) | QEI (High_Cost) | 0.04 | 0.48 |
| QER (Low_Diff) | QEI (Low_Diff) | 0.31 | 2.43** |
| QER (High_Diff) | QEI (High_Diff) | 0.08 | 0.82 |
| QER (Low_Focus) | QEI (Low_Focus) | 0.24 | 2.07** |
| QER (High_Focus) | QEI (High_Focus) | 0.12 | 0.90 |

Figure.1. Proposed model

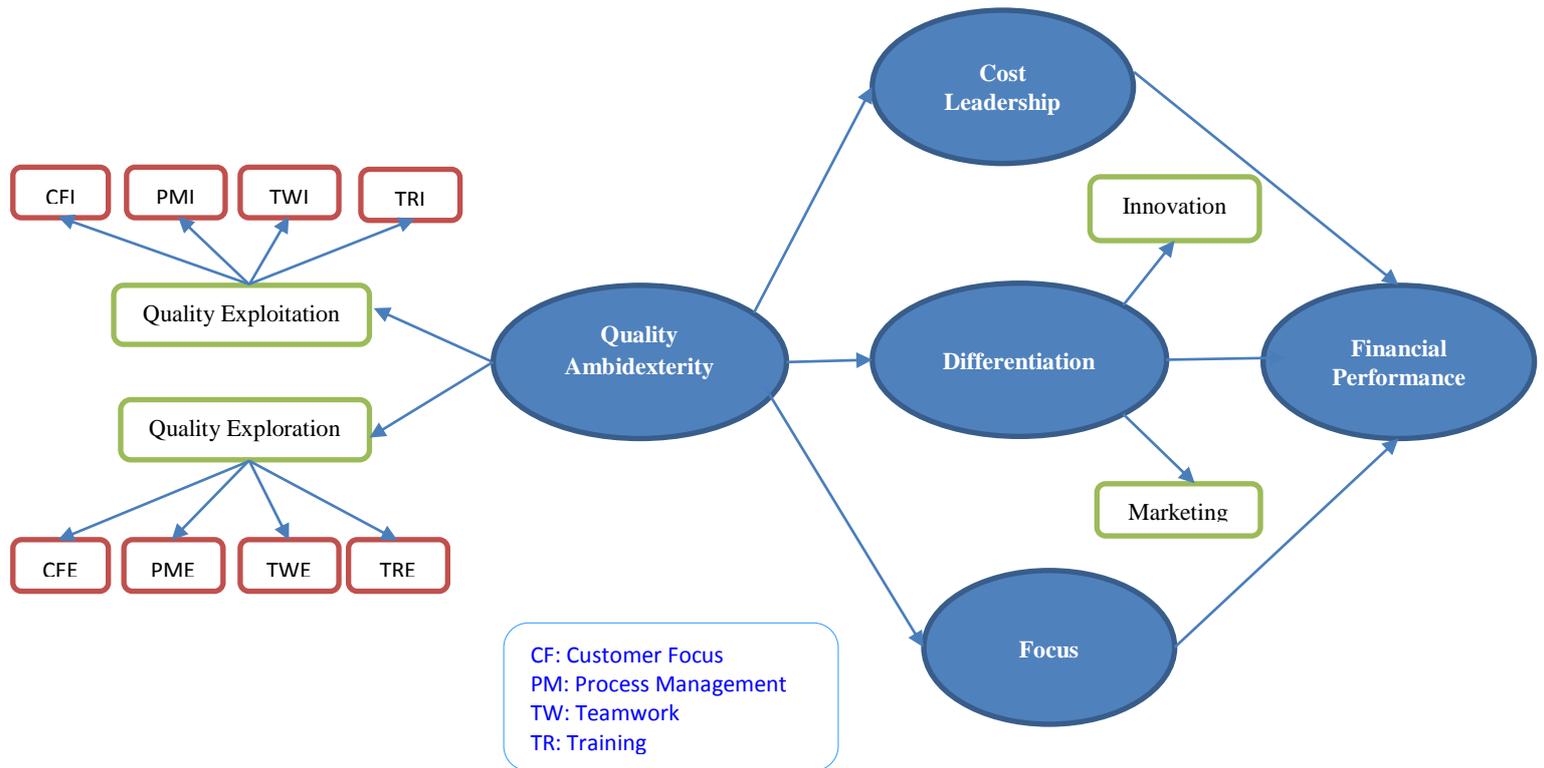


Figure 2. Measures of QAMB and cost leadership strategy

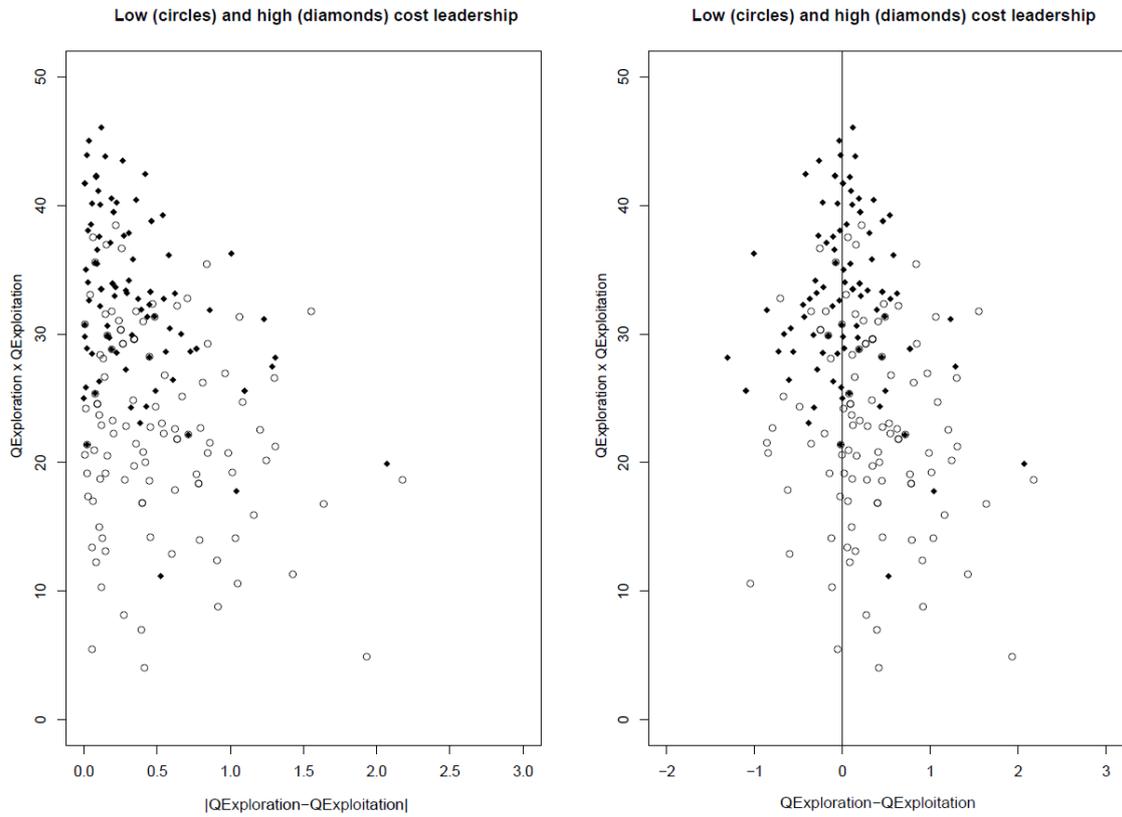


Figure 3. Measures of QAMB and differentiation strategy

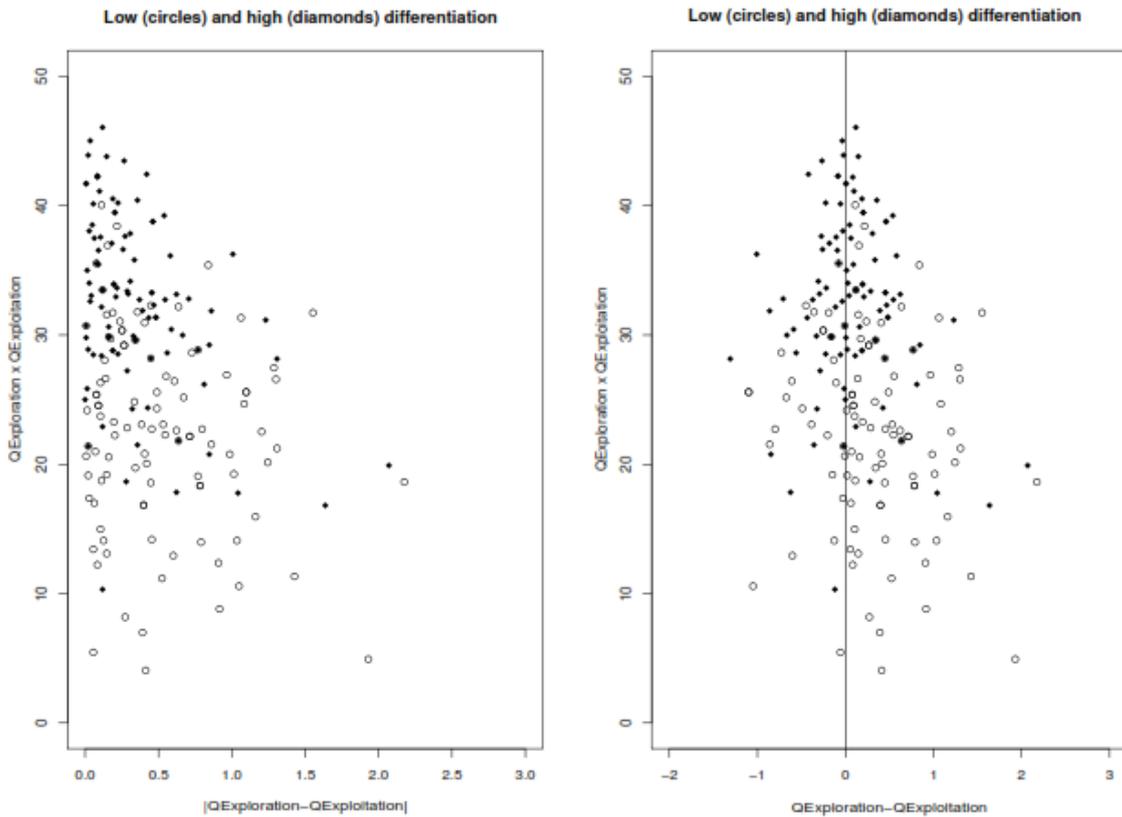
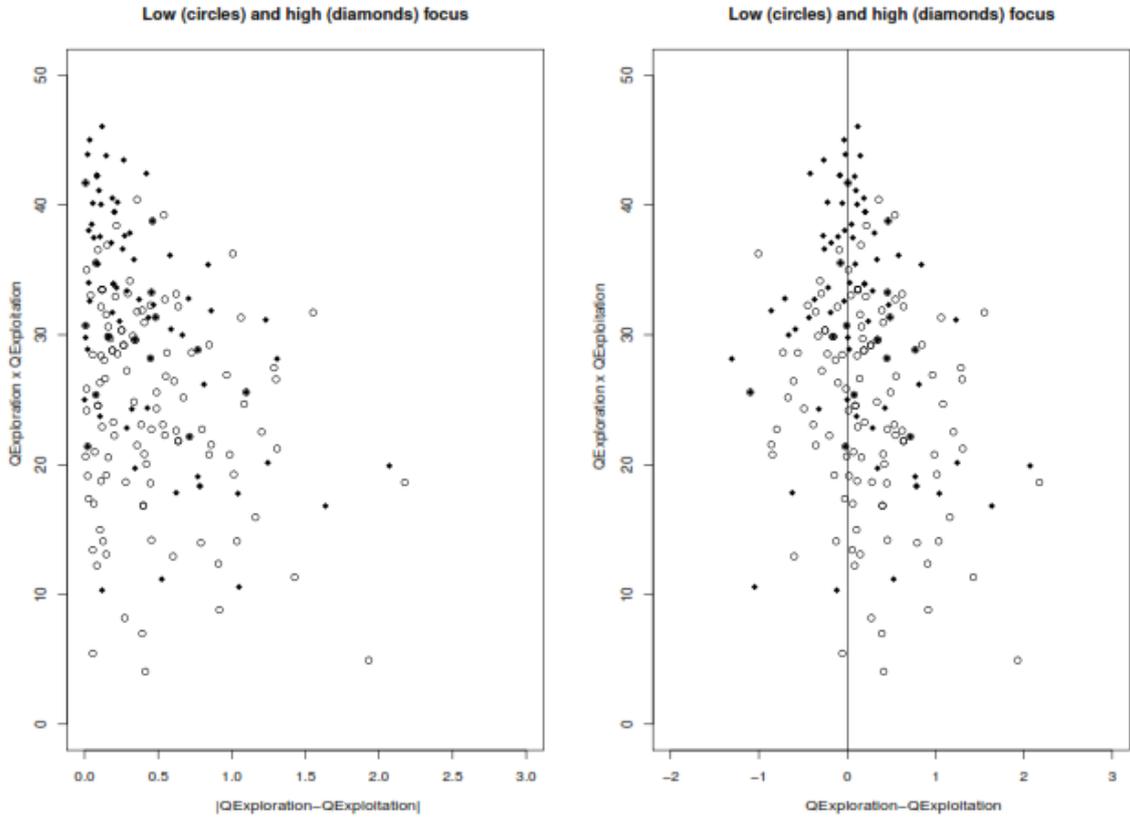


Figure 4. Measures of QAMB and focus strategy



Section 1. Quality exploitation and quality exploration: Please indicate the extent to which you agree or disagree with each of these statements about your plant and organization. (Strongly Disagree = 1 2 3 4 5 6 7 = Strongly Agree)

1.1 Customer focus for quality exploitation:

1. We frequently are in close contact with our customers.
2. Our customers give us feedback on our quality and delivery performance.
3. We regularly survey our customers' needs.

1.2. Customer focus for quality exploration:

1. We consulted customers early in the design efforts for this product.
2. We partnered with customers for the design of this product.
3. Customers were frequently consulted about the design of this product.
4. Customers were an integral part of the design effort for this project.

1.3. Process management for quality exploitation:

1. We make extensive use of statistical techniques to reduce variance in processes.
2. We use charts to determine whether our manufacturing processes are in control.
3. We monitor our processes using statistical process control.

1.4. Process management for quality exploration:

1. We strive to continually improve all aspects of products and processes, rather than taking a static approach.
2. We believe that improvement of a process is never complete; there is always room for more incremental improvement.
3. Our organization is not a static entity, but engages in dynamically changing itself to better serve its customers.

1.5. Teamwork for quality exploitation:

1. Our supervisors encourage the people who work for them to work as a team.
2. Our supervisors encourage the people who work for them to exchange opinions and ideas.
3. Our supervisors frequently hold group meetings where the people who work for them can really discuss things together.

1.6. Teamwork for quality exploration:

1. The functions in our plant cooperate to solve conflicts between them, when they arise.
2. Our plant's functions coordinate their activities.
3. Our plant's functions work interactively with each other.

1.7. Training for quality exploitation:

1. Our plant employees receive training and development in workplace skills, on a regular basis.
2. Management at this plant believes that continual training and upgrading of employee skills is important.
3. Our employees regularly receive training to improve their skills.

1.8. Training for quality exploration:

1. Employees at this plant learn how to perform a variety of tasks.
2. The longer an employee has been at this plant, the more tasks they learn to perform.
3. Employees are cross-trained at this plant, so that they can fill in for others, if necessary.

Section 2: Competitive Strategies

2.1. Differentiation:

2.1.1. Differentiation: Innovation:

What is the position of your firm vis-à-vis your leading competitors, regarding (Very low = 1 2 3 4 5 6 7 = Very high)

1. Percentage of sales from products introduced over last 2 or 3 years
2. R&D as a percentage of sales
3. Average age of products
4. Frequency of major product changes

2.1.2. Differentiation: Marketing:

1. Product quality
2. Product image
3. Marketing expenses
4. Advertising and promotion
5. Sales force
6. Services quality

2.2. Focus: What is the position of your firm vis-à-vis your leading competitors, regarding.

1. Product line breadth
2. Breadth of customer types
3. Geographic coverage

2.3. Cost leadership: What is the position of your firm vis-à-vis your leading competitors, regarding

1. Relative direct costs/unit
2. Newness of plant and equipment
3. Product pricing
4. Capacity utilization
5. Backward vertical integration
6. Process R&D

Section.3. Relative perceived performance:

3.1. Financial performance: Answer the following questions, taking into account the situation of your firm in the last 3 years. Relative to your main competitors, what is your firm's performance in the following aspects (Much worse = 1234567 = Much better)

- 1- The firm's profitability measured by profits over assets (Economic profitability or ROA)
- 2- The firm's profitability measured by profits over own resources (Financial profitability or ROE)
- 3- The firm's profitability measured by profits over sales (percentage of profits over billing volume)
- 4- The firm's market share in its main products and markets
- 5- Growth in sales in the main products