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The relationship between organization strategy, total quality management (TQM), and organization performance—the mediating role of TQM

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Abstract

The study presented in this paper examines the f t of total quality management (TQM) practices in mediating the relationship between organization strategy and organization performance. By examining TQM in relation to organization strategy, the study seeks to advance the understanding of TQM in a broader context. It also resolves some controversies that appear in the literature concerning the relationship between TQM and differentiation and cost leadership strategies as well as quality and innovation performance. The empirical data for this study was drawn from a survey of 194 middle/senior managers from Australian f rms. The analysis was conducted using structural equation modeling (SEM) technique by examining two competing models that represent full and partial mediation. The f ndings indicate that TQM is positively and signif cantly related to differentiation strategy, and it only partially mediates the relationship between differentiation strategy and three performance measures (product quality, product innovation, and process innovation). The implication is that TQM needs to be complemented by other resources to more eff ectively realize the strategy in achieving a high level of performance, particularly innovation.

Keywords: TQM; Quality; Innovation; Strategy; Mediation

1. Introduction

The link between organizational strategy, structure and performance is a classical theme in strategic management literature, with the main thesis being that organization strategy determines organizational structure, which in turn influences

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organization performance [1,2]. The study reported in this paper was conducted within the above framework in which it attempted to investigate the relationship between the organization strategy (in terms of differentiation and cost leadership), the organizational structure (in terms of the extent of implementation of TQM), and the organizational performance (in terms of quality and innovation).

The rationale for conducting this research is the need to examine the relationships between these three groups of variables because there are inconsistencies, even controversies, in identifying these relationships as have been indicated in the literature in this area. More importantly, TQM scholars [3–5] have recently called for the study of TQM in the broader organizational context by incorporating such factors as business environment, organizational culture, and, particularly, organization strategy. While a number of researchers have examined the relationship between TQM and organizational performance [6–11], none has addressed the relationship between TQM and any specific strategy. In particular, the need to investigate the role of TQM, as part of a strategy implementation, in affecting the relationship between the strategy and the organizational performance is important because, when proposing his generic models of a competitive strategy, Porter [12] has emphasized that each strategy requires different resources and organizational arrangements to be successful in achieving the primary goal of the strategy.

Using empirical data collected from Australian firms, this study attempts to achieve two primary objectives. First, it seeks to resolve the inconsistencies which have appeared in the literature concerning the relationships among organization strategy, TQM, and organization performance, and, second, to advance the study of TQM by bringing it into an organizational strategic context by examining its suitability as an organizational practice in mediating the relationship between organization strategy and organization performance.

2. Literature review

The literature review is presented in three sections. The first sections deals with the relationship between TQM and organization performance as this provides a basis for understanding the other two relationships (i.e. between organization strategy and TQM, and between organization strategy and performance) that will follow the first section.

2.1. TQM and organization performance

In a review of the literature covering the relationship between TQM and innovation, Prajogo and Sohal [13] identified two competing arguments. The first argument suggests that TQM is positively related to innovation performance because it establishes a system and culture that will provide a fertile environment for organizations to innovate [14–18]. The opposing argument holds that the implementation of TQM principles and practices could hinder organizations from being innovative [19,20]. Among several key principles of TQM, customer focus philosophy has received considerable attention in relation to its negative impact on innovation [21–24]. As argued by these scholars, the principles of customer focus could trap organizations into captive markets where they will focus on meeting the needs of existing customers and therefore view their business only through their current customers' eyes. As a result, these companies could fail to drive the search for innovative and novel solutions by ignoring the 'unserved' potential in their markets.

2.2. Organization strategy and TQM

Very few researchers have discussed the relationship between TQM and organization strategy, particularly in the context of generic strategy models developed by Porter [12]. This is because some scholars [25,26] have provided a strong support to the view that TQM must be adopted as a strategic model in an organization. The TQM philosophy, therefore, has successfully elevated the implementation of quality management practices from an operational level to a strategic level [27]. Nonetheless, Dean and Bowen [15] argue that from a strategic management perspective, TQM is concerned more with strategy implementation, or deployment, rather than strategic choice, or intent. The

issue is therefore to investigate to which particular strategy TQM can be associated.

Reed et al. [28] argue that the content of TQM can be distinguished based on the issue of two business orientations: customer orientation and process orientation. With customer orientation, organizations will focus on gaining a market advantage where they can outperform their competitors in terms of attracting more customers with distinguished products and charge a premium price. Although not implicitly stated, this notion suggests that under customer orientation TQM is associated with a differentiation strategy. On other hand, under process orientation, companies will pursue process efficiency improvements to eliminate defects and wastes. This view can be traced back to the origins of TQM as rooted in the principles of statistical process control (SPC). The concept of *kaizen* [29] that dominated the TQM literature during the 1980s and 1990s also underscored the importance of process improvement rather than product innovation. Reed et al. [28] pointed out that through the concept of continuous improvement, TQM elevates the importance of cost reduction through defect preventions, as also noted by Hackman and Wageman [30, p. 310]:

A fundamental premise of TQM is that the costs of poor quality (such as inspection, rework, lost customers, and so on) are far greater than the costs of developing processes that produce high-quality products and services.

Reed et al. [28] therefore suggested that under process orientation, TQM implementation eventually leads to a cost-based advantage that reflects a cost leadership strategy.

Another strong implication about the association between TQM and cost leadership is suggested by Gobeli and Brown [31]. In their framework on strategic approaches to innovation, they label TQM as a value leader since it places more emphasis on process innovation than product innovation. By focusing on process innovation, TQM can be linked to Porter's cost leadership strategy. Gobeli and Brown [31], however, also emphasize that TQM does not seek purely (low) cost leadership, rather, total value leadership, meaning that TQM focuses on producing quality items at a competitive price in such a way that the ratio of quality to price will be high.

Overall, the arguments suggesting that TQM is related to cost leadership strategy also have a strong basis. It is therefore difficult to derive a clear-cut conclusion to situate TQM in an exclusive association with any of these two strategies. As such, Prajogo and Sohal [13] have posited that TQM could be used in different strategic contexts, including differentiation and cost leadership.

2.3. Organization strategy and performance

Similar to the preceding section, several confusions have been identified in the literature concerning the link between organizational strategy and organization performance, particularly in terms of quality. Belohlav [32] argues that how quality fits into a specific strategy is not particularly clear because quality is a term that can be defined in a variety of ways. He also posits that attaining a high level of quality creates the potential to pursue both differentiation and cost leadership strategy within a market.

Porter [12] suggests that a differentiation strategy aims to create a product that customers see as unique. A firm adopting this strategy selects one or more attributes or characteristics that customers perceive as important, and uniquely positions itself to excel in those attributes leading to a premium price. Philips et al. [33] hold that among the many sources of differentiation, quality is the approach that most often characterizes a differentiation strategy. This is because quality creates a competitive advantage through customer loyalty as well as minimizing customer sensitivity to price. They also note that the conventional wisdom suggests that achieving higher quality usually requires the use of more expensive components, and other manufacturing and management techniques incompatible with achieving low costs. However, in their accompanying empirical study, they conclude that product quality exerts a beneficial effect on cost position via market share. This appears to be consistent with the arguments by TQM proponents that quality is inversely associated with cost, as discussed in the previous section. Under the TQM context, however, the proposition

is that quality directly impacts on cost reduction at an operational level rather than via market share. In his 'quality improvement chain' concept, Deming [34] affirmed that organizations could enhance their competitiveness by improving quality resulting in cost reduction through the elimination of scrap and rework. This cost reduction will then lead to a capture of greater market share. Crosby [35] and Juran [36] also support this argument with their concept of quality cost. The empirical work by Maani et al. [37] suggests that an improvement in quality results in a reduction of manufacturing cost. The implication of these arguments is that quality can serve the objective of the cost leadership strategy.

On the other hand, the relationship between organization strategy and innovation would seem to be clearer in the literature as it commonly agrees that there is a positive association between innovation, particularly product innovation, and differentiation strategy, and not with cost leadership strategy. Miller [38] suggests that firms adopting differentiation strategy emphasize new products and new technologies as well as placing a strong emphasis on research and development (R&D) and venturing in new markets. He also supports the significant relationship between differentiation strategy and product quality because quality is an aspect of differentiation along with design, style, or technological innovation. Substantiating this argument, Abernathy and Utterback [39] assert that the competitive advantage of innovative companies over their competitors is based on superior functional performance rather than lower initial cost, and so these radical innovations tend to offer higher unit profit margins. In addition, the literature also suggests that, in respect to the differentiation strategy, innovative companies also tend to emphasize new product development [40,31]. Higgins [41] provides several examples of innovative companies. Sony, for example, introduced 200 new products and major enhancements to 800 existing products each year, whilst 3 M determined its corporate goal to derive 30% of its revenue from products introduced within the past four years.

It is also not difficult to suggest that a cost leadership strategy does not relate to innovation performance in terms of both product and process from a theoretical point of view. Porter [12] suggests that companies adopting cost leadership strategy usually stress cost and budget control, efficient scale facilities, and the minimization of the expenses of R&D. Supporting this argument, Miller [38] suggests that cost leaders not only will always be imitators in innovation, but they will also follow a competitor's innovation after a considerable risk-reducing lag, hence, opposing the major characteristics of product innovators. On the other hand, Porter [12] suggests that a cost leadership strategy, to a certain degree, can lead to process innovation; however, as also argued by Miller [38], the emphasis on efficiency often suppresses changes even in the production processes, particularly costly ones.

3. Research framework and hypotheses

In summary, the literature review has identified several controversies in positing the nature of relationship between competitive strategy, TQM, and organization performance. An empirical study therefore was designed to unravel these confusions by testing the relationships between the three variables above. We believe that the implication of this study is important as it also examines the role of TQM in the context of strategy–performance relationship. In guiding the direction of the analysis, three sets of research hypotheses were developed based on the findings identified in the literature review. The first set is concerned with examining the nature of the relationship between TQM and each of the organization strategies in terms of differentiation and cost leadership. As discussed earlier, the literature appears to support the relationship between TQM and both differentiation and cost leadership strategy, and, therefore, the following two hypotheses are posited:

Hypothesis 1a. There is a positive and significant relationship between TQM practices and differentiation strategy.

Hypothesis 1b. There is a positive and significant relationship between TQM practices and cost leadership strategy.

The second set of the hypotheses is focused on investigating the relationship between each of the two organization strategies and the organizational performance in terms of quality and innovation. As indicated by the literature, quality performance seems to fit the strategic objectives of both differentiation and cost leadership strategy, whilst innovation performance is clearly associated only with differentiation strategy. As such, we postulate the following four hypotheses:

Hypothesis 2a. There is a positive and significant relationship between differentiation strategy and innovation performance.

Hypothesis 2b. There is a positive and significant relationship between differentiation strategy and quality performance.

Hypothesis 2c. There is a positive and significant relationship between cost leadership strategy and innovation performance.

Hypothesis 2d. There is no significant relationship between cost leadership strategy and quality performance.

The final set of the hypotheses was aimed at integrating the previous two sets of hypotheses by examining the role of TQM practices in mediating the relationship between organization strategy and performance. For this purpose, a research framework, as illustrated in Fig. 1, was developed, and it was derived from a number of studies in the manufacturing strategy area. For example, Williams et al. [42] examine the relationship between competitive strategy and manufacturing strategy and that between manufacturing strategy and performance. Ward and Duray [43], using path analysis, examine the link between competitive environment, competitive strategy, manufacturing strategy, and performance in four stages of relationships. The framework and methodology used in our study replicates that used by Ward and Duray [43], however, we limit its scope by focusing on the relationships between competitive strategy (i.e. cost leadership and differentiation), TQM as operational strategy or organizational practices, and organizational performance in terms of quality and innovation. The research framework also concurs with the concept of "fit as mediation" proposed by Venkatraman [44]. While Venkatraman's model follows the concept of the classical industrial organization economic paradigm (environment → strategy → performance), this study uses a model of strategy → practices → performance structural relationship.

Using the model, we tested the extent to which TQM practices mediate the relationship between organizational strategy and performance, whether it is a full mediation or a partial mediation. As indicated by the literature, TQM is more closely associated with quality performance than innovation performance, and this provides a basis for developing the following three hypotheses:

Hypothesis 3a. TQM practices partially mediate the relationship between differentiation strategy and innovation performance.

Hypothesis 3b. TQM practices fully mediate the relationship between differentiation strategy and quality performance.

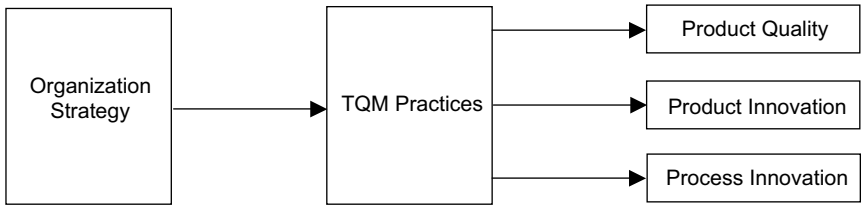

Fig. 1. Research framework.

Hypothesis 3c. TQM practices fully mediate the relationship between cost leadership strategy and quality performance.

4. Research instrument and data collection

In regards to the issue of designing the survey instrument, the use of constructs has played an important role in management research. Constructs or scales are defined as latent variables that cannot be measured directly [9]. In any research concerning behavioral elements, there is no device that can precisely produce measurement through a single metric unit. Therefore, researchers usually employ two or more measures to gauge a construct or scale. Working with constructs or scales of measurement, however, is a complex task, moving from development to final validation. Since the primary objective of this research is to examine a number of relationships rather than developing new constructs, we attempted, wherever possible, to use pre-tested constructs from past empirical studies to ensure their validity and reliability, a point emphasized by Tata et al. [45].

4.1. Organization strategy measures

In searching the model to gauge organization strategy, we reviewed a number of empirical studies that measured Porter's generic strategies, most notably Dess and Davis [46], Miller [47], Lengnick-Hall [48], Ward et al. [49] and Yamin et al. [50]. Among these studies, the scale by Miller [47] was selected for the reason that it articulated the attitude or behavioral aspects of both differentiation and cost leadership strategies. In particular, the scale of innovative differentiation in Miller's work was selected to represent differentiation strategy. The scale of differentiation strategy incorporated five items assessing the use of major and frequent product innovations, the tendency to beat competitors in the market, the innovative orientation, the competitive aggressiveness pursuit, and finally, the level of risk. The scale of cost leadership comprises three items measuring the extent of price-cutting and minimization of expenditures, the use of cost control throughout the firm, and the boldness of decision making processes.

4.2. TQM measures

Acknowledging the fact that the TQM construct is defined in numerous ways (although complementary to each other) in previous empirical studies, we decided to use a strategy where one model was selected as a skeleton or framework for the TQM construct, supplemented by several variables derived from other models. The framework used by Samson and Terziovski [10] was selected as representing the core of TQM construct in this study for the reason that it has been used in the largest study of Australian companies so far conducted. Moreover, as argued by Samson and Terziovski [10], this model constituted the criteria of the Malcolm Baldrige National Quality Award (MBNQA) that has been accepted as representing TQM practices by several scholars such as Juran [51], Evans and Lindsay [52], Ahire et al. [53], and Dean and Bowen [15]. MBNQA consists of six criteria of organizational practices and one criterion of organizational performance. The TQM practices embodied in the six criteria of organizational practices are leadership, strategy and planning, customer focus, information and analysis, people management, and process management.

4.3. Quality performance measures

As discussed in the literature review section, various definitions of quality have caused a problem in establishing its scale of measurement. This has also been reflected in past empirical studies on TQM where different researchers used different indicators for measuring quality performance. The earlier studies, such as Saraph et al. [54], Flynn et al. [55], and Adam [6] used multiple indicators of quality without testing their reliability and validity. Since quality contains multifaceted aspects, we prefer to measure it as a construct rather than individual items, a method used in the more recent studies on TQM such as Ahire et al. [9], Grandzol and Gershon [56], Samson and Terziovski [10], and Dow et al. [11]. Among these studies,

the construct for measuring quality performance that was developed by Ahire et al. [9] is the one most closely aligned to the purpose of this study in terms of the scope of the construct as well as its validity and reliability. This construct defined quality performance as composed of four indicators: reliability, performance, durability, and conformance to specification. This scale overcomes the problem of inter-industry differences because the respondents were asked to assess the four quality indicators in comparison to the major competitors in their industry.

4.4. Innovation performance measures

A review of past research on organizational innovation also indicates that there have been variations in measuring innovation performance in organizations. For the purpose of comprehensively capturing the aspects of innovation performance, this study built the construct for measuring product and process innovation on the basis of several criteria, conceptualized and used in previous empirical studies of innovation, such as Cohn [57], Miller and Friesen [58], Deshpande et al. [59], Karagozoglu and Brown [60]; Avlonitis et al. [61]; Subramanian and Nilakanta [62]; Hollenstein [63], and Kleinschmidt and Cooper [64]. These criteria are the number of innovations, the speed of innovation, the level of innovativeness (novelty or newness of the technological aspect), and being the ''first'' in the market. By including the last two criteria, the scope of the innovation performance measures captured areas that could be considered as ''radical'' innovation. These four characteristics of innovation were applied in two major areas of innovation, namely product innovation and process innovation. The distinction between these two areas of innovation has been articulated in the literature on innovation [31,50]. Similar to quality performance, perceptual data were used in which respondents were asked to evaluate the company's innovation performance against the major competitor in the industry to minimize industry effects. The advantages of this approach were discussed in detail in the study by Kraft [65].

4.5. Source of empirical data

Empirical data was obtained through a random survey of 1000 managers, most of whom were middle/senior managers who had knowledge of past and present organizational practices relating to TQM and innovation in Australian companies. The sample was selected randomly and encompassed various industry sectors. The level of analysis of this study was limited to one site (or plant) per organization. A total of 194 managers responded, whilst 150 questionnaires were returned to the researchers with RTS (Return to Sender) messages, indicating that the addresses were no longer valid. By discounting the number of RTS mails, the final response rate accounted for 22.8%.

5. Data analysis

Data analysis involved two major steps: the data reduction process and the structural relationship analysis using structural equation modeling (SEM) method. The data reduction process aimed to reduce the number of variables and parameters in the research model to a manageable number in terms of the ratio between sample size and parameters estimated in the research model [66]. The structural relationship analysis was used to examine the simultaneous relationship between TQM and product quality performance, product innovation performance, and process innovation performance as well as examining the relationships among these three performance variables.

5.1. Data reduction process

The data reduction process was conducted in order to bring the eleven constructs—each consisted of four to six items—employed in this study into eleven composite variables. Two constructs (differentiation and cost leadership) represented competitive strategy of the firms, six constructs (leadership, strategic planning, customer focus, information and analysis, people management, and process management) constituted TQM latent variables, and three constructs (product quality, product innovation, and process innovation)

constituted three organizational performance measures. These 11 constructs were subjected to validity and reliability tests before a single score could be calculated to represent each construct.

Confirmatory factor analysis (CFA) using LISREL 8.30 was employed for examining construct validity of each scale by assessing how well the individual item measured the scale. During the process, four items were deleted (one from customer focus scale, two from differentiation scale, and one from cost leadership scale) due to poor loading to their respective latent variables. The values of Goodness-of-Fit Indices (GFI) of the nine constructs exceed by a comfortable margin the 0.9 criterion generally suggested by Hair et al. [66], hence, establishing their validity. The GFI value for the final model of differentiation cannot be computed because only three variables were left in the construct that will result in a zero degree of freedom. However, LISREL 8.30 still could estimate the parameters of the scale, and the result supports robustness of the construct. The path coefficient of each item in differentiation scale is significant ($p<0.05$) and reasonably high (≈ 0.8), hence, establishing the convergent validity of the scale. Similarly, three items of cost leadership were also subjected into a measurement model. The result indicates that one item shows a poor loading to the latent construct. Consequently, this item was deleted from the scale. With only two variables left, LISREL cannot estimate any parameter. As such, exploratory factor analysis—using SPSS 11.5—was used instead. Despite its weaknesses, this method was commonly employed in previous empirical studies on TQM [54,55,10]. By using principal component analysis and varimax rotation, the two variables were extracted into factors based on the eigen-value greater than 1, and the final result indicates a strong construct with variance explained accounting for 74.55%.

The reliability analysis following the construct validity process was conducted by calculating the Cronbach's alpha for each scale. The results show that the Cronbach's alpha measure for the ten constructs well exceed the recommended critical point of 0.7 [67], hence, establishing their reliability. The Cronbach's alpha for cost leadership falls short of this criterion (0.6540), however, given that only two items were left in this construct, it was not feasible to delete any of these to improve the reliability. The final results of construct validity and reliability tests of the nine constructs are reported in Table 1.

5.2. Discriminant validity

The discriminant validity test was performed to establish the distinction among the constructs used in this study. This test is particularly important for distinguishing differentiation strategy from product innovation and process innovation performance. This is because, as suggested by Porter [12], innovation is one of the major content in the strategic direction of differentiation, and therefore, it is important to ensure that they are not mixed-up with each other, and hence, can be verified as distinct from each other. We followed the method used by Ahire et al. [9] by pairing these two constructs and subjecting them to two models of confirmatory factor analysis (CFA). The first model allowed the correlation between the two constructs to be estimated (unconstrained), whilst in the second model the correlation between the two constructs was set into one (constrained). Each model resulted in its Chi-square (χ^2) value, and between the two models there is a difference of degree of freedom of 1. The statistical significance of this Chi-square (χ^2) difference was then tested at $p<0.01$. From the statistics table, we found that the Chi-square (χ^2) difference surpass 6.64 to be verified as significant. As evidenced by the results in Table 2, both tests pass the criterion for discriminant validity.

Having met the requirement of construct validity and reliability, the composite value for each construct can be calculated. Among several methods suggested by Hair et al. [66], we chose to use mean value due to the simplicity of the method without forfeiting the accuracy. The result is presented in Table 1.

5.3. Bi-variate correlation

Bi-variate correlation among the eleven variables is presented in Table 3. First, the findings indicated no significant correlation between differ-

Table 1
Construct validity and reliability and the values for composite measures

Construct	No of items (final)	Goodness-of-Fit Indices	Means	Standard deviation	Cronbach's alpha
Differentiation	3	–[a]	3.369	0.849	0.8193
Cost leadership	2	–[a]	3.291	0.961	0.6540
Leadership	4	0.980	3.756	0.825	0.8580
Strategic planning	4	0.998	3.567	0.901	0.8242
Customer focus	5	0.976	3.918	0.684	0.7853
Information and analysis	4	0.991	3.543	0.878	0.7992
People management	5	0.974	3.431	0.802	0.8303
Process management	6	0.978	3.601	0.707	0.7922
Product quality	4	0.983	4.197	0.547	0.8839
Product innovation	5	0.970	3.377	0.697	0.8684
Process innovation	4	0.953	3.533	0.676	0.8909

[a] Goodness-of-Fit Indices cannot be computed due to zero degree of freedom.

Table 2
Discriminant validity test between differentiation strategy and innovation performance

Constructs	χ^2 (unconstrained)	χ^2 (constrained)	$\Delta\chi^2$
Differentiation with			
Product innovation	63.92	173.04	109.12
Process innovation	135.71	304.85	269.14

Table 3
Correlation between organization strategy, TQM practices, and organization performance

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
Differentiation	1.000										
Cost leadership	0.022	1.000									
Leadership	0.392**	−0.039	1.000								
Strategic planning	0.298**	0.015	0.642**	1.000							
Customer focus	0.312**	−0.042	0.541**	0.552**	1.000						
Information and analysis	0.274**	0.133	0.597**	0.684**	0.510**	1.000					
People management	0.366**	−0.028	0.723**	0.650**	0.562**	0.653**	1.000				
Process management	0.352**	0.117	0.607**	0.613**	0.653**	0.699**	0.692**	1.000			
Product quality	0.401**	0.055	0.428**	0.351**	0.478**	0.352**	0.437**	0.483**	1.000		
Product innovation	0.593**	−0.011	0.366**	0.260**	0.258**	0.328**	0.420**	0.336**	0.333**	1.000	
Process innovation	0.485**	0.028	0.433**	0.276**	0.260**	0.329**	0.362**	0.332**	0.568**	0.547**	1.000

** Correlations are significant at $p<0.01$.

entiation and cost leadership strategy, and the correlation coefficient is not negative. This confirms what Porter [12] suggested that the differentiation strategy does not allow the firm to ignore costs, but rather they are not the primary strategic intent. The result reported in the study by Yamin et al. [50] indicated a similar result that the adoption of differentiation strategy does not suppress the cost leadership strategy.

In response to the first set of the hypotheses regarding the relationship between organization strategy and TQM, the bi-variate correlation

shows different result for each of the strategies. Differentiation strategy is significantly correlated with all six TQM variables, whilst cost leadership strategy does not show any significant relationship with any of TQM variables. The findings therefore support Hypothesis 1a, but negate Hypothesis 1b. Further analysis on the result of the bi-variate correlation in terms of its direction and coefficient, sharpens the contrast nature between differentiation and cost leadership in relation to TQM. For example, leadership and people management exhibit the strongest relationship with differentiation, but show the most negative correlation with cost leadership.

In regards to the relationship between strategy and performance, the results of bi-variate correlation exhibit a significant and positive correlation between differentiation and the three performance measures, however, with the descending order of the coefficient correlation from product innovation, process innovation, and finally product quality. Therefore, both Hypotheses 2a and Hypotheses 2b are supported here. It is also interesting to note that the correlation coefficients indicated that the order of the relative strengths of the relationship between differentiation strategy and product quality, product innovation and process innovation is somewhat contradictory to those between the six TQM variables and the three performance variables. As also shown in Table 3, most of the TQM variables show the strongest relationship with product quality, followed by process innovation, and product innovation. On the other hand, none of the three performance measures show significant correlation with cost leadership strategy. The findings therefore support Hypothesis 2c that holds the insignificant relationship between cost leadership and innovation performance. They also surprisingly do not support Hypothesis 2d that postulates the significant relationship between cost leadership and quality performance. From a theoretical point of view, the findings therefore does not support the arguments made by Belohlav [32] that quality encompasses both differentiation and cost leadership strategy. It is also important to note that quality appears to be the point of contrast between these two strategies since it has the weakest relationship with differentiation but appears to show the strongest relationship with cost leadership.

5.4. The mediating role of TQM in the relationship between organization strategy and performance

The assessment of the mediating role of TQM in the relationship between organizational strategy and performance excluded cost leadership strategy since it has been shown as not being significantly related to TQM practices and any type of organizational performance. Consequently, we could not test Hypothesis 3c. The method for testing this mediating role was derived from the work by Germain and Spears [68] by competing two models of SEM, as illustrated in Figs. 2 and 3, and testing their significance difference.

The two models represent a similar causal link: differentiation strategy—TQM—organizational performance. The first model (Fig. 2) assumes that TQM fully mediates the effect of differentiation strategy on organizational performance, whilst the second model (Fig. 3) suggests only partial mediation of TQM. As such, the second model adds three paths that directly link differentiation strategy to the three performance variables to estimate the proportion of direct effect of strategy on performance other than what is generated through TQM.

Overall, the second model exhibits a better fit than the first one, as indicated by the goodness of fitness indices. The first model even does not meet the acceptable criteria of robustness as indicated by the excessive values of RMSEA (0.106) and SRMR (0.073). The level of significance of the difference between the two models was tested by calculating the discrepancy ($\Delta\chi^2$) of the χ^2 values (91.48 and 36.84, respectively) with respect to the discrepancy (Δdf) of the degree of freedom (29 and 26, respectively). The result is $\Delta\chi^2$ of 54.64 with Δdf of 3. Since this value is greater than 11.34 ($p<0.01$) of the Chi-square table, it is concluded that these two models are significantly different to each other, and that the second model is proven to show a better fit. In summary, in regards to the mediating role of TQM practices, the findings suggest that TQM practices only partially mediate the relationship between differentia-

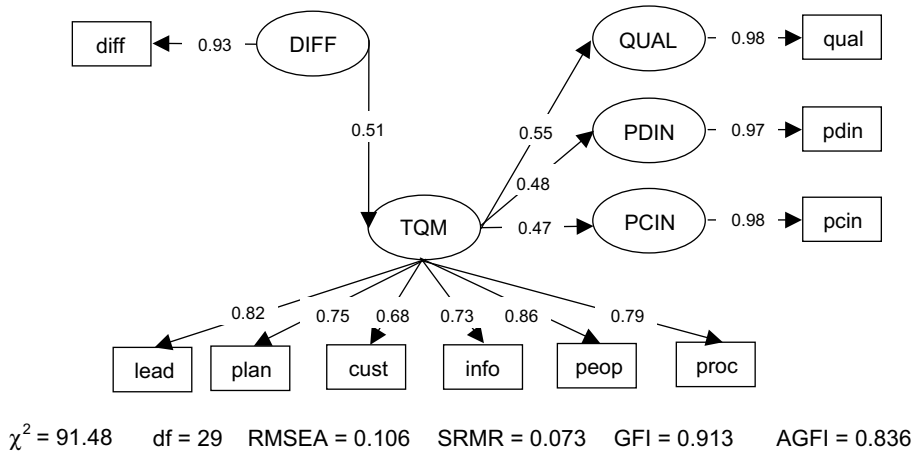

Fig. 2. The structural relationship between differentiation strategy and organizational performance with a full mediation by TQM.

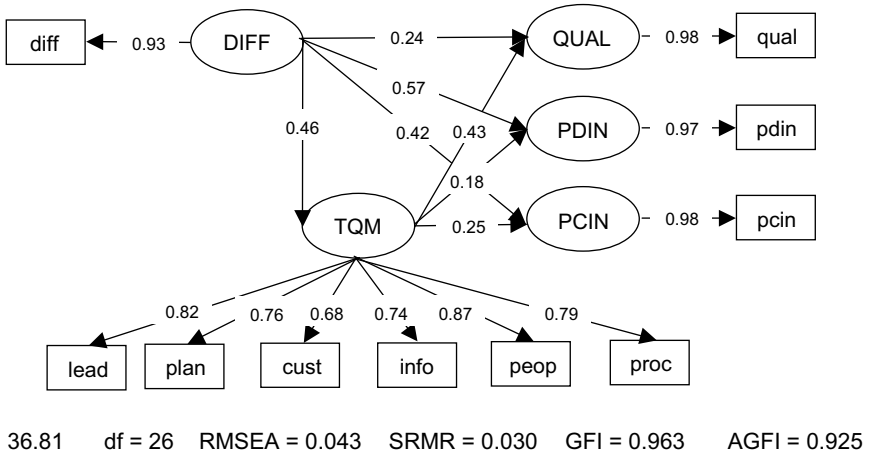

Fig. 3. The structural relationship between differentiation strategy and organizational performance with a partial mediation by TQM.

tion strategy and the three organizational performance measures. Therefore, *hypothesis 3a* is supported, but, Hypothesis 3b is rejected.

The final part of the analysis is focused on comparing the direct path coefficients between differentiation and performance and the path between TQM and performance of the second model (Fig. 3). First, it is evident that the three direct paths between differentiation strategy and organizational performance are significant, meaning that there is a certain proportion of variance on organizational performance that is explained by differentiation strategy without being mediated by TQM practices. With regard to innovation performance, the result suggests that TQM shows much weaker relationships to both product innovation and process innovation measures (indicated by the path coefficients of 0.18 and 0.25) than differentiation strategy (indicated by the path coefficients of 0.57 and 0.42). On the other hand, the strength of the direct relationship between differentiation strategy and quality performance (0.24) is lower than that between TQM and quality performance (0.43).

This confirms the previous findings that differentiation strategy shows an opposite order of the relative strength of relationship with the three

performance variables compared to TQM. From the correlation analysis presented in Table 3, it is evident that differentiation strategy has the strongest relationship with product innovation, followed by process innovation, and finally product quality. On the other hand, most of the TQM practices show stronger correlation with product quality compared to product innovation and process innovation. This explains the lack of fit in the full mediation model (Fig. 2) as TQM distorts, even twists, the nature of the relationship between differentiation strategy and the three types of performance into the opposite direction.

6. Discussion

6.1. Organization strategy and TQM

As evidenced by the correlation analysis presented in Table 3, TQM is shown to have a significant and positive relationship with a differentiation strategy. This means that the adoption of TQM practices is usually driven by a differentiation strategy. This result is substantiated by the findings suggesting that both differentiation and TQM are significantly and positively related to the three organizational performance measures (i.e. product quality, product innovation and process innovation), indicating that TQM can be employed as an effective means for implementing a differentiation strategy to achieve satisfactory organizational performance.

On the other hand, the findings do not indicate any positive relationship between TQM and cost leadership strategy. This insignificant relationship is of particular interest because a certain degree of support for this relationship has been identified in the literature. However, as cited by Powell [69], there were two major issues that have created barriers for companies implementing TQM practices (irrespective of the formalization of the program). First, the great demand for substantial time and financial investment in the implementation process and, second, the "failure" of TQM to produce short-term results, particularly in terms of financial performance. In other words, in the context of a cost leadership strategy, the cost of implementing TQM will override the potential benefit that could be expected from it. Further results from the correlation analysis (Table 3) substantiate the argument in regards to the incompatibility between TQM and cost leadership given that cost leadership negatively relates (although not significantly) to several TQM variables, particularly the human factors (i.e. leadership and people management) incorporating practices such as empowerment and training. The implementation of these practices requires a commitment from management to provide necessary resources, including financial resources, for the implementation process, as would be the case for training. The return of such expenditure in terms of "soft technology" is difficult to directly measure by the use of the common accounting or financial management systems, and this could explain why such TQM practices may not be favorable to management in a strategy that is more oriented toward tight cost control.

Furthermore, it is important to make a clear distinction between understanding cost leadership in terms of a competitive strategy and understanding it in the context of a competitive advantage where the first denotes the strategic intent and the latter the strategic result. In the light of this distinction, the argument made by Deming [34] concerning the inverse relationship between quality and cost has to be understood in the sense that product quality can be associated with cost leadership only in terms of competitive advantage, but not as a competitive strategy. Indeed, Deming has untiringly warned companies that an attempt to boost profit mainly from lowering their costs—which often resulted in lower product quality—contradicts the principal concepts of quality management, and, ultimately, undermines the implementation of TQM in yielding significant benefits [70].

6.2. Organization strategy and performance

The second part of the findings indicates that a differentiation strategy is significantly and positively related to all the three performance variables. This suggests that both innovation and quality are the appropriate targets for organiza-

tions in differentiating themselves from their competitors. Since differentiation strategy in this study is focused on the innovative aspect, it is to be expected to find that it should relate more strongly to innovation performance than quality performance. Furthermore, this result also suggests that the principal aspect in creating a competitive advantage through differentiation is by introducing innovative products that are unique from a competitor's products rather than through process innovation.

Conversely, cost leadership strategy does not show a significant correlation with any of the three types of performance. As discussed in the literature review section, a cost leadership strategy is not expected to be associated with innovation performance due to the differences in their underlying philosophies. Explaining the insignificant relationship between cost leadership and quality performance, on the other hand, is more problematic because, as indicated earlier, TQM proponents have suggested a direct and inverse relationship between quality and cost. This means that improvement in quality will result in cost reduction, and this seems to be compatible with a cost leadership strategy that seeks the lowest possible unit cost in production. However, while quality and cost are arguably related, the relationship is limited to the definition of quality as "conformance to specification" such that cost reduction can be achieved through the elimination of defects that result in a reduction of *failure* costs. Since our construct of quality performance includes variables with a wider scope beyond conformance to specification, this contributes to its significant relationship with cost leadership strategy. Garvin [71] even suggests that when quality is defined in a broader context than "conformance to specification", it will increase cost, make it more incompatible with the objective of cost leadership strategy. Furthermore, TQM proponents also suggest that to achieve a reduction in *failure* costs, companies need to invest in other costs, namely *prevention* and *appraisal* costs [35]. Juran [36], in particular, emphasizes the lagging effect of quality on cost reduction such that it requires a commitment from companies to persistently cultivate quality before it can yield significant benefits, and it is in this sense that a cost leadership strategy can diverge from quality.

These arguments, nonetheless, still provide support for the positive relationship between cost leadership strategy and quality performance, and therefore our finding in this part would seem to indicate a right direction because, although not significant, cost leadership strategy still exhibits a relatively stronger relationship with quality performance than innovation performance. From a theoretical point of view, as an industry approaches its maturity stage, all competitive bases will be standardized and the opportunities for creating differentiation or uniqueness will diminish [72]. As a result, products will simply become commodities and quality will be defined in terms of conformance to standardized requirements, leaving price as the only competitive factor [39,73]. This situation will favor a cost leadership strategy for developing competitive advantage, and more importantly, may increase the significance of the relationship between cost leadership and quality. At the same time, this argument also implies that quality, at certain point, can lose its differentiation value. Therefore, in realizing a differentiation strategy, organizations would prefer product innovation than product quality, hence, reinforcing our result showing that differentiation strategy is more strongly related to product innovation than product quality.

6.3. The mediating role

The final part of the findings shows that TQM only partly mediates the relationship between differentiation strategy and the three performance variables. In particular, this result suggests that the direct effects of a differentiation strategy on both product and process innovation are stronger than that between TQM and these two performance measures. What can be inferred from this link is that while TQM is considered as a set of practices through which a differentiation strategy can be implemented, under TQM, however, differentiation is more directed to quality performance rather than innovation performance. Therefore, when organizations want to pursue innovation in the purer sense that includes the characteristic of

"being the first" or venturing into new markets through product innovation, TQM, in its own right, would be less effective in realizing this objective, and consequently, organizations would need to complement it with other resources.

The partial mediation of TQM against product quality, on the other hand, is interesting. This is because the result of bi-variate correlation (Table 3) indicates that quality performance shows the weakest correlation with differentiation strategy but appears to strongly relate to most of the TQM practices. The findings of the first mediating model (Fig. 2) show that TQM has the strongest relationship with quality performance. From a theoretical point of view, one could expect that the variance of quality performance would be largely explained through TQM practices since these were originally developed to achieve high quality performance. As such, it was expected that TQM would fully mediate the relationship between differentiation strategy and quality performance. Our findings, however, do not support this notion since a significant portion of variance in quality performance is directly explained by a differentiation strategy without being mediated by TQM. This finding is important in providing a better understanding of the relationship between TQM practices and quality performance in the sense that when pursuing quality performance under the context of a differentiation strategy, organizations also need to furnish certain resources that are not accommodated by TQM, such as technology management. If this is true, this notion provides a counter balance to the understanding of quality management practices that has been so dominated by a "soft" technology like TQM.

7. Conclusion

The combination of the three findings suggests a harmony between differentiation strategy, TQM practices, and organization performance in terms of quality and innovation. TQM is shown to be an effective means for deploying a differentiation strategy. It should be noted, however, that its role is more effective for pursuing differentiation in terms of quality rather than innovation. More importantly, the findings indicate that TQM only partially mediates the relationship between differentiation strategy and the three performance variables (product quality, product innovation, and process innovation).

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