# Assessing the Mediating Role of Marketing Capability in the Relationship between TQM Practices and Innovation Performance Dynamic Capabilities Approach

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## Abstract

*Achieving high innovation performance has been considered as the best way to compete, survive, and gain market share in the hyper competitive market. To do so, companies need to enhance and build its capabilities which represent the main antecedents of innovation performance. In response to the aforementioned issue, this study aims to investigate the effect of TQM as an effective organizational philosophy that enhances organizational performance and marketing capabilities, and in turn, innovation performance. To this end, a primary data is collected from the manufacturing companies in Malaysia. Then, data is analyzed through Partial Least Square PLS-SEM technique. The obtained results support all the formulated hypotheses.*

**Key words:** TQM practices, marketing capabilities, innovation performance, dynamic capability, Partial Least Square PLS

## *1. Introduction*

In fact, building and developing the capabilities of the organization have gained the attention of both managers and theorists (Teece and Pisano, 1994) with the turbulence in the marketplace nowadays as the main reason behind this attention. In this respect, achieving competitive advantage becomes a crucial factor for surviving and sustainability (Schilling & Hill, 1998). To achieve that, innovation is the best weapon to compete, survive, and gain market share (Lundstedt & Moss, 1989; Porter, 1980; Cooper, 1998). In order to build and enhance innovation performance, a bundle of capabilities should be built and developed, and, marketing capability is one of the capabilities that strongly influence innovation performance of the organization (Dutta, Narasimhan, & Rajiv, 1999). Moreover, Day (1994) argued that one way marketing can make a more significant contribution to the theory and practice of strategy is by explicit articulation of marketing capabilities.

Although the relationship between marketing capability and different aspects of organization's performance has been assessed by several studies, literature concerning the relationship is still limited (Weerawardena, 2003). This lack of the studies is what underlies the intention behind the present study to examine this relationship empirically and provide some insight that will contribute to reduce the mentioned literature gap.

Among the most popular strategies and approaches that have been adopted to enhance many aspects of organizational performance, TQM practices have been confirmed by researchers to be a very important strategy in helping organizations to create and sustain their competitive advantage (Idris & Zairi, 2006). However, studies dedicated to the examination of how TQM practices enhance organizational capabilities, particularly marketing capabilities are still few and far between. Thus, this study attempts to examine the effect of TQM practices on marketing capabilities. Furthermore, dynamic capabilities approaches will be the basis in which this relationship will be addressed.

Besides, this study tries to provide some light on manufacturing companies in Malaysia by determining the role of TQM practices in developing their capabilities which in turn, reflect on their innovation performance. To this end, this study was carried out involving bit manufacturing companies in Malaysia as they are more suitable for their technological and resources capabilities compared to their smaller counterparts (*The World Bank: Malaysia Economic Monitor: Growth through Innovation*, 2010).

### 1.2 Innovation performance of Malaysian manufacturing companies

Malaysia is planning to become a developed country by achieving Vision of Malaysia 2020 (*10th Malaysia Plan 2011-2015*, 2010). For that, Malaysia has developed and applied successive economic plans which helped the country to move forward from stage to stage. Innovation Led Economy is one of the many plans that have been conducted with numerous procedures and steps to achieve the 2020 Vision (*10th Malaysia plan 2011-2015*, 2010). Malaysia has started to be concerned about innovation since 1990 (Lee, 2003; Lee & Chew-ging, 2007; Saleh & Ndibisi, 2006), where it has carried out three waves of survey through its National Survey of Innovation in the manufacturing sector to determine the position of innovation performance in Malaysia (Lee, 2003). The finding of these surveys is shown in Table 1 below:

**Table 1: Innovation in the Malaysian Manufacturing Sector, 1990-2002**

| **Items** | **NSI-1** | **NSI-2** | **NSI-3** | **MyKe** |
|---|---|---|---|---|
| Period | 1990-1994 | 1997-1999 | 2000-2001 | 2000-2002 |
| Number of innovation firms | 270 | 217 | 263 | 771 |
| Number of non-innovation firms | 142 | 827 | 486 | 1048 |
| Total number of firms | 412 | 1044 | 749 | 1819 |
| Percentage of innovating firms (%) | 66 | 21 | 35 | 42 |

**Source**: NSI-1, NSI-2 and NSI-3 (*National Survey of Innovation in Industry, 1997-1999*, 2000; *2000-2001*, 2003)

From Table 1 above, it is clear that there are negative variations in the incidence of innovation in the manufacturing sector from 66 to 21 per cent ( Lee & Chew-ging, 2007). After five years another indicator is introduced as shown in Table 2 below:

**Table 2: Innovation efforts by firms generally declined between 2002 and 2007**

| **Innovation activity** | **All Firms** | **manufacturing** | **E&E Firms** | |
|---|---|---|---|---|
| | **2007** | **Chang from 2002** | **2007** | **Chang from 2002** |
| Upgraded an existing product line | 48.0 | - 4.6 | 81.3 | 0.0 |
| Developed a major new product line | 26.2 | - 3.6 | 46.9 | -18.7 |
| Upgraded machinery and equipment | 60.3 | - 2.0 | 84.4 | 0.0 |
| Introduced new technology to change production process | 27.6 | - 1.7 | 50.0 | +12.5 |
| Filed patent/utility or copyright protected materials | 11.1 | - 3.2 | 9.7 | -6.4 |
| Subcontracted R&D projects to other organizations | 6.1 | + 1.5 | 6.3 | +6.3 |
| Agreed a new joint venture with foreign partner | 5.2 | + 1.0 | 6.3 | -9.3 |

**Source**: *The World Bank: Malaysia Economic Monitor: Growth through Innovation*, 2010

According to the previous Tables, it can be concluded that despite adopting several policy initiatives and support from institutions to help Malaysia become an innovation-led economy, the occurrence of innovation is still low in Malaysia compared to what should have been based on its level of development. This fact encourages this study to investigate, determine and provide some insight that can help to enhance the innovation performance of Malaysian manufacturing companies.

## 2. Literature Review

In 1994, Teece and Pisano extended the Resource-Based View (RBV) Theory proposing the dynamic capabilities theory as the total competencies/capabilities enabling a firm to come up with novel products and processes and to respond to the dynamic market situation. Hence, it can be stated that competitive advantage hinges on the distinctive processes formed by the firm's asset positions, the strategies employed and the processes undertaken. Dynamic capability stresses on management capability and the unique combination of resources throughout the functions such as R&D, product and process development, manufacturing, human resources and organizational learning (Lawson & Samson, 2001). As a result, the competition driver is not the introduction of new products or processes but the firm's capability of developing new products, and flexibly adopting to the dynamic environment (Prahalad & Hamel, 1990).

Moreover, dynamic capabilities theory is thus well-suited to the study of organizational innovation for two reasons. First, dynamic capability theory is more flexible, where it does not give a special focus on technology, and where the technological capability theory is only among other resources and capabilities that can be available to the organization to use in order to achieve high performance. This characteristic flexibility enables the development of a holistic model of organizational innovation.

Second, the process of innovation may just be linked to the development of new products as well as it can be to new processes, systems or even business models. Additionally, the need for asset heterogeneity exhibits the lack of one generic formula of innovation capability. However, there are generic threads that connect highly and lowly innovative firms varying only in levels of importance (Tidd, Bessant & Pavitt, 2005).

Building on the previous discussion, this study uses dynamic capability theory to explain the relationship between TQM practices and marketing capability. Applying TQM in a successful way requires several practices (e.g., leadership commitment, customer focus, people management, process management, supplier management, and quality data reporting). Implementing those practices in the organization leads to generate several capabilities within the organization. For example, leadership commitment to achieve quality performance provides an environment that encourages the trust and cooperation among the employees, which in turn, lead to knowledge flow across the organization (Ju, Lin, Lin, & Kuo, 2006; Zeitz, Johannesson, & Jr, 1997). Furthermore, customer focus orientation supports the organization with the necessary feedback regarding the customers' attitudes, preferences, and complaints. These kinds of information help the organization to improve its marketing capabilities to build good relationship with the customers, and facilitates its ability to solve and deal with customers' complaints to achieve customer satisfaction (Ooi, Teh, & Chong, 2009).

On the other side, TQM practices focus on developing people's skills and capacities through the engagement of employees in several kinds of training programs (Jones & Grimshaw, 2012; Perdomo-Ortiz, González-Benito, & Galende, 2006), which provides the organization with skillful sales-force, and, skillful marketing team in general (Jones & Grimshaw, 2012). In addition, emphasizing TQM on managing process and continuous improvement in all organizational aspects help to improve the process of making marketing decision, pricing, promotion activities, distribution. To this end, the data related to improving the processes along with the previous success and failure stories have been recorded and reported to the relevant section (Perdomo-Ortiz, González-Benito, & Galende, 2009). Suppliers are one of the success factors especially for manufacturing companies. Therefore, establishing good relationship with the suppliers is one of the principles that TQM asserts on. This kind of relationship provides the necessary knowledge that helps to make right purchasing decision, develop the negotiation skills of the marketing team, and enhance the database with knowledge that relate to the suppliers in the industrial market. According to the previous discussion the following hypothesis is formulated:

***H1**: There is a positive relationship between TQM practices and marketing capabilities.*

On the other hand, dynamic capability theory is also considered among marketing capabilities that enhances innovation performance. Moreover, marketing capability impacts on both technological and non-technological innovation, providing support for the view that marketing is an initiator of innovation activity in the organization (Hutt, Reingen, & Ronchetto, 1988). Weerawardena (2003) confirmed that marketing capability influences both innovation performance and competitive advantage.

In another study conducted by Varadarajan (1992), it is concluded that marketing function is equipped to play a dominant role in the context of leveraging a number of distinctive organizational skills and resources into sustainable positional advantages. Thus, based on the aforementioned statements the following hypothesis is introduced:

***H2**: There is a positive relationship between marketing capabilities and innovation performance.*

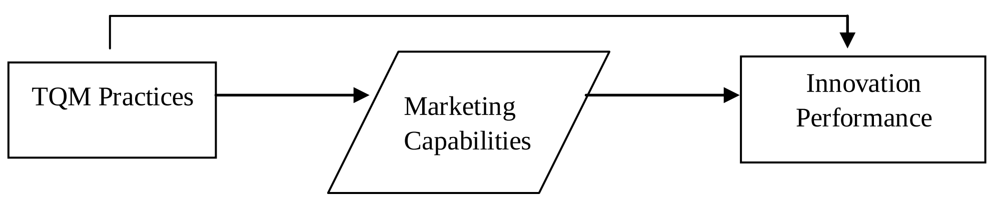
Regarding the relationship between TQM practices and innovation performance, although a review of literature reveals that there is inconclusive finding among the previous studies, this study supports the argument that TQM practices influence innovation performance. For example, Gustafson and Hundt (1995) asserted that TQM practices represent the critical success factors that help to enhance innovation performance, where TQM helps the organization to be innovative through customer focus, which encourages the search of a better way to meet and exceed customers' requirements, and further, linking innovation with customers' needs (Prajogo & Sohal, 2001). Furthermore, people management and training programs will support the employees with required knowledge for innovation action (Kaynak, 2003; Snape, Wilkinson, Marchington, & Redman, 1995). Likewise, continuous improvement, and supplier quality management provide the organization with important knowledge and information from both inside and outside of the organization that helps to enhance the capabilities in the marketing field (Flynn, Schroeder, & Sakakibara, 1995). Pekovic and Galia (2009) argued that in order to achieve considerable innovative performance, a very well-established quality is required through the organization. From the previous discussion the following hypothesis is introduced:

***H3**: There is a positive relationship between TQM practices and innovation performance.*

As discussed earlier, through dynamic capability theory it can be concluded that applying TQM practices provide the organization with distinctive marketing capabilities, which in turn, lead to enhancement of its innovation performance (Weerawardena, 2003). In addition, building on the previous assumptions which meet the mediating relationship criteria, it can be concluded that marketing capability play a mediating role in the relationship between TQM practices and innovation performance. Therefore, the following hypothesis is introduced:

***H4**: Marketing capability mediates the relationship between TQM practices and innovation performance.*

Consequently, the following framework is introduced:




## 3. Research Methods

### 3.1. Sample and data collection

For the purpose of examining the conceptual model of this study, the data is collected from manufacturing companies listed in Federation of Malaysian Manufacturing (FMM) (2010). For the justification mentioned earlier, big companies have been chosen for this study. A survey research method is adopted to collect the data, where the instrument is adopted from the previous studies.

By using on-line survey approach, a total of 44 items was administrated randomly to 400 manufacturing companies. The unit of analysis of this study was represented by the following managers: CEO, quality manager, R&D manager, or factory manager, as the researchers are convinced that those managers have knowledge regarding the issue under study. Out of 400 distributed questionnaires, 138 usable questionnaires were returned, representing a response rate of 34.5 %.

### 3.2. Data analysis

To evaluate the present model, Partial Least Square (PLS) analysis and Structural Equation Modeling (SEM) techniques was adopted. PLS-SEM path modeling was adopted for several reasons; first of all, the model of the present study includes formative construct (e.g., marketing capability construct), and, unlike CB-SEM approach, PLS-SEM has the ability to run formative constructs. Second, PLS-SEM is a nonparametric technique and, consequently, does not assume normality of data. Third, PLS-SEM does not require a large sample size as CB-SEM approach, and, since the sample size of the current study is considered small, PLS-SEM is a more suitable approach. Therefore, SmartPLS version 2.0.M3 was employed to examine the measurement of structural model.

As mentioned in the previous paragraph, this study has one formative construct represented by marketing capability. Unlike the reflective construct, the formative construct does not suppose that the measures are all caused by a single underlying construct. Rather, it supposes that the measures all have an impact on (or cause) a single construct. That is, the direction of causality flows from the indicators to the latent construct, and the indicators, as a group, jointly determines the conceptual and empirical meaning of the construct (Jarvis, Mackenzie, & Podsakoff, 2003). Consequently, the processes to evaluate formative construct are quite different from those that evaluate reflective constructs. The assessment of formative constructs and reflective constructs are separately discussed in the following sections.

#### 3.2.1. Formative construct

Marketing capability is formative first order construct, which consists of the cause-effect relationship between the manifest variables and the latent variable (Jarvis et al., 2003). Therefore, internal consistency reliability is not an appropriate standard for evaluating the adequacy of the measures in formative models (Jarvis et al., 2003; Mathieson, Peacock, & Chin, 1996). Instead, evaluating formative constructs require i) the assessment of the indicator/manifest relevance (weight); ii) the evaluation of the indicators significance (external validity); and iii) the determination of the multicollinearity of indicators. The weight of the formative construct is shown in Table (3) below:

**Table (3) Items' weight of marketing capability construct (formative construct)**

| MC construct | Items Weight | T-Value |
|---|---|---|
| **MC1 -> MC** | -0.022 | 0.148 |
| **MC2 -> MC** | 0.277* | 1.691 |
| **MC3 -> MC** | 0.162 | 0.763 |
| **MC4 -> MC** | 0.403** | 2.181 |
| **MC5 -> MC** | 0.320** | 1.986 |
| **** $p < 0.05$, * $p < 0.01$** | | |

Table (3) above shows that out of five items belonging to marketing capabilities, three were significant and contribute to marketing capabilities. Although there were two items which were found to be non-significant, formative indicators should never be discarded simply on the basis of statistical outcomes (Henseler, Ringle, & Sinkovics, 2009). Such actions may substantially change the content of the formative index (Jarvis et al., 2003). Consequently, the researcher should keep both significant and insignificant formative indicators in the measurement model as long as they are conceptually justified. As the items of marketing capabilities have been adopted from previous studies, this study is going to keep these insignificant indicators in the measurement model of the current framework.

A concern with formative construct is the potential of multicollinearity among the items, which could produce unstable estimates (Mathwick, Malhotra, & Rigdon, 2001). Accordingly, collinearity test is employed. Hair, Anderson, Tatham and Black's (2010) procedure was followed. As defined in the multivariate literature, tolerance measure is the amount of the variance of the variable that is not explained by other variables. Similarly, VIF is the inverse of tolerance value. According to Hair et al. (2010), tolerance values should be higher than 0.1, while VIF values should be lower than 10. Table (4) indicates the multicollinearity result.

**Table (4) Collinearity analyses of formative construct MC**

| Marketing Capability | Collinearity Statistics | |
|---|---|---|
| | Tolerance | VIF |
| **MAC1** | .366 | 2.734 |
| **MAC2** | .321 | 3.120 |
| **MAC3** | .366 | 2.729 |
| **MAC4** | .338 | 2.957 |
| **MAC5** | .339 | 2.948 |

Table (4) above shows that all tolerance values were higher than 0.1, and the VIF values were lower than 10 indicating that all values meet the cut-off threshold for tolerance and VIF, which implies that the issue of multicollinearity was not a serious issue (Hair et al., 2010).

To evaluate the formative construct completely, external validity has to be assessed. As mentioned earlier, internal consistency examinations (e.g., Cronbach's alpha) are not appropriate for formative indicators. Several authors instead suggested testing the external validity of a formatively measured construct (Diamantopoulos, Riefler, & Roth, 2008; Jarvis et al., 2003). Diamantopoulos et al. (2008) stated that formative indicators should be correlated indicators of other constructs. Therefore, the external validity was examined by evaluating the relationship between marketing capability and other endogenous construct innovation performance which has a theoretical relationship. As shown in Table (5) below, the correlation between MC and IP was significant which leads confidently to conclude that the formative construct of this study is valid and reliable.

**Table 5: The correlation of MC and IP**

| Constructs | Correlation | Standard Error | T –value | P-value |
|---|---|---|---|---|
| **MC -> IP** | 0.60483 | 0.057106 | 10.5914 | 0.000 |

**Reflective construct**

The other constructs are reflective. Therefore, evaluating the measurement model need to go through processes to test the indicators reliability, convergent validity, average variance extracted AVE, cross loading, and discriminate validity. The main goal from these steps is to assess the internal consistency of the reflective indicators. Since TQM construct has high level order (first order and second order) the evaluating processes will be into two levels also. According Fornell and Larcker (1981); Hair, Ringle and Sarstedt (2011); and Henseler et al. (2009), the values of Cronbach’s alpha and composite reliability should be higher than 0.70, while the values of AVE should be higher than 0.50. Furthermore, Henseler at al. (2009) and Hair et al. (2011) recommend that the indicators’ cross loading should be higher than 0.70. For discriminant validity test two condition should be met: a) the correlations values of the indicators with its latent variables should be higher than the correlation with other constructs, b) the square root of AVE of the construct should be higher than correlation with another constructs (Fornell and Larcker, 1981).

**Table 6: CFA of First order construct**

| Construct | Items | Internal reliability Cronbach's alpha | Convergent validity Factor Loading | Construct Composite reliability | Items AVE |
|---|---|---|---|---|---|
| TQM | LMC1 | 0.901 | 0.818 | 0.927 | 0.718 |
| | LMC3 | | 0.838 | | |
| | LMC4 | | 0.767 | | |
| | LMC5 | | 0.910 | | |
| | LMC6 | | 0.897 | | |
| | CF1 | 0.912 | 0.813 | 0.935 | 0.718 |
| | CF2 | | 0.889 | | |
| | CF3 | | 0.891 | | |
| | CF4 | | 0.900 | | |
| | CF6 | | 0.808 | | |
| | PEM1 | 0.919 | 0.814 | 0.937 | 0.712 |
| | PEM2 | | 0.898 | | |
| | PEM3 | | 0.868 | | |
| | PEM4 | | 0.849 | | |
| | PEM5 | | 0.838 | | |
| | PEM6 | | 0.791 | | |
| | PRM1 | 0.915 | 0.863 | 0.936 | 0.746 |
| | PRM2 | | 0.889 | | |
| | PRM3 | | 0.867 | | |
| | PRM4 | | 0.846 | | |
| | PRM5 | | 0.854 | | |
| | SQM1 | 0.871 | 0.722 | 0.907 | 0.663 |
| | SQM4 | | 0.841 | | |
| | SQM5 | | 0.890 | | |
| | SQM6 | | 0.829 | | |
| | SQM7 | | 0.780 | | |
| | QDR1 | 0.908 | 0.796 | 0.932 | 0.732 |
| | QDR2 | | 0.854 | | |
| | QDR3 | | 0.873 | | |
| | QDR4 | | 0.854 | | |
| | QDR5 | | 0.898 | | |
| IP | IP1 | 0.927 | 0.819 | 0.940 | 0.662 |
| | IP2 | | 0.878 | | |
| | IP3 | | 0.814 | | |
| | IP4 | | 0.809 | | |
| | IP5 | | 0.779 | | |
| | IP6 | | 0.831 | | |
| | IP7 | | 0.732 | | |
| | IP8 | | 0.839 | | |

**Table 7: Cross loading of the first order of TQM construct**

| | CF | IP | LMC | PEM | PRM | QDR | SQM |
|---|---|---|---|---|---|---|---|
| **CF1** | **0.801** | 0.339 | 0.695 | 0.557 | 0.560 | 0.542 | 0.560 |
| **CF2** | **0.879** | 0.483 | 0.629 | 0.646 | 0.704 | 0.595 | 0.631 |
| **CF3** | **0.885** | 0.539 | 0.695 | 0.696 | 0.721 | 0.678 | 0.618 |
| **CF4** | **0.894** | 0.426 | 0.694 | 0.692 | 0.730 | 0.688 | 0.672 |
| **CF5** | **0.679** | 0.289 | 0.498 | 0.527 | 0.545 | 0.480 | 0.522 |
| **CF6** | **0.804** | 0.363 | 0.651 | 0.634 | 0.654 | 0.639 | 0.619 |
| **IP1** | 0.338 | **0.819** | 0.350 | 0.454 | 0.408 | 0.427 | 0.429 |
| **IP2** | 0.404 | **0.878** | 0.438 | 0.503 | 0.484 | 0.501 | 0.463 |
| **IP3** | 0.342 | **0.814** | 0.378 | 0.517 | 0.482 | 0.455 | 0.458 |
| **IP4** | 0.392 | **0.809** | 0.389 | 0.433 | 0.451 | 0.413 | 0.455 |
| **IP5** | 0.415 | **0.779** | 0.349 | 0.429 | 0.474 | 0.459 | 0.463 |
| **IP6** | 0.391 | **0.831** | 0.334 | 0.442 | 0.445 | 0.516 | 0.472 |
| **IP7** | 0.458 | **0.732** | 0.329 | 0.465 | 0.489 | 0.387 | 0.453 |
| **IP8** | 0.495 | **0.839** | 0.500 | 0.519 | 0.587 | 0.560 | 0.522 |
| **LMC1** | 0.639 | 0.351 | **0.807** | 0.494 | 0.500 | 0.538 | 0.526 |
| **LMC2** | 0.418 | 0.272 | **0.649** | 0.463 | 0.355 | 0.462 | 0.486 |
| **LMC3** | 0.660 | 0.361 | **0.852** | 0.531 | 0.557 | 0.561 | 0.532 |
| **LMC4** | 0.536 | 0.392 | **0.769** | 0.379 | 0.467 | 0.462 | 0.568 |
| **LMC5** | 0.769 | 0.456 | **0.894** | 0.710 | 0.711 | 0.644 | 0.647 |
| **LMC6** | 0.718 | 0.452 | **0.876** | 0.629 | 0.605 | 0.621 | 0.571 |
| **PEM1** | 0.633 | 0.444 | 0.543 | **0.814** | 0.671 | 0.629 | 0.531 |
| **PEM2** | 0.637 | 0.498 | 0.547 | **0.898** | 0.720 | 0.628 | 0.572 |
| **PEM3** | 0.726 | 0.521 | 0.628 | **0.868** | 0.721 | 0.721 | 0.640 |
| **PEM4** | 0.574 | 0.519 | 0.571 | **0.849** | 0.645 | 0.580 | 0.572 |
| **PEM5** | 0.705 | 0.509 | 0.594 | **0.838** | 0.753 | 0.649 | 0.626 |
| **PEM6** | 0.553 | 0.438 | 0.498 | **0.791** | 0.609 | 0.578 | 0.627 |
| **PRM1** | 0.675 | 0.559 | 0.623 | 0.731 | **0.863** | 0.693 | 0.713 |
| **PRM2** | 0.728 | 0.479 | 0.573 | 0.690 | **0.889** | 0.654 | 0.675 |
| **PRM3** | 0.675 | 0.427 | 0.542 | 0.702 | **0.867** | 0.605 | 0.604 |
| **PRM4** | 0.658 | 0.496 | 0.521 | 0.671 | **0.846** | 0.659 | 0.566 |
| **PRM5** | 0.688 | 0.578 | 0.630 | 0.730 | **0.854** | 0.702 | 0.673 |
| **QDR1** | 0.652 | 0.608 | 0.567 | 0.735 | 0.699 | **0.796** | 0.631 |
| **QDR2** | 0.594 | 0.572 | 0.548 | 0.603 | 0.619 | **0.854** | 0.702 |
| **QDR3** | 0.667 | 0.460 | 0.610 | 0.605 | 0.678 | **0.873** | 0.652 |
| **QDR4** | 0.585 | 0.369 | 0.561 | 0.631 | 0.614 | **0.854** | 0.666 |
| **QDR5** | 0.641 | 0.441 | 0.625 | 0.631 | 0.670 | **0.898** | 0.675 |
| **SQM1** | 0.550 | 0.450 | 0.563 | 0.473 | 0.557 | 0.625 | **0.738** |
| **SQM2** | 0.500 | 0.413 | 0.527 | 0.470 | 0.534 | 0.575 | **0.690** |
| **SQM3** | 0.342 | 0.326 | 0.340 | 0.367 | 0.356 | 0.377 | **0.613** |
| **SQM4** | 0.600 | 0.482 | 0.565 | 0.592 | 0.583 | 0.636 | **0.853** |
| **SQM5** | 0.667 | 0.478 | 0.597 | 0.621 | 0.695 | 0.661 | **0.859** |
| **SQM6** | 0.592 | 0.421 | 0.508 | 0.550 | 0.572 | 0.568 | **0.795** |
| **SQM7** | 0.590 | 0.457 | 0.510 | 0.635 | 0.640 | 0.654 | **0.754** |

**Table 8: Fornell-Larcker criterion (discriminant validity) (first order of TQM construct)**

| Construct | Square root of AVE | IP | CF | LMC | PEM | PRM | SQM | QDR |
|---|---|---|---|---|---|---|---|---|
| **IP** | **0.814** | 1 | | | | | | |
| **CF** | **0.861** | 0.502 | 1 | | | | | |
| **LMC** | **0.848** | 0.477 | 0.789 | 1 | | | | |
| **PEM** | **0.844** | 0.580 | 0.751 | 0.659 | 1 | | | |
| **PRM** | **0.864** | 0.589 | 0.785 | 0.678 | 0.816 | 1 | | |
| **SQM** | **0.814** | 0.574 | 0.725 | 0.665 | 0.708 | 0.751 | 1 | |
| **QDR** | **0.856** | 0.563 | 0.732 | 0.672 | 0.750 | 0.768 | 0.773 | 1 |

Reviewing the above result indicates that all values of Cronbach's alpha and composite reliability exceed the threshold of 0.70, and the same conclusion was reached with the AVE test as the values exceed the cut-off values of 0.50. As the statistics results show in the previous Tables, all values of cross loading and discriminant test meet the recommended values where cross loadings of all indicators go beyond the recommended value 0.70, and, Fornell-Larcker criterion for discriminant validity indicates that all square root of AVE values of the latent constructs were higher than correlation values with other constructs. Thus, it can be concluded that all reflective constructs showed an adequate measurement model. Given this result, the hypotheses could be tested through the examination of the structural model which is discussed in the coming section.

## Structural Model

Before examining the hypotheses, the predictive relevance of the model is tested. The quality of the structural model can be assessed by $R^2$ which shows the variance in the endogenous variable that is explained by the exogenous variables. The $R^2$ value is assessed based on assessment criterion suggested by Cohen (1988), where 0.26 is considered as substantial, 0.13 moderate, and 0.02 weak.

An additional criterion to evaluate the quality of the model is through the use of Blindfolding procedure to assess the model's capability to predict (Hair et al., 2011). According to Henseler et al. (2009), blindfolding procedure is only applied to endogenous latent variable that has formative measurement model. The predictive relevance $Q^2$ comes in two forms which are cross-validated redundancy and cross-validated communality (Hair et al., 2011). Hair et al. (2011) recommended using the cross-validated redundancy where the use of PLS-SEM is required to estimate both the structural model and the measurement model for data prediction. Therefore, cross-validated redundancy is perfectly suitable for the PLS-SEM approach. The cross-validated redundancy measure value (i.e., $Q^2$) should be higher than zero, otherwise, it indicates a lack of predictive relevance (Fornell and Cha, 1994; Henseler et al., 2009). The following Table shows the prediction relevance of the model.

**Table 9: Prediction Relevance of the Model**

| Endogenous | R square | Cross-Validated Redundancy |
|---|---|---|
| **IP** | 0.453 | 0.297 |

As reported in the above Table (9), $R^2$ was found to be 0.453 indicating that TQM and MC can account for 45% of the variance in the innovation performance. According to Henseler et al. (2009), if a particular inner path model structures only partially explain endogenous latent variables by only a few (e.g., one or two), it is acceptable to consider exogenous latent variables with a moderate $R^2$. Referring to Cohen (1988) criterion, $R^2$ of this study is considered substantial indicating the power of TQM and MC in explaining the innovation performance. Regarding the $Q^2$ value, as shown in Table 11 above, the cross-redundancy value was found to be (0.297) more than zero. This result supports the claim that the model has an adequate prediction quality.

Having established the validity and the reliability of the measurement model, this paves the way to move to the next step which is testing the hypothesized relationship by running PLS algorithm and Bootstrapping algorithm in SmartPLS 2.0. As shown in Table (10).

**Table 10: Hypothesis testing result**

| Hypotheses | path coefficient | Standard Error | T-Value | P-value | Decision |
|---|---|---|---|---|---|
| **H1: TQM -> MC** | 0.631 | 0.066 | 9.581 | 0.000 | Supported |
| **H2: MC -> IP** | 0.327 | 0.091 | 3.584 | 0.000 | Supported |
| **H3: TQM -> IP** | 0.413 | 0.093 | 4.453 | 0.000 | Supported |
| **H4: TQM -> MC -> IP** | 0.207 | 0.066 | 3.12 | 0.001 | Supported |

## Mediating Effect

To figure out the mediating role of MC in the relationship between TQM and IP, Baron and Kenny's (1986) criteria are followed. According to Baron and Kenny (1986), the following conditions have to be met to be able to claim that there is mediating relationship:

a. The predictor TQM has to significantly influence the mediator MC (H1);
b. The mediator MC has to significantly impact the criterion variable IP (H2); and
c. The predictor TQM has to significantly influence the criterion variable IP without the mediator influence.

Bootstrapping technique was used to determine the mediating relationship; accordingly, the result support the mediating effect of MC in the relationship between TQM and IP (β= 0.207, t= 3.12, p<0.001) (H4) as shown in Table 12. After excluding the mediating variable, the direct relationship between TQM and innovation was tested and a significant relationship was found between TQM and IP (β= 0.625, t= 10.071, p<0.001). By comparing the path value between TQM and IP in the two cases (e.g., with mediating effect and without mediating effect) it was found that the path value, although still significant, is reduced when the mediating variable MC, was introduced to this relationship. Thus, MC is established as a partial mediator in this relationship. To estimate the size of indirect effect of TQM on IP through MC, the present study used the Variance Accounted For (VAF) values, which represent the ration of the indirect effect to the total effect. The VAF value indicates that 33.4% of the total effect of TQM on IP is explained by indirect effect (MC) as shown in the following equation.

$$VAF = \frac{a \times b}{a \times b + c} = \frac{0.631 \times 0.327}{0.631 \times 0.327 + 0.413} = 0.334$$

**Goodness of Fit (GoF) of the Model**

In contrast to CBSEM approach, PLS-SEM has only one measure of goodness of fit which was defined by Tenenhaus, Vinzi, Chatelin and Lauro (2005) as the global fit measure (GoF). This measure is the geometric mean of the average variance extracted and the average $R^2$ for the endogenous variables. GoF is calculated by the following formula:

$$GOF = \sqrt{\overline{R}^2 \text{ x Average Communality } (\overline{AVE})}$$
$$GOF = \sqrt{\overline{0.848}^2 \text{ x Average Communality } (\overline{0.662})} = 0.749$$

According to Wetzels, Odekerken-Schröder and Oppen (2009) criterion, the outcome demonstrated that the model's goodness of fit measure is large and adequate for global PLS model validity, where Wetzels et al. (2009) suggested that small =0.1, medium =0.25 and large =0.36.

**Discussion and Conclusions**

Maintaining and enhancing innovation performance has been considered as the key engine to achieve competitive advantage, gain market share and customer loyalty (Cooper, 1998; Porter, 1980). Recently, the tendency of most of the studies concerned with innovation is the investigation of factors that can be the antecedences of high innovative performance. However, the past studies somehow ignored the effect of the organizations' capabilities. Thus, there is lack of studies that examine the effect of capabilities, and, specially marketing capabilities on innovation performance. Consequently, this study is one of the studies that aim to answer the question: how can organizations enhance their innovation performance? To this end, the study introduces the framework through which the effect of TQM practices and marketing capabilities on the innovation performance was examined. Therefore, the main purpose of this study is to explore the following point.

First, examining the effect of integration of TQM and marketing capabilities on innovation performance is the main goal of this study. To achieve this goal, the relationship between TQM practice and marketing capabilities was examined. The finding shows that TQM practices have a positive and significant effect on marketing capabilities of the organization (β = 0.631, t = 9.581, p < 0.001). This result is compatible with previous studies (Lorente, Dewhurst, & Dale, 1999; Perdomo-Ortiz et al., 2006; Prajogo & Hong, 2008; Santos-Vijande & Lez, 2007), and provides additional evidence of the importance of TQM practice to the organizations.

Second, the relationship between marketing capabilities and innovation performance also has been examined. The outcome indicated that marketing capabilities contribute significantly to enhance the innovation performance (β = 0.327, t = 3.584, p < 0.001).

This result is in line with dynamic capabilities theory that considers the organization's capabilities as the most important antecedent to achieve high innovation performance (Teece & Pisano, 1994). Furthermore, the direct relationship between TQM practices and innovation performance was examined. The obtained result indicates that there is a positive and significant relationship between TQM practices and innovation performance ($\beta = 0.413$, $t = 4.453$, $p < 0.001$). This result is similar to that obtained by Flynn, Schroeder and Sakakibara (1994) and is consistent with Hung, Lien, Yang, Wu and Kuo (2010) and Prajogo and Sohal's (2003) conclusion, where they confirmed that TQM is not only a tool to improve quality, it is also provides a suitable environment that reinforces innovation performance.

Finally, having established the relationship among TQM practices, marketing relationship and innovation performance, the partial mediating role of marketing capabilities in the relationship between TQM practices and innovation performance was also established as significant ($\beta = 0.207$, $t = 3.12$, $p < 0.001$). Moreover, the outcome indicates that 33% of the total effect of TQM practices on innovation performance is explained through marketing capabilities.

The implications of this study are presented by providing the evidence that companies aiming to be innovative need to continuously enhance and build their capabilities. Additionally, through the findings of this study, it can be advised that managers should adopt and apply quality practices within their companies, as it was confirmed that TQM practices provide an environment that help and pave the way to develop and build the organization's capabilities. This study also highlights that marketing capabilities is one of other organization's capabilities that lead to superior innovation performance. Therefore, managers of companies should give more attention and allocate necessary resources to build and enhance these kinds of capabilities.

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