Does the Absorptive Capacity Influence the Relationship between TQM Practices and Innovation Performance?

Maha Mohammed Yusr
Sany Sanuri Mohd Mokhtar
Abdul Rahim Otham
Yaty Sulaiman

School of Business, College of Business
University Utara Malaysia UUM

ABSTRACT

Recently, enhancing innovation performance is considered as one of the main objectives of companies. To achieve that, several strategies are adopted and investigated. The Total Quality Management (TQM) practice is one of the effective strategies to enhance performance. However, the nature of this relationship between TQM and innovation performance is still inconsistent. Therefore, in order to extend our understanding regarding this relationship, this study aimed to investigate the interaction effect of the absorptive capacity. Results confirmed the positive effect of TQM and absorptive capacity on innovation performance. However, the moderating effect of the absorptive capacity on the relationship between TQM and innovation performance was not supported by this study. In the light of these results, several recommendations have been suggested.

Keywords: TQM, Absorptive Capacity, Innovation Performance

I. INTRODUCTION

TQM practices are one of the strategies that have demonstrated its effective role in enhancing the business performance. Therefore, several companies adopt TQM to achieve high rates of performance. The effectiveness of TQM has been tested empirically through several studies (e.g. Perdomo-Ortiz, González-Benito, & Galende, 2006; Prajogo & Sohal, 2001; Singh & Smith, 2004). Broadly, there is a consensus among previous studies regarding the positive effect of TQM practice on business performance (Pekovic & Galia, 2009; Perdomo-Ortiz et al., 2006). However, the effect of TQM practices on innovation performance is still controversial (Cole & Matsumiya, 2008; Pinho, 2008; Prajogo & Sohal, 2001). While a wide group of the scholars supports the effectiveness of TQM practices in enhancing innovation performance (e.g. Pekovic & Galia, 2009; Perdomo-Ortiz et al., 2006; Prajogo & Hong, 2008), another respected group questions about the role of applying TQM practices to create and introduce a novel output (Cole & Matsumiya, 2008; Pinho, 2008; Singh & Smith, 2004). Beside these inconsistent results, most of the past studies focused on examining the direct relationship between TQM practices and innovation performance. Thus, having this inconsistent finding among the previous studies gives a sign that there might be some contingent (moderator) variables that have not examined yet, which could be the cause of this inconsistency. Since, the absorptive capacity has been determined as the main capability that leads to reinforce innovation performance (Cohen & Levinthal, 1990), the Absorptive Capacity Theory will serve as the basis for this paper that aims to examine the moderating effect of absorptive capacity between TQM practices and innovation performance.

II. TQM PRACTICES AND INNOVATION PERFORMANCE

Despite the mixed findings in the previous studies as to the relationship between TQM and innovation, this study argues that TQM practices is increasingly considered as the key source of innovation, something that assents to Lopez-Mielgo, Montes-Peon, & Vazquez-Ordas (2009) who indicate that TQM and innovation departments should cooperate in order to be able to create new products and processes. In another argument, Pekovic and Galia (2009) stress that in order to achieve a considerably innovative performance, a very well-established quality is required through the organization. Hung at al. (2010) also argue that both TQM and innovation are interrelated. On the other hand, Prajogo and Sohal (2003) affirm that TQM establishes a “precondition” for innovation in order to achieve a real competitive advantage. Prajogo and Sohal (2004) report that each of TQM practices has a different role in determining different types of performance including innovative
performance, adding that these practices have the same importance to influence the performance. Furthermore, Prajogo and Sohal (2004) differentiate between the technical aspects of TQM and system aspects of TQM. Prajogo and Sohal confirm that the systematic aspect of TQM is more effective to support innovation performance. In addition, Martinez-Costa and Martinez-Lorente (2008) assert that applying TQM practices provides an excellent environment to foster innovation in organizations. Hung et al. (2010) point out that TQM is not only a management tool for promoting and improving quality, but it also provides a suitable environment that enhances innovation when supported by top management, employee involvement, continuous improvement, and customer focus, which, in turn, stimulates employees to enhance products, processes, and organizational innovation performance.

Furthermore, the present study justifies the positive effect of TQM practices on innovation based on the Absorptive Capacity Theory. Absorptive Capacity Theory points out to the importance of the organizations’ abilities to get the essential knowledge from outside and inside the organization to enhance the innovative abilities of the organization (Cohen & Levinthal, 1990). As mentioned earlier, TQM practices (i.e., leadership commitment, customer focus, processes management, supplier quality management, people management, and quality data reporting) provide a basic structure that enhances the absorptive capabilities of the organization (i.e., the organization ability to acquire, assimilate, and exploit the knowledge). Therefore, based on the above discussion, the following hypothesis is proposed:

H1: TQM practices are positively associated with innovation performance.

III. ABSORPTIVE CAPACITY

Absorptive capacity is a set of capabilities that are considered as critical capabilities for organizations’ innovation processes. Cohen and Levinthal (1990) indicate that the firms’ abilities to identify the significance of new information, assimilating it, and applying it to commercial ends, are the main capabilities that form absorptive capacity. The core of the concept of absorptive capacity is that the organization needs previous related knowledge to assimilate and employ new knowledge outside the organization in order to recognize the organizational environment (Cohen & Levinthal, 1990). On other hand, Kim (1998) links the absorptive capacity to organizational learning. Furthermore, Kim (1998) explains that absorptive capacity involves learning capability and develops problem-solving skills. Learning capability is the capacity to assimilate knowledge (for imitation), whereas problem-solving skills represent a capacity to create new knowledge (for innovation). Therefore, it is not surprising that several studies confirm the positive effect of absorptive capacity on innovation performance (Cohen & Levintha, 1989; Kim, 1998; & Lane & Koka, 2006). In other words, absorptive capacity works as an essential part of an organizations’ ability to create new knowledge through which innovative output will be achieved. Zahra and George (2002) define absorptive capacity as the dynamic capabilities related to knowledge creation and application through which the innovation performance will be improved. According to Zahra and George (2002), absorptive capacity consists of a group of organizational routines and processes through which organizations acquire, assimilate, transform, and exploit knowledge to produce a dynamic organizational capability. Establishing absorptive capacity provides organizations with the prerequisite processes of innovation. Founding absorptive capacity promotes organizations’ capabilities to learn and establish the research and development (R&D) capabilities by which the basis of innovation processes will be built (Cohen & Levinthal, 1990). In order for the firms to have absorptive capacity, a suitable and an elasticity culture have to be provided. Therefore, organizations need to adopt and adapt the strategies that promote such cultures. In this regards, TQM strategies emphasize on several principles and factors such as customer focus / customer satisfaction, maintaining cooperative relationships with the suppliers for long-terms, establishing effective internal processes to achieve the tasks, and instituting internal systems to distribute and transfer the data regarding quality processes (Kaynak, 2003). Such principles help to generate open systems within the organization that links the firm with its surrounded environment through which the external knowledge and prior related knowledge will be available to the firm. Based on the above discussion regarding absorptive capacity and the literature that accentuates its role to enhance the innovation performance, this study would expect that absorptive capacity has a
moderating effect between TQM practices and innovation performance. Consequently, this study proposed the following hypotheses:

H2. Absorptive capacity is positively associated with innovation performance.

H3. The relationship between TQM practices and innovation performance is moderated by the firm’s high absorptive capacity.

IV. RESEARCH FRAMEWORK OF THIS STUDY

The current study proposed three hypotheses. There are very few studies that explore the effect of TQM practices and absorptive capacity on innovation performance. Hence, this study addresses the effect of TQM practices on innovation performance through the moderating role of absorptive capacity as shown in the research framework in Figure 1 below. TQM practices work as the independent variable, whereas innovation performance appears as the dependent variable, while absorptive capacity serves as a moderator variable.

V. METHODOLOGY

A. Sample and Procedures

This study was conducted in the Malaysian manufacturing companies listed in the Federation Malaysian Manufacturing (FMM) directory (2012). By using the sample random sampling, the adopted questionnaire was administrated to 500 companies through an online survey from June to September 2012. Out of 500, 120 valid questionnaires were returned, representing a response rate of 24%. Such a sample size was acceptable for Partial Least Square- Structural Equation Model (PLS-SEM).

B. Measures

To test the hypothesized relationships in this study, 48 items were adopted from the previous literature (Antony, Fergusson, Warwood, & Ysang, 2004; Calantine, Cavusgil, & Zhao, 2002; García-Morales, Ruiz-Moreno, & Llorens-Montes, 2007; Govindarajan & Kopalle, 2006; & Prajogo & Sohal, 2006). Furthermore, the response options range was a seven-point Likert scale.

VI. ANALYSIS AND RESULTS

A. Measurement Model

Before testing the structural model (i.e., testing the hypotheses), evaluating the measurement model was performed in order to confirm the validity and reliability of the measurement. The measurement model comprised of associations between the constructs and the items utilized to measure those constructs. To test the measurement model, several criteria were conducted by using PLS-SEM software such as composite reliability, Cronbach’s Alpha and Average Variances Extracted AVE (Hair, Hult, Ringle & Sarstedt, 2014). Table 1 below presents the result of the measurement model.

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Composite Reliability</th>
<th>Cronbach’s Alpha</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>0.869</td>
<td>0.812</td>
<td>0.571</td>
</tr>
<tr>
<td>IP</td>
<td>0.897</td>
<td>0.859</td>
<td>0.551</td>
</tr>
<tr>
<td>TQM</td>
<td>0.919</td>
<td>0.895</td>
<td>0.654</td>
</tr>
</tbody>
</table>

AC: Absorptive capacity; IP: Innovation Performance

Table 2: Cross loading of the constructs

<table>
<thead>
<tr>
<th>Constructs</th>
<th>AC</th>
<th>IP</th>
<th>TQM</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC1</td>
<td>0.723</td>
<td>0.272</td>
<td>0.226</td>
</tr>
<tr>
<td>AC2</td>
<td>0.701</td>
<td>0.200</td>
<td>0.124</td>
</tr>
<tr>
<td>AC3</td>
<td>0.828</td>
<td>0.185</td>
<td>0.091</td>
</tr>
<tr>
<td>AC4</td>
<td>0.803</td>
<td>0.244</td>
<td>0.219</td>
</tr>
<tr>
<td>AC5</td>
<td>0.715</td>
<td>0.190</td>
<td>0.090</td>
</tr>
<tr>
<td>IP1</td>
<td>0.253</td>
<td>0.808</td>
<td>0.367</td>
</tr>
<tr>
<td>IP2</td>
<td>0.227</td>
<td>0.837</td>
<td>0.402</td>
</tr>
<tr>
<td>IP3</td>
<td>0.260</td>
<td>0.800</td>
<td>0.461</td>
</tr>
<tr>
<td>IP4</td>
<td>0.258</td>
<td>0.782</td>
<td>0.370</td>
</tr>
</tbody>
</table>
Table 1 and 2 show that all the constructs (i.e., AC, IP, TQM, TQM*AC) exceeded the threshold of 0.70 and 0.50. Moreover, the cross loading test indicated that all the items loaded highly on their respective constructs with values exceeding 0.70. Given this result, the hypotheses could be tested through examining the structural model.

B. Structural Model

Having established the measurement model, the following step was to test the hypothesized relationships by running PLS algorithm. To determine the significance of the path loading between the constructs, bootstrapping algorithm was performed. Table 3 below displays the path coefficients of the structural model.

Table 3: The Path coefficient values

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Path Coefficient</th>
<th>Standard Error</th>
<th>T-Value</th>
<th>P-Value</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC -&gt; IP</td>
<td>0.121*</td>
<td>0.067</td>
<td>1.814</td>
<td>0.035</td>
<td>Accepted</td>
</tr>
<tr>
<td>TQM -&gt; IP</td>
<td>0.481**</td>
<td>0.065</td>
<td>7.407</td>
<td>0.000</td>
<td>Accepted</td>
</tr>
<tr>
<td>TQM * AC</td>
<td>0.148</td>
<td>0.159</td>
<td>0.932</td>
<td>0.176</td>
<td>NotAccepted</td>
</tr>
</tbody>
</table>

* P<0.01; ** P<0.05

C. Discussion

The mixed findings among the previous studies regarding the relationship between TQM practices and innovation performance induced some scholars to justify and suggest solutions to clarify when and how TQM practices can be the driver of innovation performance. In this regards, Singh and Smith (2004) and Prajogo and Sohal (2006) point out that the effect of TQM on innovation performance becomes clearer through an indirect way. Moreover, Baron and Kenny (1986) clarify that when the inconsistent finding is dominant among studies, the contingent (i.e., moderator) variable needs to be investigated, which may help illustrate the nature of this relationship (i.e., between independent and depended variable). Therefore, the issue related to TQM practices and innovation performance motivated the authors of this study to investigate the moderating influence of absorptive capacity on the relationship between TQM practices and innovation performance in the manufacturing sector in Malaysia. In general terms, this study found out that TQM practices had a positive and significant relationship with innovation performance ($\beta = 0.481$, $t = 7.407$, $p > 0.01$). Accordingly, the present study is consistent with past studies (e.g., Pekovic & Galia, 2009; Perdomo-Ortiz et al., 2006; Prajogo & Hong, 2008; Sadikoglu & Zehir, 2010) that support the positive influence of TQM practices on innovation performance. This result can be explained through the argument made by Perdomo-Ortiz et al. (2006) who refer to the role of practicing TQM within the organization to provide fertile platforms of innovation. Sucha statement is supported by Pekovic and Galia (2009) who conclude that through several dimensions that belong to TQM concept, the environment and culture that support innovation will be established in the organization. Furthermore, providing a culture created by TQM concept allows for improving customer orientation, employee involvement, enhancing leadership, better access to tools, regular meetings and better team spirit, all of which will improve innovation performance.

Regarding the effect of absorptive capacity on innovation performance, the results of this study elucidated that absorptive capacity had a positive influence on innovation performance ($\beta = 0.121$, $t = 1.814$, $p > 0.05$). This expected result is in line with Absorptive Capacity Theory introduced by Cohen and Levinthal (1990). Furthermore, it has been agreed that absorptive capacity is considered as capabilities that help improve the processes of creating and getting knowledge (Cohen & Levinthal, 1989) through which learning and R&D abilities will be improved. Cohen and Levinthal further assert that the ability to learn and enhance R&D is one of the critical capabilities to reinforce innovation performance. While learning improves imitating
abilities, R&D capabilities improve innovative outputs.

Further analysis to clarify the moderating effect of absorptive capacity on the relationship between TQM practices and innovation performance was performed. The path coefficient of the moderating effect was positive (0.148), indicating a positive interaction between the moderator (i.e., absorptive capacity) and the relationship between TQM practices and innovation performance. In other words, if absorptive capacity increased by one standard deviation point, this would imply that the relationship between TQM practices and innovation performance would increase by the size of the interaction term (0.481+0.148=0.629). However, the obtained result can be only applied when the interaction term is significant. Interestingly, the outcome of bootstrapping procedure indicates that the t value of the interaction relationship was (t = 0.932, p > 0.176). Accordingly, the moderating effect of absorptive capacity in the relationship between TQM practices and innovation performance was not confirmed by this study. One of the possible reasons for the lack of the moderating/interaction effect is that TQM practices and absorptive capacity have only an independent influence on innovation performance. It is also likely that the strong association between TQM practices and innovation performance (from the perspective of the respondents of this study) leads to decrease the moderating effect of absorptive capacity. In other words, the effect of TQM practices on innovation performance exists, regardless of the degree of absorptive capacity. However, since the effect of absorptive capacity on innovation performance is a well-established relationship that has been supported by absorptive capacity theory and several empirical studies (e.g., Gray, 2006; Kohlbacher, Weitlaner, Hollosi, Grahs, & Gru, 2013; Tseng, Pai, & Hung, 2011; Wang, Wang, & Horng, 2010), the result attained draws the attention towards the possibility of the mediating role of absorptive capacity. That is, the positive influence of TQM practices on innovation performance is attributed to a vital role of practicing TQM in enhancing the organizations’ absorptive capacity.

Moreover, Choo, Linderman and Schroeder (2007), Pérez-Aróstegui, Sousa and Lloréns-Montes (2009), Yusr, Mokhtar and Othman (2013) highlighted that applying TQM reinforces firms’ capabilities in different aspects of the organization. Such an acknowledgment motivated the present study to suggest that absorptive capacity could mediate the relationship between TQM and innovation performance.

D. Implications of the Study

From the theoretical perspective, this study contributed to reducing the gap perceived in the ambiguous relationship between TQM and innovation performance by investigating the moderating effect of absorptive capacity. Hence, the findings of this study confirmed the positive effect of TQM on innovation performance, while the proposed effect of the moderating role of absorptive capacity was rejected. In the light of the aforementioned results of this study, the managers of manufacturing companies could use TQM as one of the strategies that improve the innovation performance. The top management should focus on their customers both internally and externally in order to introduce successful innovative products, the aims that can be achieved by implementing TQM practices. Moreover, the output of this research confirms to the decision maker the importance of having absorptive capabilities to maintain long-term innovation performance.

E. Conclusion and Future Studies

TQM and innovation are two of the critical strategies to gain competitive advantages and survival. The main purpose of this study was to empirically investigate the nature of interaction of absorptive capacity in the relationship between TQM and innovation, specifically based on the recommendations found in the literature to explore this relationship in a complex manner rather than the simplistic way (i.e., direct relationship) in order to clarify the role of TQM in enhancing innovation performance. Hence, two of the most important findings of this empirical work were the existence of the relationship between TQM and innovation performance as well as identifying absorptive capacity as the critical antecedent capability of innovation. However, the interaction effect was not supported by this study, a result that can be attributed to the strong relationship between TQM and innovation performance that may cause the main reason behind decreasing the interaction effect. Consequently, this study highly recommends
explaining the nature of this relationship through testing the mediating role of absorptive capacity.

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