An Analysis of the Impact of Total Quality Management on Employee Performance with mediating role of Process Innovation

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Abstract. TQM practices are important to provide customer satisfaction by improved product performance and sustained towards the organizational goal. The objective of this study was to analyse the relationship between TQM practices, process innovation and employee performance. In this study, six critical success factors of TQM have been identified namely customer focus, leadership, training, teamwork, communication, and top management. Based on thorough literature review, employee performances have been measured by two constructs which are job satisfaction and workplace environment. The study used methodology of quantitative approach. The questionnaires for this study were randomly distributed to 102 employees in the selected car manufacturer companies. The respondents were choosing from management team, supervisor, technician and others worker. Results of the study support the proposed hypotheses that there are significant relationship between TQM practices, process innovation and employee performance.

Keywords – Total Quality Management, Car Manufacturer Industry, Employee Performance, Malaysia and Regression Analysis

1. Introduction

TQM has been thoroughly discussed in the past literature and can be seen as one of a management philosophy characterized by its principles, implementation, and strategies that emphasizes upon continuous improvement in quality, increased empowerment of employees, top management support, employee enhancement, teamwork, transformational leadership, rewards and incentives, and suppliers management. Ahmad et al., (2013), noted that most of the reviews on TQM have been undertaken in the electronic and manufacturing sectors and have later spread to service industry.
Recently there are many problems faced by the organization in terms of quality management among employees. For example, they need to compete in the market to make the company remain competitive. In Malaysia automotive industry, many companies overlook the fierce competition from other countries. This resulted may impact to the businesses in Malaysia.

The research question of this paper is does there is relationship between TQM practices, process innovation and employee performance? Therefore, to answer the research question, the purpose of this paper is to analyze the relationship between TQM, process innovation and employee performance. It is important for all organizations to have knowledge about quality management. Given the significance of automotive industries to the Malaysian economy, the researcher decided to evaluate the impact of TQM on employee performance with mediating by process innovation. In order to survive in a competitive market place, total quality management practices implementation is one of the key issues that can help align organization’s to stay competitive.

2. Literature Review

TQM has been widely recognized and successfully implemented in many small and large organizations, giving them the edge in international as well as local competitiveness through the production of high quality products to satisfy customer needs (N.M Zakuan et al., 2008). Quazi and Padibjo (1998) stated that TQM efforts in the United States of America and Japan highlighted the increasing importance of TQM and its impact on profitability. This is supported by Lakhal et al. (2006), who noted that organizations with TQM systems in place consistently exceeded industry standards for return on investment. Six critical factors of TQM practices namely: customer focus, leadership, training, teamwork, communication, and top management have been identified in this study.

Employee performance can be defined as the set of competencies that are related to the goals of the organization or the organizational unit in which an employee’s works, (Aarabi et al., 2012). In this study, author will measure employee performance based on two elements which are job satisfaction and workplace environment.

2.1 Hypothesis Development

In this model, all possible relationships between each of six TQM dimensions considered as the independent variables which are top management, training, leadership, teamwork, communication, and customer focus and employee performance considered as the dependent variables as shown in Figure 1.

TQM practices were positively related with employees’ work-related attitudes, such as job involvement, job satisfaction, career satisfaction, and organizational commitment. TQM practices also encourage employees’ participation, promote empowerment, and recognize that employees play an important role in achieving the organizations’, objectives and treat employees as primary resource. (Evans and Jack, 2004), Thus hypothesis 1 being develop as below:

Hypothesis 1: TQM has a direct and positive relationship with employee performance

TQM practices were positively related with employees’ work-related attitudes, such as job involvement, job satisfaction, career satisfaction, and organizational commitment. TQM practices also encourage employees’ participation, promote empowerment, and recognize that employees play an
important role in achieving the organizations’ objectives and treat employees as primary resource. (Norliza and Muhd Hasmi, 2006), Thus hypothesis 3 being develop as below:

**Hypothesis 2: TQM has a direct and positive relationship with employee performance**

Employee performance is positively related to process innovation. Employees refer to the non-management employees of the organisation and the role they play in affecting innovation management. This factor takes into account the various personal characteristics associated with employees (Bharadwaj and Menon, 2000) and the motivation of employees to become innovative (Mostafa, 2005). Thus hypothesis 2 being develops as below.

**Hypothesis 3: process innovation has a direct and positive relationship with employee performance**

Kaynak, 2003 stated that in a total quality setting, employee involvement in decision making service is highly valued, encouraged, and rewarded. In such work environment, employee will work harder to improve the process, product or service quality. Incremental improvement of the existing process can come from learning curve, which means that an experienced worker will lead to decrease in cost per unit over time, (Anderson et al 1994). Thus Process innovation was to carry out about the mediator impact to total quality management. It means to know what would happen to TQM is innovation practise will be apply in the process. And also to study the relationship between innovation and employee performance which to what will happen to employee performance is would be increase or decrease. Implementation of innovations gives an opportunity to modernize the structures of manufacturing and services, to improve products and technologies, to raise their international competition, (Laura and Bronius, 2005). Thus hypothesis 4 being develops as below.

**Hypothesis 4: the implementation of TQM increases with a mediating role of process innovation**

![Figure 1: The conceptual model](image-url)
3. Research Method

Chang (2002) describes survey as questioning the respondents and the recording of their responses to be used as data for analysis. A survey technique is considered the most economical among methods available for data collection due to its ability in performing efficient data collection (Rao et al., 1999), which had been used by the author.

The questionnaires for this study were randomly distributed to 102 employees in the selected car manufacturer companies. The respondents were choosing from management team, supervisor, technician and others worker. The data used in this research was through questionnaire to obtain quantitative data to testing of statistical of the hypotheses.

4. Results

4.1 Analysis of Mean score for Total Quality Management

Table 1 list out the mean, level of significant and rank of dimension for TQM. Customer focus represented the highest significant level with mean score 4.253 compare with others which was ranked at first place and determined as the most critical success factor for TQM practises. Next, it was followed by the leadership with 4.071 mean score, training with 3.961 mean score and communication with 3.978 means score. However, teamwork and top management were ranked as fifth and six places as its mean score was lower compared to other dimensions with the mean score 3.655 and 3.766 respectively. In short, customer focus is determined as the most critical success factor while teamwork as the less critical success factor based on the mean score.

| Dimension          | N   | Mean | Level of Significance | Rank |
|--------------------|-----|------|-----------------------|------|
| Top management     | 102 | 3.766| High                  | 5    |
| Leadership         | 102 | 4.071| Very high             | 2    |
| Customer focus     | 102 | 4.153| Very high             | 1    |
| Training           | 102 | 3.961| High                  | 3    |
| Communication      | 102 | 3.978| High                  | 4    |
| Teamwork           | 102 | 3.655| High                  | 6    |

4.2 Analysis of means score for employee performance

Table 2 indicates, employee satisfaction and working environment showed high level of significance based on the range of means score. However, employee satisfaction has the highest mean score with 3.848 and followed by the working environment with 3.834 means score. Hence, employee satisfaction is identified as the critical success factor in the employee performance based on the ranking.

| Dimension               | N   | Mean | Level Of Significance | Rank |
|-------------------------|-----|------|-----------------------|------|
| Employee satisfaction   | 102 | 3.848| High                  | 1    |
| Working environment     | 102 | 3.834| High                  | 2    |

4.3 Analysis of relationship between TQM and EP

In this section, linear regression was conducted to analyse the effect of TQM (independent variable) on the EP (dependent variable). From Table 3, there was a positive effect of TQM on EP which was significant at 0.01 level, (β=0.809, t=11.179, Sig. =0.000). It also showed that R square for
this regression model was 0.555; it means that 55.5 per cent of the variance in employee performance was explained by the total quality management. Thus, it can be concluded that there is a significant relationship between TQM and EP which represent the TQM practises could affect EP.

Table 3: Linear Regression between TQM Practises and EP

| Linear regression | Employee performance |
|-------------------|----------------------|
|                   | Beta (β) | Std. Error | t-value | p-value |
| (constant)       | .739     | .280       | 2.638   | .000    |
| TQM               | .809     | .072       | 11.179  | .000    |
| F statistic       | 124.970  |            |         |         |
| R square          | .555     |            |         |         |

Note: Significant at p <0.01

4.4 Analysis of relationship between TQM and Process innovation

To identify the relationship between TQM and PI, a linear regression was conducted to determine the effects of TQM (independent variable) on the PI (dependent variable). From the finding in Table 4, there indicated positive effect of TQM on PI which was significant at 0.01 level, (β=0.953, t=11.637, Sig.=0.000). Besides, R square for this regression model was 0.575. It means 57.5 percent of the variance in process innovation was explained by the total quality management. In short, it can be concluded that there is a significant relationship between TQM and EP which show that the TQM could affect PI.

Table 4: Linear Regression between TQM Practises and PI

| Linear regression | Process innovation |
|-------------------|--------------------|
|                   | Beta (β) | Std. Error | t-value | p-value |
| (constant)       | .056     | .317       | .177    | .000    |
| TQM               | .953     | .082       | 11.637  | .000    |
| F stat            | 135.414  |            |         |         |
| R square          | .758     |            |         |         |

Note: Significant at p <0.01

4.5 Analysis of relationship between PI and employee performance

Table 5 presents the finding of the regression analysis between PI (independent variable) and EP (dependent variable). The result showed a positive effect of PI on EP which was significant at 0.01 level, (β=0.560, t=8.518, Sig.=0.000). The R square for this regression model was 0.420, it means that 42 percent of the variance in employee performance was explained by the process innovation. Thus, it can be concluded that there is a significant relationship between PI and EP which also proved that the PI could affect EP.

Table 5: Linear Regression between PI and EP

| Linear regression | Employee performance |
|-------------------|----------------------|
|                   | Beta (β) | Std. Error | t-value | p-value |
| (constant)       | 1.763    | .248       | 7.118   | .000    |
| PI               | .560     | .066       | 8.518   | .000    |
| F stat            | 72.559   |            |         |         |
| R square          | .648     |            |         |         |

Note: Significant at p <0.01
4.6 Analysis of Sobel test for Process innovation mediator

There are three prerequisites must be fulfilled before conducting Sobel test. Firstly, independent variables should have significant effect on mediator. Second, there must be a significant effect on dependent variable and dependent variable. Lastly, independent variables must have significant effect on dependent variables without independent variables must have significant effect on independent variables without including the influences of mediator. According to the finding in Table 4, TQM was a statically significant predictor of PI with (p<0.01). Next, process innovation was a statically significant predictor of EP with (p<0.01). Moreover, Table 3 also showed that TQM was a statically significant predictor of EP with (p<0.01). Thus, it can be explained that there might consist of partial mediating effect.

Next, to compare the coefficients between TQM and EP to determine whether there is a partial mediator. From the Table 6, it showed that the coefficient between TQM and PI with EP is β = 0.648 and the coefficient between TQM and EP was equal to β= 0.809. By comparing two unstandardized coefficients, there showed a decreasing of coefficient. So, it can be concluded there was a partial mediator effect with the existing of PI mediator. Sobel test was used in this section to prove that whether mediation effect is statically significant on TQM to EP. A statically significant level of p<0.05 and z>1.97 is defined as an existing of mediation. Based on the results the test statistics is equal to 2.8525202 (z>1.97), with p- value equal to 0.00433741 (p<0.05). Thus, it means that the relationship between TQM and EP is mediated by PI and predictability of dependent variables (EP) by means of independent variables (TQM) will be more significant.

| Multiple regression | Employee performance |
|---------------------|----------------------|
| Beta (β) | Std. Error | t-value | p-value |
| (constant) | .729 | .276 | 2.639 | .010 |
| TQM | .648 | .110 | 5.914 | .000 |
| PI | .169 | .087 | 1.941 | .000 |
| F stat | 66.096 | |
| R square | .572 | |

Note: Significant at p <0.01

Based on the previous analysis results, Table 4.7 indicated the results of the hypothesis presented in this study. All hypotheses were accepted by the following findings of the analysis conducted on the variables.

| Table 4.10: The results of the hypothesis presented in this study |
|---------------------------------------------------------------|
| **Hypotheses** | **Result** |
| H1: TQM has a direct and positive relationship with EP | Supported |
| H2: TQM has a direct and positive relationship with PI | Supported |
| H3: PI has a direct and positive relationship with EP | Supported |
| H4: The implementation of TQM increases with a mediating role of PI in automotive industry | Supported |
5. Discussions

5.1 Results on TQM Practises Dimensions Measure

Based on the results in Tables 1, it showed that customer focus was distinguished as the most critical success factor for TQM practises with the highest mean score 4.153. This outcome can be proved by the Deming (1982), customer focus is the most important part of production, means producing and delivering products and services that fulfil customers’ present and future needs and expectations. It explained to exceeding customers’ expectations in order to ensure long-term organizational success and survival. It is necessary for every organization to create a customer focused culture.

There are numerous reasons why more and more companies are choosing to become customer oriented. The simplest of these is that it gives them a better understanding of what the customers want. In order to reach of success, companies need to be more focused on delighting customers, rather than on making profits. Many respondents very agree that they increased personal contacts between the organization and customer. Used customer requirement as the basis for quality and also support activity to improve customer satisfaction. Also always alert and update to the needs and feedback from customers. With all this activity they can make sure they can achieve the exceeding customer expectations.

5.2 Results on the EP Dimensions Measure

Based on the result, employee satisfaction obtained the highest score with 3.848 and followed by working environment with 3.834 mean score. Hence employee satisfaction is identified as the critical success factor in the organizational performance based on the ranking. This is particularly true for employee involvement and job performance that is directly affected by TQM on employee involvement because of established participative activities and job performance because of the conditions created necessary for good performance. According to Romano (2002), had defines employee satisfaction “as an individual’s general attitude toward” their job. In fact, Total Quality Management covers every aspect on the way of life and operation that is conducted in an organization.

5.3 Results of Regression between TQM Practises and EP

From the findings of linear regression, the result shows there was a significant and positive effect of TQM practises on EP. “TQM practices were positively related with employees’ work-related attitudes, such as job involvement, job satisfaction, career satisfaction, and organizational commitment. TQM practices also encourage employees’ participation, promote empowerment, and recognize that employees play an important role in achieving the organizations goals, its objectives and treat employees as primary resource.”

5.4 Results of Regression between TQM and PI

The relationship between TQM and process innovation are positively related because both have the same role in improving the quality of product or service of the company. Flynn (1994) stated satisfied and experienced employees have historical knowledge and insight on their external customers’ needs and requirements and the skills to innovate new products to satisfy the customers and improve competitiveness of the firm.
5.5 **Results of Regression between PI and EP**

The relationship between process innovation and employee performance is positively related to process innovation. Employees refer to the non-management employees of the organisation and the role they play in affecting innovation management. This factor takes into account the various personal characteristics associated with employees (Bharadwaj and Menon, 2000) and the motivation of employees to become innovative (Mostafa, 2005).

5.6 **Results on Mediating Role of PI**

Thus Process innovation was to carry out about the mediator impact to total quality management practices. It means to know what would happen to TQM is innovation practise will be apply in the process. And also to study the relationship between process innovation and employee performance which to what will happen to employee performance is would be increase or decrease. Implementation of innovations gives an opportunity to modernize the structures of manufacturing and services, to improve products and technologies, to raise their international competition, (Laura and Bronius, 2005). Hence, it will make company better in industry and gained more profit from their product.

6. **Conclusion**

Finally, this research has indicated that the customer focus was distinguished as the most critical success factor for TQM practises. Whereby, employee satisfaction is identified as the critical success factor for the employee performance based on the ranking.

The second objective is to examine the relationship between TQM practises, PI and EP in automotive industry. It was also found that there was positive correlation among dimensions of TQM practises. Besides, there was also a strong correlation appeared between dimensions of TQM practises and EP. Furthermore, the direct positive relationship was proven to be existed between the TQM with PI, TQM with EP and PI with EP. It has fulfilled the first three hypotheses in this research.

The third objective is to investigate the effect of process innovation (PI) mediator toward total quality management (TQM) to employee performance in automotive industry. In this research, the sobel test for mediating role of PI proved that there was an indirect effect through PI and it could stronger the effect of TQM towards EP. As a result, all the objectives of this study have been achieved.

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