TQM as business strategy: a meta-analysis review

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Abstract: There is no doubt in the fact that organisations worldwide are currently in the era of total quality management (TQM), but whether it is making a real impact on these organisations’ bottom-line remains a much-debated topic in both academic and management forums. In this direction, the study conducted a meta-analytical investigation of the association of TQM practices with firm’s performance from the TQM literature by adopting the heuristic approach (Hunter and Schmidt, 1990). The study also examined the role of moderating factors in influencing this association. For the meta-analytical review, 12 empirical studies that had examined the link between TQM practices and firm’s performance were sampled. The study adopted the ‘random-effects’ model using weighted mean of raw correlation coefficient as a measure of the size of the effect. The results showed the existence of association between the TQM practices and the firm’s performance and existence of moderators impacting this association.

Keywords: total quality management; TQM; meta-analysis; effect size; correlation; random-effects models; competitive advantage.


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1 Introduction

There is no doubt that organisations worldwide are currently in the era of total quality management (TQM), but whether it is making real impact on these organisations’ bottom-line or is turning out to be yet another fad, remains a much-debated topic in both academic and management forums (Jaca and Psomas, 2015;
Jiménez-Jiménez et al., 2015). Although the term ‘TQM’ got popularised in the mid-1980s, it is recognition as a quality-related language only happened in the late 1980s, when Deming’s 14 principles on quality were implemented. However, despite the publication of an international definition of TQM in ISO 8402 (1994) standards as an organisation-wide management approach for quality improvement, the writers and researchers did not stick to this valid definition but continued to create their own unique descriptions of TQM. Several writers including Saraph et al. (1989), Flynn et al. (1995) and Ahire et al. (1996) have tried to describe the dimensions that shape TQM. Some termed TQM as a business or management philosophy, whereas, others have defined it as a collection of principles, tools and methods for improving processes in an organisation (Besterfield et al., 1999). This subjectivity in the revelation of TQM structure has led to its criticism for the lack of its specificity as a concept, and the uncertainty of its impact on business performance (BP) (Zbaracki, 1998; Hackman and Wageman, 1995; Young, 1992).

The TQM literature showed several empirical evidences supporting the impact of TQM principles (primarily top/senior management leadership, training and education, quality culture) on strategic BP and competitive advantage (Singh and Ahuja, 2012; Talib and Rahman, 2010; Powell, 1995; Reed et al., 1996, 2000). In this direction, initial progress was made when Powell (1995) empirically supported the conclusion that TQM produces value to the firm. However, its success depends more on the intangible TQM elements such as executive commitment, open communication and employee empowerment, than the tangible TQM procedures such as benchmarking, process improvement, and measurement. Reed et al. (1996, 2000) deduced that TQM principles are capable of producing a cost-or-differential advantage to an organisation. Later many empirical studies confirmed the structural relationship between TQM factors and organisational performance in terms of internal procedures, product/service quality, customer focus and market share, and operational and financial performance (FP) (Jaca and Psomas, 2015; Jiménez-Jiménez et al., 2015; Fotopoulos and Psomas, 2010; Escrig-Tena, 2004; Mehra and Agrawal, 2003). In an empirical investigation in the hospitality industry, Nair and Choudhary (2016) established a structural relationship between critical success factors (CSFs) in TQM, and the measures of organisational performance. Although ample evidences supporting the role of TQM in attaining competitive advantage are available in literature, there are studies, which supported that TQM may not be a panacea for business problems, particularly in the absence of critical resources (Candido and Santos, 2011; Rahman, 2001). In context of manufacturing environment, McLean et al. (2015) highlighted eight critical factors, which contributed towards the downfall of continuous improvement initiatives including TQM. Researchers have also been examining the effect of contextual factors on the relationship between TQM and firm’s performance (Sadikoglu and Zehir, 2010; Sila, 2007; Nair, 2006). In a recent study, Patyal and Koilakunta (2016) proposed a conceptual framework that studied the impact of organisational culture on the success of quality practices, and organisational performance. The proposed framework was tested on a sample of 40 medium scale manufacturing organisations. In an empirical survey on 238 manufacturing plants across eight countries, Zhang et al. (2012) highlighted that TQM programs need to be customised as per organisation’s environment (stable/dynamic) for optimal performance benefits. Thus, despite an ever expanding theoretical foundation, the acceptance of TQM as a competitive strategy to improve BP needs further exploration. This meta-analytical study is aimed at filling the research gap, empirically validating the
association between TQM practices and firm’s performance, and examining the role of moderators in this association.

The rest of the paper is organised in three sections. It begins with the literature review of various empirical studies, exploring the association between TQM practices and BP at different levels. The following section describes the research methodology, including the meta-analysis approach adopted for the review. This section also explains the sample selection and analysis procedure to test the research hypothesis. This is followed by the result and conclusion section, describing the research implications, limitations, and direction for future research.

2 Literature review

The literature on TQM was studied for examining the nature of empirical studies conducted in different industry settings for establishing an association between TQM practices and BP.

The review revealed varied conceptualisations for both the constructs i.e., TQM practices and BP. For evaluating adoption of TQM practices, most of the studies have adopted a multi-dimensional construct (Jaca and Psomas, 2015; Jiménez-Jiménez et al., 2015; Kaynak, 2003). In a study on Spanish service industries, Jaca and Psomas (2015) extracted five latent factors for TQM (top management practices, process management, employee quality management, customer focus, and employee education) and four latent factors representing company performance (FP, customer satisfaction, product/service quality performance (QP), and operational performance (OP) using exploratory factor analysis. In an empirical study exploring the simultaneous effect of both, TQM and learning capabilities, on the firm’s performance, Jiménez-Jiménez et al. (2015) adopted the exploitation-exploration capability scale (Flynn et al., 1995) for measuring TQM and a 16-item scale for measuring performance developed on the basis of result criteria of European Foundation Quality Medal (EFQM) excellence model. Danyen and Callychurn (2015) in a study on Mauritian food manufacturing companies evaluated the impact of a TQM program on OP, BP and QP of the companies. Results of the study showed a positive association between all the bivariate combinations in the model, except between TQM index and BP, and QP and BP. In an empirical study on Malaysian manufacturers, Fotopoulos and Psomas (2009) explored the impact of soft and hard TQM elements on innovation performance of an organisation. In a recent study, Shojai et al. (2016) checked the impact of the hard aspects of TQM on the sigma level of the production process in electronics and electrical industries. The results indicated that the process sigma rose by 0.3, which is equivalent to 8% improvement, after the TQM implementation. In a meta-analytical review, Anil and Satish (2016) examined the link between the individual TQM practices and the performance measures resulting in the development of a conceptual model for TQM implementation for BP. Many researchers followed the criteria of Malcolm Baldrige national quality award for measuring the impact of TQM elements (Sinha et al., 2016; Shenawy et al., 2007) on the BP. Zailani et al. (2007) examined the influence of quality improvement aspects (six variables, including teamwork and awareness) on firm’s productivity in context of manufacturing firms in Malaysia. The authors also studied the moderating effect of the level of automation on the relationship between quality and productivity. In a study on Jordanian
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manufacturing firms, Al-Refaie and Hanayneh (2014) established a structural model to investigate the impact of total preventive maintenance (TPM) and TQM on the firm’s FP. The results showed significant positive effects of TPM and TQM on the firm’s FP.

Review also revealed diversity in the research methodologies and characteristics of the samples adopted for investigating the relationship between TQM practices and BP. The methodologies considered for the investigation were correlation and regression analysis (Parvadavardini et al., 2016; Nair and Choudhary, 2016; Ahmad et al., 2015; Silva et al., 2014), structural equation modelling (Anil and Satish, 2016; Jiménez-Jiménez et al., 2015; Al-Refaie and Hanayneh, 2014; Chen, 2015; Kaynak, 2003), Wilcoxon rank-sum test (Hendricks and Singhal, 2001), and path analysis (Anderson et al., 1995; Flynn et al., 1995). In terms of the unit of the analysis, studies have either focused on firm-level data or plant-level data for investigating the relationship. Broadly, the review showed that the researchers could not establish a generalised agreement on the nature of relationship (direct or indirect) between TQM practices and BP.

3 Research methodology

To fill the research gap, this study aimed to test the validity of the generally accepted direct relationship between TQM practice and BP based on the data obtained from empirical studies in the TQM literature. The study also explored the role of moderating variables from the literature impacting this association. The hypotheses framed for examining these relationships, and the role of moderating variables on them, were given below:

H1 TQM practices are significantly associated with BP.

H2 Country/region of firm’s origin moderates this association.

Meta-analysis procedure was chosen to conduct this investigation due to its aptness in integrating findings across literature while controlling measurement errors and other artefacts (Hunter and Schmidt, 1990).

3.1 Meta-analysis

Meta-analysis is a systematic, scientific and quantitative epidemiological research design that allows:

- to summarise quantitative findings of the empirical studies
- to analyse the findings using analytical tests, to see whether, and how, a particular variable affects the outcome variable (Hunter and Schmidt, 1990).

Thus, a meta-analysis investigation permits the aggregation of studies with different sample sizes, construct validity and other study characteristics. This facilitates the researchers in generalising their findings on the basis of a single study (Hunter and Schmidt, 1990). The output of a meta-analytical investigation is a consolidated review of large, complex and conflicting body of literature. However, the technique relies heavily
on the relevance of each of the contributing studies for a particular variable. A failure to identify the majority of information from related studies may lead to an erroneous conclusion. Additionally, the clarity of the hypothesis being investigated is crucial for the success of this systematic investigation (Moher et al., 2009).

The initial applications of meta-analysis happened in the field of psychotherapy (Smith and Glass, 1977) for integrating the results of 475 controlled evaluations of psychotherapy. Another meta-analytical investigation that drew much attention was a research by Glass and Smith (1979) into the success of students in school as a function of size of the school division. This methodology also found its application in the social science research including educational research (Hartley, 1977; Smith, 1980; Cohen, 1988). The TQM literature adopted meta-analytical procedure for exploring the quality measures in the manufacturing system (Jitpaiboon and Rao, 2007) for empirically validating theoretical models (Nair, 2006; Powell, 1995), and for studying the impact of TQM on a firm’s competitive advantage (Shenawy et al., 2007). Ahmad et al. (2013) performed a meta-analytical review of the role of moderators (such as the organisation structure) in influencing the impact of TQM on BP. In another meta-analytical review, Mosadeghrad (2014) explored the CSFs for the TQM implementation in the organisations. In a recent study, Ahmad et al. (2015) conducted a meta-analytical review to investigate the impact of TQM on BP across regions and countries. The results showed no statistically significant difference in the impact. The present study attempted to extend the research on the role of moderators. It did this by empirically investigating the role of ‘country/region of origin’ of the firm in influencing the effectiveness of TQM as a business strategy in contributing towards the firm’s competitive advantage.

3.2 Procedure

The objective of the study was to estimate the ‘combined effect’ of an independent variable (TQM practices) on the dependent variable (BP). Meta-analysis of correlation was the methodological procedure adopted to examine the distribution of study correlations between the dependent and independent variables from the literature (Damanpour, 1991). There are two models which are widely used in conducting meta-analysis – the ‘fixed-effects model’ and the ‘random-effects model’ (Borenstein et al., 2010). Under the ‘fixed effect model,’ the combined effect is estimated as the size of fixed effect based on the assumption that all studies are homogenous. By contrast, under the ‘random effects model’, a pooled variance estimate is developed to account for the heterogeneity of studies.

The study used the ‘random-effects meta-analysis’ model proposed by Hunter and Schmidt (1990). It used the weighted mean of the raw correlation coefficient (Pearson’s ‘r’) as a measure of the size of the effect. This type of meta-analysis investigation is popular in behavioural research (Lipsey and Wilson, 2001). The study preferred Pearson’s ‘r’ as the measure of the size of the effect since it is a well known statistic for measuring correlation. Additionally, it is easy to convert the sizes of other effects such as Glass’s Δ (Smith and Glass, 1977), Cohen d (Cohen, 1988) and Hedge’s g (Hedges, 1981) into Pearson ‘r’ (Field, 2001).
3.2.1 Sample

The first and foremost step of the study was to obtain a sample for the meta-analysis (Lipsey and Wilson, 2001). For sample selection, ABI/INFORM database was searched using the search terms: TQM, quality management, quality measures, BP, FP, competitive advantage, business strategy. The time period for the literature review was 2003–2016.

The search presented varied articles ranging from case studies, practitioners’ articles, and empirical and non-empirical work. The criteria used for sample selection were:

- The study should be empirical in the academic sense. That is, it should include statistical hypothesis testing using appropriate sample size (more than 50). Additionally, the data should be collected from quality practitioners using cross sectional mail survey.
- The reported Pearson correlation (r) of the sample or an equivalent size of the effect should show the association of the TQM practices with firm’s performance, and report the reliability coefficients of the constructs.
- The studies, which were based on the subjective evidence from a single or a few case studies, should not be sampled.
- The sampled studies should be from different countries/regions.
- The differences among the sampled studies with respect to the type of industry (manufacturing or service) and their size (large or small) was not ignored, to ensure the generalisation of findings (Shenawy et al., 2007).

For the measurement of dependent and independent variables, studies with closely related constructs were sampled. For measuring TQM practices, the constructs adopted were leadership commitment (Kaynak, 2003; Douglas and Judge, 2001), employee empowerment (Ugboro and Obeng, 2000; Kaynak, 2003), customer satisfaction (Douglas and Judge, 2001), and process improvement (Powell, 1995; Ahire and Dreyfus, 2000). The measures of BP used for review were success of product innovations (Silva et al., 2014), competitive advantage (Shenawy et al., 2007), employee job satisfaction (Zailani et al., 2007), production and operations performance (Chen, 2015), customer satisfaction (Ugboro and Obeg, 2000), FP (Kaynak, 2003), and market share growth (Curkovic et al., 2000; Sayeda et al., 2010).

Based on the sample selection criteria, 12 referred articles from ten referred journals formed the sample for the meta-analysis study. This sample size was found appropriate considering the pervious meta-analytic studies (Gerwin and Barrowman, 2002). These sample studies belonged to different countries/regions including Australian nations (New Zealand, Australia), Asian nations (India, Korea, China, Taiwan, Malaysia etc.), and European nations (Netherlands, Cyprus). All the sample studies were coded (using a code number) and publication details (author, year of publication, sample size), country/region of firm, data collection methods, and variables involved were recorded. Table 1 shows the codes of sample studies used for the analysis.
<table>
<thead>
<tr>
<th>Code no.</th>
<th>Author(s) (publication year)</th>
<th>Journal</th>
<th>Country/region</th>
<th>Sample size</th>
<th>Method</th>
<th>Dependent variable</th>
<th>Independent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Prajogo and Sohal (2003)</td>
<td>IJQRM</td>
<td>Australia</td>
<td>194</td>
<td>Structural equation modeling</td>
<td>Organisational performance</td>
<td>Leadership commitment</td>
</tr>
<tr>
<td>2</td>
<td>Kaynak (2003)</td>
<td>JOM</td>
<td>Australia</td>
<td>214</td>
<td>Structural equation modeling</td>
<td>Financial and QP</td>
<td>Management leadership</td>
</tr>
<tr>
<td>3</td>
<td>Lia (2003)</td>
<td>IOPE</td>
<td>Australia</td>
<td>304</td>
<td>Correlation analysis</td>
<td>BP</td>
<td>Quality management principles</td>
</tr>
<tr>
<td>4</td>
<td>Kontoghiorghes and Gudgel (2004)</td>
<td>TQMJ</td>
<td>China</td>
<td>189</td>
<td>Correlation analysis and stepwise regression analysis</td>
<td>Productivity</td>
<td>12 quality indicators</td>
</tr>
<tr>
<td>5</td>
<td>Mahmood et al. (2014)</td>
<td>IJQRM</td>
<td>Asia</td>
<td>215</td>
<td>Correlation analysis</td>
<td>Performance</td>
<td>11 TQM Dimensions</td>
</tr>
<tr>
<td>6</td>
<td>Silva et al. (2014)</td>
<td>IJOPM</td>
<td>Europe</td>
<td>112</td>
<td>Partial least square regression</td>
<td>Strategic product innovation</td>
<td>TQM culture, product design innovation capability</td>
</tr>
<tr>
<td>7</td>
<td>Chen (2015)</td>
<td>BPMJ</td>
<td>China</td>
<td>173</td>
<td>Structure equation modeling</td>
<td>Production performance</td>
<td>JIT and TQM</td>
</tr>
<tr>
<td>8</td>
<td>Ahmad et al. (2015)</td>
<td>IJISE</td>
<td>Asia (16 countries)</td>
<td>4,040</td>
<td>Correlation and regression analysis</td>
<td>BP</td>
<td>TQM dimensions</td>
</tr>
<tr>
<td>9</td>
<td>Jaca and Psomas (2015)</td>
<td>TQM and BE</td>
<td>Europe</td>
<td>72</td>
<td>Exploratory factor analysis</td>
<td>FP, customer satisfaction, product/service QP</td>
<td>TQM factors (top management, process management, employee quality management)</td>
</tr>
<tr>
<td>10</td>
<td>Jiménez-Jiménez et al. (2015)</td>
<td>TQMJ</td>
<td>Europe</td>
<td>111</td>
<td>Correlation analysis</td>
<td>Exploitation and exploration constructs</td>
<td>TQM dimensions</td>
</tr>
<tr>
<td>11</td>
<td>Parvadavardini et al. (2016)</td>
<td>TQM and BE</td>
<td>Asia</td>
<td>152</td>
<td>Partial least square</td>
<td>QP and FP</td>
<td>Quality management practices</td>
</tr>
<tr>
<td>12</td>
<td>Nair and Choudhary (2016)</td>
<td>IJPQM</td>
<td>Asia</td>
<td>331</td>
<td>Structural equation modeling with partial least square</td>
<td>FP measures</td>
<td>TQM CSFs</td>
</tr>
</tbody>
</table>

3.2.2 Analysis

The objective of the (meta) analysis was to identify the ‘combined effect’ of TQM practices on firm’s performance, and to investigate the role of country/region of firm in facilitating this effect. The study adopted the ‘random-effect meta-analysis’ model since this method allowed for the absence of unreachable literature such as dissertation reports or conference articles (Hunter and Schmidt, 1990). The results of the method show the individual effect-size of the dependent and the independent constructs in the sampled studies. Meta-analysis of correlations was used to obtain the combined reliability of the TQM practices and the firm’s performance constructs for each of the sample study. Similarly, the combined correlation was obtained by averaging the sample correlations of individual TQM practices and those of firm’s performance. The mean of sample correlation was obtained using the following formula by Hunter and Schmidt (1990).

\[
\text{Mean Effect Size } (r) = \frac{\sum N_i r_i}{\sum N_i}
\]

where

- \( N_i \) = size of sample ‘i’
- \( r_i \) = sample correlation ‘i’
- \( \sum N_i \) = number of samples included for mean correlations of TQM practice and firm’s performance.

To account for the error in the measurement of dependent and independent variables involved in the study, the combined correction factor (described by Hunter and Schmidt, 1990, as attenuation factor) of each sample study was obtained as follows (Hunter and Schmidt, 1990):

\[
A = \frac{1}{\sqrt{r_{xx}} \sqrt{r_{yy}}}
\]

where

- \( r_{xx} \) = reliability coefficient of TQM practices
- \( r_{yy} \) = reliability coefficient of firm’s performance.

Therefore, corrected correlation \( r' = \frac{r}{A} \).

The weights to be attached, to account for the contribution of each study, were calculated using the following formula (Hunter and Schmidt, 1990):

\[
W = N_i \times A^2
\]

Finally, the error variance of each sample study was estimated using the below formula (Hunter and Schmidt, 1990):

\[
e = \frac{1 - r^2}{[(N - 1) \times A^2]}
\]
<table>
<thead>
<tr>
<th>Code no.</th>
<th>Sample size (N)</th>
<th>TQM practice reliability coefficient (r_xx)</th>
<th>Firm’s performance reliability coefficient (r_yy)</th>
<th>Correction factor A = \sqrt{r_xx} \sqrt{r_yy}</th>
<th>Pearson (correlation) r</th>
<th>Corrected Pearson r' = \frac{r}{A}</th>
<th>Weight W = N_i \times A^2</th>
<th>Error e = \frac{1-r^2}{(N-1) \times A^2}</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>194</td>
<td>0.89</td>
<td>0.87</td>
<td>0.879</td>
<td>0.273</td>
<td>0.310</td>
<td>164.27</td>
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<td>0.9</td>
<td>0.915</td>
<td>0.28</td>
<td>0.306</td>
<td>191.67</td>
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<td>0.84</td>
<td>0.859</td>
<td>0.61</td>
<td>0.711</td>
<td>36.85</td>
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</tr>
<tr>
<td>4</td>
<td>189</td>
<td>0.75</td>
<td>0.71</td>
<td>0.729</td>
<td>0.292</td>
<td>0.401</td>
<td>153.19</td>
<td>0.0054</td>
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<td>0.95</td>
<td>0.919</td>
<td>0.334</td>
<td>0.364</td>
<td>211.12</td>
<td>0.0036</td>
</tr>
<tr>
<td>6</td>
<td>173</td>
<td>0.89</td>
<td>0.93</td>
<td>0.909</td>
<td>0.633</td>
<td>0.695</td>
<td>496.69</td>
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</tr>
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<td>7</td>
<td>173</td>
<td>0.89</td>
<td>0.93</td>
<td>0.909</td>
<td>0.633</td>
<td>0.695</td>
<td>496.69</td>
<td>0.0029</td>
</tr>
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<td>8</td>
<td>4,040</td>
<td>0.95</td>
<td>0.89</td>
<td>0.919</td>
<td>0.546</td>
<td>0.594</td>
<td>257.03</td>
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<td>0.421</td>
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<td>0.0029</td>
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<td>11</td>
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<td>0.64</td>
<td>0.693</td>
<td>0.181</td>
<td>0.268</td>
<td>145.47</td>
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</tr>
</tbody>
</table>
3.2.2.1 Hypothesis testing

For testing hypothesis H1 (H1: TQM practices are significantly associated with BP), the study adopted the heuristic approach suggested by Hunter and Schmidt (1990). This heuristic is based on RATIO1 and RATIO2, where,

\[
RATIO 1 = \frac{\text{average of corrected correlation coefficient (})}{\text{standard deviation of population correlations (sqrt(e))}}, \quad \text{and}
\]

\[
RATIO 2 = \frac{\text{error variance (})}{\text{variance of corrected sample correlations}}.
\]

So, if RATIO 1 is less than or equal to 2, it can be concluded that the population correlations are less than or equal to zero. However, a value greater than 2 implied a positive correlation among the variables (Hunter and Schmidt, 1990).

In the present study, the value of RATIO 1 was found to be 3.205. Since the value was greater than the cut-off value of 2, it was concluded that firm’s performance are positively correlated with the TQM practices.

Further, RATIO 2 was determined to examine the presence of moderating effects as follows.

If RATIO2 is greater than or equal to 0.75, it can be concluded that there is only one population correlation. However, if the value is less than 0.75, it can be reasoned that the moderators do exist (Hunter and Schmidt, 1990).

In the present study, the value of RATIO2 was found to be 0.141. Since the value was less than the cut-off value of 0.75, it indicated the existence of moderators, which influence the impact of TQM practices on the firm’s performance.

<table>
<thead>
<tr>
<th>Code</th>
<th>Sample size (N)</th>
<th>Organisation performance reliability coefficient (r_{yy})</th>
<th>F-statistic (p value)</th>
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<tr>
<td>1</td>
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<td>0.87</td>
<td>F = 6.4, p &lt; 0.0001</td>
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<td>2</td>
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<td></td>
</tr>
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<td>0.84</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>189</td>
<td>0.71</td>
<td></td>
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<td>0.95</td>
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<tr>
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<tr>
<td>9</td>
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<td>0.91</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>111</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>152</td>
<td>0.64</td>
<td></td>
</tr>
</tbody>
</table>

Note: p < 0.0001, significant difference at 5% level of significance.
Further to test hypothesis H2 (H2: country/region of firm’s origin moderates the association between TQM practices and BP), analysis of variance (ANOVA) of mean value of reliability coefficients of dependent variable (that is, firm’s performance) was conducted across studies based on different nations/regions (Table 3).

The results of variance analysis suggested that there is a significant difference in the mean value of reliability coefficients of firm’s performance in studies across nations. The mean values of reliability coefficients from studies from Asia, North and South America, Africa were found be higher than those from Australia and Europe.

4 Results

The ‘combined effect’ of TQM practices on BP was investigated through meta-analysis of the selected sample of empirical studies from the quality literature. The study adopted the heuristic approach suggested by Hunter and Schmidt (1990) to drive the meta-analysis. According to this approach, if RATIO 1 (ratio between \( r' \), i.e., average of corrected correlation coefficients and \( \sqrt{e} \), i.e., standard deviation of population correlations) is more than 2, it can be convincingly concluded that the population correlations are positive. In this study, meta-analysis involving sampled empirical studies showed the value of RATIO 1 as 3.205 (above the cut-off value of 2), thus leading to the conclusion that, at aggregate level, TQM practices are positively associated with the BP. Hence the study found support for hypothesis H1. Further, for testing the existence of moderators, RATIO 2 (ratio between \( e \), i.e., error variance and variance of sample correlations) was evaluated for the selected sample of study. This heuristic approach (Hunter and Schmidt, 1990) suggested that a value less than 0.75 indicate the existence of moderation effect. For the present sample, RATIO 2 was 0.141 (below the cut-off of 0.75), leading to the conclusion that moderators exist in the relationship between TQM practices and BP. To validate the existence of ‘country/region of firm origin’ as a moderator (H2: country/region of firm’s origin moderates the association between TQM practices and BP), ANOVA was conducted to test the difference in reliability coefficient of dependent construct (i.e., firm’s performance) across studies from different countries/regions. The results (F = 6.4, p < 0.0001) supported the existence of country/region of firm’s origin as a moderator.

Despite the modest results with respect to the direct association between TQM practices and BP, the study facilitates the theory building process in this field of TQM. Of course, further exploration of interaction effects between individual TQM practices will contribute in enhanced understanding of this overall linkage (Shah and Ward, 2003). However, investigation of direct relationship is the crucial first step towards further development of theory on the success of TQM as a business strategy.

5 Conclusions

The role of TQM as a business strategy contributing to firm’s performance had been under debate over decades. Although, there is enough evidence of direct association (Jiménez-Jiménez et al., 2015; Parvadavardini et al., 2016), there are proofs of no relationships as well (Davis, 1997; Powell, 1995). Therefore, the present study adopted
meta-analysis approach to build a consensus on the relationships between TQM practices and organisational performance across the empirical studies reported in the quality literature from 2003 to 2015. The study also explored the role of organisations’ country/region of origin as a moderator in this relationship.

The results revealed that at an aggregate level there is a positive association between TQM practices and firm’s performance. Therefore, the results provide an impetus for the quality practitioners to continue to adopt the TQM practices in organisations. Further, the study highlighted the role of environment (country of firm origin) as a moderating factor in the success of TQM as a business strategy. Therefore, it is vital to align the quality management practices with the business environment (Nair, 2006).

In this study, every effort was been made to conduct an extensive review of the TQM literature to obtain reliable and valid findings with an aim to enhance the theoretical foundation of quality management. However, the study does suffer the limitation of not considering all the measurement errors in the sample studies used for the meta-analysis review. Only combined error factor (accentuation factor) was considered in the study. Further, the study considered the relationship of aggregate TQM practices with BP. The association of individual TQM practices with performance was not explored. Additionally, due to the lack of similarity among past studies with respect to sample size, construct validity, the study conducted the meta-analysis review using a modest sample size of 12.

The study also provided a direction for future research. The present study examined the association for TQM practices with firm’s performance at aggregate level. To examine the link more closely, the relationship between the individual TQM practices (leadership commitment, customer focus, employee empowerment etc.) and various performance measures can be investigated explicitly. Furthermore, the upcoming studies should also explore the role of other moderators towards the association of TQM practices on firm’s performance (Sadikoglu and Zehir, 2010; Sila, 2007).

References


TQM as business strategy


