Firm resource advantage, total quality management, SME performance: Empirical evidence from Nigerian manufacturing firms

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Abstract—Considerable research attention has been devoted to examining the relationship between total quality management and SME performance. Further, extant research has traditionally focused on examining contextual factors, such as business environment, organisational culture, firm age, and firm size as moderators between total quality management and SME performance. However, we cannot theoretically rule out the important of other moderating variables on this relationship that are yet to be explored. The current study examined whether the relationship between total quality management and SME performance depends upon firm resource advantage. Based on survey data collected from 212 SMEs, located in Kano metropolis, findings suggested that total quality management was significantly associated with SME performance. The results also indicated that the relationship between total quality management and SME performance was moderated by firm resource advantage. The implications of the results for explaining the performance of SMEs are discussed.

I. INTRODUCTION

Small and medium-sized enterprises (SME) have been identified as major drivers of economic growth, competitiveness and jobs creation, in both developed and developing countries[3, 20, 36, 45, 47]. Specifically, in Nigeria, the contribution made by SMEs to the GDP in 2015 was 35.9 percent [39]. SMEs in Nigeria also contribute 60 percent to GDP in 2014 [38]. Additionally, SMEs in Nigeria are estimated to employ more than 32.41 million persons, which represents 25 percent of employment in the country [19].

Theory and empirical studies have established a positive relationship between Total Quality Management (TQM) and SME performance [e.g., 26, 27, 28, 35]. Furthermore, in an attempt to understand the boundary condition on the ability of a firm to translate TQM into superior performance, researchers have investigated several contextual factors. For example, Joiner [29] found that the relationship between TQM implementation and organization performance are moderated by co-worker support and organization support. Wang, Chen and Chen [50] also showed that external environment factors play significant moderating role between TQM and hotel performance. Relatedly, [53] examined how contextual factors influence the relationship between quality management practices and firm performance. They found that contextual factors (both internal fit with the organizational structure and external fit with the environment) moderated the quality management practices - firm performance relationship.

Given the aforementioned empirical studies, it necessitates scholars to continue to probe potential moderator on the relationship between TQM and firm related performance to better understand the condition under which implementation of TQM result in desirable organisational performance. The present study also adopts Barney’s [6] resource based view perspective to examine intangible resource advantage as a potential moderator of the relationship between TQM and SME performance. Towards this end, section II reviews the theory and literature on link between TQM and SME performance, as well as the moderating role of intangible resource advantage on this relationship. The research method employed in study has been described in this section III. The findings of the study are then presented in section IV. Finally, section V discussed the findings of the study in terms of its implications.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A. Total quality management and SME performance

TQM has been defined as “a corporate culture characterized by increased customer satisfaction through continuous improvements, in which all employees in the firm actively participate” [12]. As indicated earlier, empirical studies have shown that TQM is positively related with SME performance [1, 10, 48]. For example, Demirbag, Koh, Tatoglu and Zaim [15] demonstrated that TQM implementation has a significant and positive relationship with SME performance. In the same Relatedly, Christos and Evangelos [10] found a significant positive
relationships between TQM and organizational performance among a sample of 370 ISO 9001:2000 certified Greek companies. In a study involving 193 firms in Turkey, Akgün et al.’s [1] showed that TQM had significant and positive effects on firm’s financial performance. There are also several other studies that established significant and positive relationships between total quality management practices and firm’s financial performance [e.g., 14, 17, 18, 26, 28, 33, 40, 46, 49, 52, 54]. Based on aforementioned empirical studies we therefore advanced the following hypothesis:

Hypothesis 1: Total quality management relates positively to SME performance.

B. Firm resource advantage as a potential moderator

What is the condition under which implementation of TQM result in desirable SME performance? One possible answer to this research question lies in the realm of firm’s resources. Research suggests that firm resources play an important role in determining firm’s ability to implement, and derive the benefits of total quality management that result in positive organizational outcomes [2]. Firm resources encompass “all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness” [6].

Although TQM is widely recognized as a means to improve organizational performance, many SMEs do not or cannot properly implement it. This is because implementation of TQM is fundamentally a resource-consuming accomplishment; implementation of TQM requires the expenditure of organizational resources, necessitating either a significant existing resources and/or the continued exploration for new resource base to translate total quality management into firm performance [2]. Thus, the implementation of TQM is dependent upon the firm's resource capacity. The higher the firm's resource capacity, the more likely it would implement TQM; and vice versa. Therefore, the following hypothesis is advanced:

Hypothesis 2: Intangible resource advantage moderates the positive relationship between total quality management and SME performance.

III. MATERIALS AND METHODS

A. Research Design and Analytical strategy

Considering the costs associated with longitudinal research design, the present study employs a cross-sectional research design in which the data were analysed and interpreted statistically, while drawing conclusions about the study’s population at one point in time [42, 44]. Partial Least Squares path modeling in conjunction with SmartPLS software 2.0 [43] was used to test the hypotheses.

B. Procedure and Sample

We employ a convenience sampling to collect data for this study using self-administered questionnaires that were distributed to 248 SMEs operating in manufacturing industry within Kano metropolis in Nigeria. Specifically, the questionnaires were completed by CEOs and senior level managers in these firms because we believe that they have a clear picture of their entire firm [32]. To increase the response rate, the questionnaires were sent along with a cover letter that ensured the anonymity of the participants. Of the 248 questionnaire sent, only 212 were completed by the participants, which yielded a response rate of 85%. In terms of demographic profile of the 212 participating SMEs in this study, 11.3 percent were sole proprietorship, 35.4 percent were partnership form of business organisation and 53.3 percent were incorporated as limited liability companies. Regarding the firm size, 4.2 percent of the participating firms employ less than 50 employees, 54.2 percent employ between 50 and 99 employees and 20.8 employ between 100 and 249 employees. About 11 percent of the participating firms employ between 250 and 499 employees, and the remaining 9.4 percent employ 500 or more employees. In terms of industry of the participating firms, 21.7 percent were operating in Food and beverages industry, 8 percent operate in packaging/containers industry, 10.4 percent operate in metal and metal products industry. Additionally, about 45 percent operate in printing and publishing industry, another 7.1 percent were into agro-allied business, and 2.8 percent operate in building materials. Finally, 5.2 percent of the participating firms were regarded as those that operate in other industries not indicated above.
C. Measures

**Total quality management.** We adapted seven items from the works of Chenhall [7] to measure TQM. The items in this scale reflect the extent to which their firms have implemented programmes over the past three years to improve the quality of products and processes, efficiency, minimizing waste, as well as involving employees in the continuous improvement. Ratings were completed using a seven-point Likert scale ranged from 1 = *strongly disagree* to 7 = *strongly agree*. Sample item was: “Our firm implements programs to improve the quality and reliable delivery of materials and components provided by suppliers”.

**Firm resource advantage.** Firm resource advantage was assessed using a five-item intangible resource advantage scale developed by Anderson and Eshima [2]. Participants were asked to respond to the items regarding the degree to which their firms enjoy an intangible resource advantage relative to their competitors. Ratings were completed on 7-point Likert scale (1 = "significant disadvantage" to 7 = "significant advantage"). Sample item was: “Special skills owned by specific engineers/researchers”.

**SME performance.** Six-items were used to assess a broad range of SME’ performance indicators. Of these items, five were adapted from the work of Powell [41], and the remaining item was drawn from Baker and Sinkula [5]. Ratings were based on a seven-point Likert scale ranged from 1 = *strongly disagree* to 7 = *strongly agree*. Sample item was: “Over the past 3 years, financial performance of our firm has exceeded our competitors”.

IV. RESULTS

The PLS path modeling estimation results are structured according to the measurement model and structural model. Furthermore, measurement model results (Table 1) are based on the indicator reliability, internal consistency reliability, convergent validity, and discriminant validity [8, 51]. On the other hand, the structural model results are assessed based on the significance of path coefficients, level of R-squared values, and the predictive relevance of research model [25].

A. Measurement Model

Following Hair, Hult, Ringle and Sarstedt [24], indicator reliability was established by examining the outer loadings of each construct’s measure; and a loadings between 0.40 and 0.70 should be retained. As indicated in Table I, of the 18 items in the measurement model, only 2 items were deleted due to loadings below 0.40. Hence, the remaining 16 items with loadings between 0.538 and .874 suggest adequate indicator reliability. We then established internal consistency reliability by inspecting the composite reliability of each construct’s measure. Methodologically, internal consistency reliability is said to be established if composite reliability of each construct’s measure is .70 or higher [8]. Again, the results of the measurement model Table 1 suggest adequate internal consistency reliability because the composite reliability co-efficient of each construct’s measure exceeded the threshold of .70.
TABLE I
RESULTS OF MEASUREMENT MODEL

<table>
<thead>
<tr>
<th>Latent variables/items</th>
<th>Loadings</th>
<th>Composite reliability</th>
<th>Average variance extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total quality management</td>
<td>0.908</td>
<td></td>
<td>0.628</td>
</tr>
<tr>
<td>TQM02</td>
<td>0.874</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQM03</td>
<td>0.825</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQM04</td>
<td>0.538</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQM05</td>
<td>0.856</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQM06</td>
<td>0.761</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TQM07</td>
<td>0.849</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm resource advantage</td>
<td></td>
<td>0.873</td>
<td>0.632</td>
</tr>
<tr>
<td>FRA01</td>
<td>0.849</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRA02</td>
<td>0.844</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRA03</td>
<td>0.751</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRA04</td>
<td>0.729</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME performance</td>
<td>0.928</td>
<td></td>
<td>0.683</td>
</tr>
<tr>
<td>SME01</td>
<td>0.818</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME02</td>
<td>0.829</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME03</td>
<td>0.799</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME04</td>
<td>0.871</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME05</td>
<td>0.772</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SME06</td>
<td>0.867</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To establish the convergent validity of each construct’s measure, Average Variance Extracted (AVE) should be 0.5 or higher [4]. Following Bagozzi and Yi [4], the AVE values of each construct’s measure in Table I exhibited high loadings above .50, which indicates adequate convergent validity. Finally, discriminant validity is established using Fornell and Larcker’s [22] criterium, if square root of AVE of each latent variable is greater than the correlations among the latent variables. As indicated in Table II, the square root of AVE of each latent variable is greater than the correlations among the latent variables, as such, discriminant validity is established.

TABLE II
RESULTS OF DISCRIMINANT VALIDITY

<table>
<thead>
<tr>
<th>Latent variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total quality management</td>
<td>0.792</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm resource advantage</td>
<td>-0.365</td>
<td>0.795</td>
<td></td>
</tr>
<tr>
<td>SME performance</td>
<td>0.250</td>
<td>0.275</td>
<td>0.827</td>
</tr>
</tbody>
</table>

Note. Entries shown in bold face represent the square root of the average variance extracted.

B. Structural Model
Following Hair, Hult, Ringle and Sarstedt [24], as well as Chin [9], the structural model was evaluated based on the following criteria: algebraic sign, significance of the structural path coefficients, $f^2$ values, $R^2$ values, and assessment of PLS estimates at the construct level ($Q^2$ values). We used bootstrapping with 5000 resamples was used to generate beta values, standard errors, t-values, and p-values. The full results of structural model are presented in Figure II and Table III. As indicated in Table III, the algebraic signs (beta values) in the direct effect model was positive, which is consistent with the first three research hypotheses were formulated. Accordingly, the positive beta values direct effect model suggests that Hypotheses 1, the relationships between TQM and SME performance is positive. Regarding the significance of the structural path coefficients, all hypotheses postulated and tested, H1, and
H2, were statistically significant (Table 3). Specifically, a significant positive relationship between TQM and SME performance was found ($\beta = 0.452$, $t = 3.897$, $p< 0.01$). Accordingly, Hypotheses 1 was supported. Similarly, Hypothesis 2, which predicted that intangible resource advantage moderates the positive relationship between TQM and SME performance, was also supported ($\beta = 0.354$, $t = 5.793$, $p< 0.01$).

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Relations</th>
<th>Beta</th>
<th>SE</th>
<th>t-value</th>
<th>p-value</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>TQM -&gt; SME performance</td>
<td>0.452</td>
<td>0.116</td>
<td>3.897</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>TQM * FRA -&gt; SME performance</td>
<td>0.354</td>
<td>0.061</td>
<td>5.793</td>
<td>0.000</td>
<td>Supported</td>
</tr>
</tbody>
</table>

$R^2$ (Main Effect Model) 22%

$R^2$ (Moderating Effect Model) 34%

$f^2$ (Main Effect Model) 0.171

$f^2$ (Moderating Effect Model) 0.179

$Q^2$ (Main Effect Model) 0.144

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

TQM = Total quality management, FRA = Firm resource advantage, SE = Standard Error

Additionally, following procedures recommended by Dawson and Richter [13], information from the structural model results was used to plot a graph depicting the moderating effect of firm resource advantage on the relationship between TQM and SME performance. Figure I demonstrates that the relationship between TQM and SME performance is stronger (i.e. more positive) when a firm with resource advantage relative to its competitors.

![Figure I. Full Interaction Effect of TQM and FRA on SME performance.](image)
As shown in Table III, we also ascertained the strength of the effect of TQM on SME performance, as well as the strength of moderating effect of firm resource advantage based on Cohen’s [11] effect size determination criteria. Cohen [11] categorized effect size based on small, medium, and large effect sizes with $f^2$ values of 0.02, 0.15 and 0.35, respectively. Thus, based on this categorization of effect size, it can be seen in Table III that TQM on SME performance was 0.171, which can be considered as medium effect size. Furthermore, the results of moderating effects size are reported (Table III) was also as expected. In particular, Table III indicated that the strength of the moderating effect of firm resource advantage on the relationships between TQM and SME performance was 0.179, suggesting medium effect size.

Regarding the coefficient of determination, Table III presents the R-squared values of the main effect structural model, as well as the moderating effect structural model. As shown in Table III, the coefficient of determination for the main effect PLS model was 0.217. This suggests that the two sets of exogenous latent variables (i.e., TQM and FRA) collectively explain 22% of the variance in SME performance. In the same vein, Table III showed that the coefficient of determination for the moderating effect PLS model was 0.336. This suggests that after computing the interaction terms, the exogenous latent variables collectively explain 34% of the variance in SME performance. Taken together, the coefficients of determination for both the main effect PLS models, as well as the moderating effect PLS model can be considered acceptable based on Falk and Miller’s [21], who suggested a minimum acceptable levels of R-squared value to be 0.10. Finally, we applied Stone-Geisser test of predictive relevance to assess model fit [23]. Results of Stone-Geisser test of predictive relevance ($Q^2$) are presented in Table III. As shown in Table III, the Crossvalidated redundancy ($Q^2$ value) for endogenous latent variable (SME performance) was 0.144, suggesting that the structural model in this study has predictive relevance [24].

V. DISCUSSION

The main objective of the present study was to examine the moderating role of firm resource advantage on the relationships between TQM practices and SME performance. Based on the main objective of this study, two hypotheses formulated were tested and the results of the PLS path modeling provided support for the two hypotheses. It could be recalled that the present study sought to assess the influence of TQM on SME performance. TQM was found to have a significant influence on SME performance. This denotes that firm that implements total quality management is able to achieve sustainable business performance. This findings was very much similar to the previous studies in the literature TQM, including Akgün, Ince, Imamoglu, Keskin and Kocoglu [1], Dubey and Gunasekaran [17], Herzallah, Gutiérrez-Gutiérrez and Munoz Rosas [26], Lee and Lee [35], Yunis, Jung and Chen [52], and Zhang and Xia [54], and Jaca and Psomas [28].

Regarding the moderating role of firm resource advantage, extant research has argued that resources endowed by a firm play an important role in determining its ability to implement, and derive the benefits of TQM that result in positive organizational outcomes [5]. Given the limited number of research examining the moderating role of firm resource advantage on TQM – SME performance relationship, it behooves scholars to continue to probe potential
moderator on this relationship. As mentioned earlier, the present study established that firm of resource advantage moderated the relationship between TQM and SME performance. Accordingly, this result suggests that while TQM is widely recognized as a means to improve organizational performance, however, many SMEs do not or cannot properly implement it. This is because implementation of TQM is fundamentally a resource-consuming accomplishment; implementation of TQM requires the expenditure of organizational resources, necessitating either a significant existing resources and/or the continued exploration for new resource base to translate total quality management into firm performance [2]. Hence, the implementation of TQM is dependent upon the firm's resource capacity. The higher the firm's resource capacity, the more likely it would implement TQM; and vice versa.

A. Practical Contributions

The results of this research provided important insights on how total quality management and firm resource advantage could enhance the overall performance of SMEs in Nigerian manufacturing sector. Subsequently, the results of this study would serve as a blueprint for the policy-makers and practitioners in formulating vital policies that could assist and help in improving the overall performance of SMEs. The findings suggested that managers of SMEs require working alongside strategic business units, including marketing and quality assurance departments to design relevant policies that help in promoting customer satisfaction and firm performance [33, 34]. Furthermore, the findings of this study imply the need to encourage employees’ involvement and participation in the implementation of TQM. This could be achieved by developing formal reward and recognition systems in order to encourage employee involvement and participation, provide feedback to the employees, as well as support teamwork [15]. This finding also suggests the need for commitment of top management in the implementation of total quality management. The top management of SMEs should develop an appropriate organisation culture, vision, and quality policy in order to satisfy customer expectations and improve their organizations’ performance [15].

B. Limitations and future research directions

Despite its contributions, the present study has a number of limitations that merit discussion. First, SME performance data used in the present study was only perceptual or subjective. Although researchers [e.g., 30, 31] showed that subjective measure of firm performance is valid and reliable proxies for objective measures, however, objective measures of firm performance has been found to be relatively free from measurement error [16, 37]. Therefore, future research could incorporate objective measures of SME performance in order to replicate the findings of the current study. Second, the present study offers quite limited generalizability because it focused mainly on SMEs in Nigerian Manufacturing sector, particularly those located in Kano metropolis. Thus, future research is needed to include SMEs in other sector of the economy or geo-political zones in order to generalize the findings. Furthermore, future research could study and compared Manufacturing sector with other sector including banking sector, and real estate industry. Finally, the present study employed a cross-sectional design. One major weakness of cross-sectional design is that it does not allow causal inferences to be made from the population. Hence, given the shot coming of cross-sectional design, future research is strongly needed using longitudinal research design in order to measure re-examine the relationship between total quality management and SME performance by collecting data at different points in time to confirm the findings of the present study.

C. Conclusion

The present study demonstrated that firm resource advantage is an important boundary condition on the relationship between TQM and SME performance. In conclusion, the present study has extended our knowledge of the underlying factors explaining SME performance, which has focused specifically on total quality management and firm resource advantage. The results are notable because they are well grounded in aspects of the literatures on total quality management. Thus, total quality management and firm resource advantage interacted together to influence SME performance.

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