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Research Paper

The moderating role of Research and development onCompetitive strategy and manufacturing performance relationships

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ABSTRACT: *Reports has it that performance of Manufacturing sector of the Nigerian economy hasbeen fallen consistently over the years. As such it negatively affects the country's unemployment rate, gross domestic product and industrial development. This has attracted a lot of research attention by both academics and policymakers. The objective of this research is to investigate the direct relationships between cost-leadership, differentiation strategies and Manufacturing performance. Andalso to determine the extent to which these relationships are influenced by Research and Development. Adapted questionnaire was distributed to managers of each manufacturing firms who are member of the manufacturers Association of Nigeria MAN. 309 of the 319 questionnaires received were analysed.SPSS version 23 was used to carry out the preliminary analysis and hierarchical regression. The findings indicate that there is significant positive relationship between cost-leadership strategy, differentiation strategy and manufacturing performance. However, Research and Development failed to moderate these relationships.*

KEY WORDS:*Differentiation strategy, Cost-leadership strategy, R & D and manufacturing performance*

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I. INTRODUCTION

Research findings show that Manufacturing sector playskey roles in shaping and defining the core path to industrialization not only in developing countries such as Nigeria but the world over.The contributions of the sector include; employment generation, growth enhancement and wealth creation [1], [2]. However, the decline in performance of the sector in recent years which cut across different contexts attracts a lot of attention of the policy makers, investors and researchers [2], [3], [4]. Globalization and economic integration have brought about serious competition which in consequence gives upper hand to firms with better competitive advantage than others [5]. Adoption of competitive business strategies have been identified as a crucial root to gaining competitive advantage to improve performance [6], [7]. Various typologies of Business strategy have been propounded by different researchers. For instance, [8] divided firm level strategy into; Prospectors, defenders, analysers and reactors. Also, Cost leadership, differentiation and focused strategies are other popular typology put forward [9].Another competitive strategy typology introduced covers; Develop, stabilize, turnaround and harvest[10]. This paper therefore adopted [9]'s Cost leadership and differentiation strategies.

The objective of this research is to investigate variations in performance in the context of Nigerian manufacturing sector and also to determine the moderating roles of Research and Development capabilities on the relationships.

II. LITERATURE REVIEW.

2.1 Competitive business strategies

Business strategy has been described as a combination of decisions and actions taken and implemented with a view to achieving company performance better than competitors [11]. Porter's generic strategy have been suggested for solution to Businesses facing challenges related to firm level variations in performance within the same industry and context such as the manufacturing sector in Nigeria[12]–[14]. To this end, a number of research works have been conducted to address differences in firm performance in various industries using cost leadership and differentiation strategies. These include; transport sector[13], hotel industry [12], agricultural

sector [14] and a host of others. The literature indicates that little attention was paid to manufacturing firms in developing countries specifically, sub-Sahara Africa. This paper used the two of Porter's generic strategies. Cost leadership and differentiation strategies to examine their relationships with manufacturing performance within the manufacturing sector in Nigeria.

2.2 Manufacturing performance

Manufacturing firms are faced with different dimensions in performance due to divergent objectives from different stakeholders such as the directors, managers, employees and customers. Firms may have difficulties in conceptualizing the performance of their organizations since the stakeholders in such firms tend to perceive firms performance from different angles based on their individual or group interests [15]. To address the firm objectives emanating from various interest groups, this study adopted a comprehensive measure of performance that combined both financial performance and non-financial performance measures from the work of[16]. This is in line with the suggestion of [17] in which researchers have been encouraged to use subjective measures of performance that covers; profitability performance, growth performance, market value performance, employee performance and a host of others

2.3 Competitive business strategy and manufacturing performance

Cost leadership is the first competitive strategy in this study. The strategy is aimed at achieving low cost of production by a firm better than its competitors in the same industry. This is usually accomplished through investment in production facilities, process technology, waste avoidance and careful monitoring of total operating costs[18]. Many research findings have established the positive contributions of cost leadership strategy to manufacturing performance. For example, [19]found significant positive relationship between cost leadership and performance among 12 participating manufacturing companies listed the Jakarta Islamic index from 2014 to 2018. Similar finding was reported in an investigation conducted in Kenya among 222 participating medium-scale miners in which application of cost-leadership strategy was found to be responsible for reduced cost of production, increased output and profitability [20].

The second is differentiation strategy which concerns production and distribution of distinct products or services within the same industry to customers. The strategy is usually based on various dimensions such as product quality, brand image, innovativeness and firm reputation. These unique features must however not be easy to copy by the competitors [21]. Previous research outcomes indicate positive contributions of differentiation strategy to manufacturing performance. For instance, [22] found differentiation strategy to have significantly contributed positively to firm performance. However, the participants were drawn from customers of only one company. This limits the generalization of the finding. Finding from another research in [23] reported that significant contribution of differentiation strategy to performance among small business enterprises in Nigeria. Never the less, only 25 respondents out of 135 participants belonged to manufacturing sector. Similarly differentiation strategy was reported to have significantly contributed to variations in real earnings among 65 manufacturing companies quoted on the Indonesian stock exchange [24].In line with the findings this paper therefore inferred that that:

H1: Cost leadership strategy has significant positive relationship with manufacturing performance in Nigeria.
H2: Differentiation strategy makes positive and significant contribution to manufacturing performance in Nigeria

2.3 The moderating roles of Research and Development

Even though, most outcomes of researchwork on competitive strategy relationship with manufacturing performance were positive, the extent of their positivity or strength still remains a source of concern. While most of the findings indicate significant positive relationship of both cost leadership and differentiation strategies on performance [11], [13], [25], [26], few empirical research findings has also indicated significant negative or insignificant relationship between these generic strategies and performance [27], [28]. These results give clear indications that investigations into variations in differentiation and cost-leadership-performance relationship is inconclusive. As such there is a need for introduction of a moderating variable. Research and development have been considered to serve this purpose. Competitive advantage gained from both cost leadership and differentiation strategies are mostly derived from research and development investment and activities [29].

[30] tries to distinguish research and development. While research is usually being targeted at improvement in productivity, development is normally aimed at increasing firm profitability. It therefore concluded that both R & D are complementary expenditures and efforts that create competitive advantage. Extant literature has revealed that research development expenditure makes immense contributions to manufacturing performance using various dimensions such as innovation and new product development, more efficient production process and higher value creation. For example, R & D innovation was found to have significant positive relationship with corporate performance in an investigation conducted in China where panel

data that covered 2007 and 2019 was used [31]. In a similar development,an investigation conducted in Taiwan between 2000 and 2015, it was reported that manufacturing firms that commit more resources to research and development perform better than their competitors that invest less on innovation activities [32]. Investment on research and development does not only leads to improvement in the firm present performance, it also builds prepare grands for future benefits [33]. Based on the reported reports this paper hereby hypothesized that;

H3: Research and Development capability is significantly related to Manufacturing performance

H4: Research and Development capability moderates the relationship between cost leadership strategy and Manufacturing performance.

H5: Research and Development capability moderates the relationship between differentiation strategy and Manufacturing performance

III. RESEARCH METHOD

3.1 Data collection

Quantitative survey was utilized among manufacturing companies that constituted members of Manufacturers Association of Nigeria MAN within the southwest geopolitical zone of Nigeria. Stratified random sampling was used based on the segregation the companies into 10 sub-sectors by MAN. Following the sampling tables of [34], 300 samples were considered enough. However, taking into cognizance the official responsibilities of the target respondents, poor response was anticipated. This research therefore, increased the sample by 100 percent (600) in line with the suggestion of [35]. The questionnaire was adapted from two different sources [16], [36]. The survey instrument was categorized into two sections: Sections one covered the respondents' demographic data. While section two concerned cost leadership and differentiation strategies and research and development and performance related questions. Out of 319 questionnaire that were returned, 309 were eventually considered useful for further analysis.

3.2 Respondents' profile

The features of the officers or representatives of the selected manufacturing companies that responded to the distributed questionnaires include; gender, highest academic qualifications and office designations. It indicated that about 82.% of the respondents were male while the remaining were females. It also showed that the largest population of the respondents (45%), have academic as well as professional qualifications. More, majority (44%) of them were owner-managers followed by managers with 40% of the participants.

3.3 Profile of the sample firms

This aspect of the profile gives detailed characteristics of the selected manufacturing companies that have participated in the research based on their ages, industry classification, annual income and their staff strength. The results indicates that the oldest manufacturing companies (30 years and above) that responded were the least with only about 2%. While those with the highest and second highest are between the ages of 20 and 20, 10 and 19 with 46.6% and 42.2% respectively. Concerning the industry classification, chemical and pharmaceutical companies have the highest number of respondents of 19.2% strictly followed by the food and tobacco sub-sector with 18.5%. While the lowest of them are those companies that are into non-metallic mineral products with just 2.9%. Lastly, looking at the respondents from company sizes measured in number of employees and annual income, the result indicated that 54.6% of them fall into the SME category and they have the highest number of respondents. While large companies among the participants were 16%. And the remaining 29.4% are the micro-size enterprises.

3.4 Preliminary analysis

The objective of preliminary data screening in any multiple regression research is to enhance a better understanding of the researcher on the nature of the data to be used for analysis. Initial data screening also assist the researchers in identifying the likely violations of any of the key assumptions guiding the application of the multiple regression analysis [37]. The outcome of the initial data screening in this research, lead to identification of six unusable questionnaires The common method of estimating internal consistency reliability is the Cronbach's alpha. It is a diagnostic measure of internal consistency which is commonly used in management research [16]. In this paper, Cronbach's alpha has been used to examine the reliability of the scales and the findings indicate that the two independent variables cost-leadership strategy and differentiation strategy have coefficients of .0.88, 0.82. While the dependent and moderating variables have coefficient of 0.87 and 0.81 respectively which fall within the acceptable region of 0.7 and above [38]. The data have also been subjected to series of tests and it has satisfied normality and other conditions that are necessary for parametric techniques.

3.5 Test of Hypothesis

This section contains the findings of hypothesis testing for this study. The analyses of relationship were performed using hierarchical regression technique. The tests were carried out following three steps. In the first step, regression was run to assess the existence ofdirect relationship between the 2 independent variables that is cost-leadership and differentiation strategies on manufacturing performance. The second step was running the regression of the 2 IVs plus the moderating variable MDV that is Research and development on the DV. The third step was regressing the all the variables plus the interaction variable. The regression analysis was conducted in line with the stated hypothesis. Pearson correlation analysis was specifically utilized to offer clear understanding regarding the strengths of the relationship between the variables [38]. To understand the relationship between the independent and dependent variables for this study, multiple regression analysis was initially conducted to examined the relationship in the first two hypotheses cost-leadership strategy and manufacturing performance (H1) and differentiation strategy and manufacturing performance (H2). The results of the regression analysis indicated that hypothesis H1 and H2are positively significant at level $p < 0.001$. Similarly, Research and Development-manufacturing relationship (H3) was also significant at $p < 0.001$ level of significant. However, the variable failed to moderate the dependent variable (H4 and H5). These findings therefore implied that Hypothesis 1, 2, and were supported. While H4 and H5 have not been supported.

Table 1*Hierarchical Regression for Moderating Effect of Research and Development*

Variables in the models	Model 1 Independent variables	Model 2 Moderating variable	Model 3 Interaction variables
Cost leadership strategy	0.000***	0.025	0.044
Differentiation strategy	0.000***	0.000	0.148
Research and development capabilities	-	0.000***	0.087
Cost-leadership strategy*R&D capabilities	-	-	0.324
Differentiation strategy*Technology cap	-	-	0.107
F change	393.292	28.185	1.360
Sig F change	0.000	0.000	0.258
R^2	0.720	0.744	0.746
Adjusted R^2	0.718	0.741	0.742
R^2 change	0.720	0.024	0.002

From table 1 above, the coefficient of determination R^2value in models 1, 2, 3 are 0.72, 0.744 and 0.746 respectively. The implication these are that the combined contribution of the two independent variables to manufacturing performance in this research is 72 per cent. The contribution increased to 74.4 per cent when moderating variable R& D was added and re-ran in model 2. In addition to that, it rose up to 74.6 per cent when the two interaction variables were added and re re-run for the third time as shown in model 3. These are indications of good model fit.

IV. DISCUSSION AND CONCLUSION

The results of this study provide evidence that confirm previous findings regarding cost-leadership-performance and differentiation strategy-relationships reported in various industrial and geographical contexts [19], [20], [39]. It indicated that implementation of the two generic strategies is capable of improving manufacturing performance in Nigeria like other countries wheresimilar investigations were conducted. The analysis further shows that even though research and Development is an essential factor that account for variations in manufacturing performance it however not strong enough to moderate the strategy-performancerelationship. Failure of Research and Development to moderate service as a moderator may be as a result of high cost conducting research in this country or the futuristic nature of benefits associated with research outcomes.

Despite the number of important contributions highlighted in this study regarding the performance of manufacturing companies, this work has several limitations that need to be addressed. The main limitation of this study is that it has used cross-sectional design for the survey of respondents in which the perception of participants was captured at one specific period of time. Thus, the design by nature is restricted in proving causal relationships between the variables [40]. Since the data was collected at one time, this might not permit the data to represent long-term behaviours of the firms. In view of these restrictions, a longitudinal study is suggested for future research. This may help researchers to get more understanding on the subject matter and validate the findings from cross-sectional studies. More so, the two hypotheses concerning moderations were not supported by the findings, there may be some other interaction variables and possible intervening variables not covered by this study. This research therefore recommends that future research may consider looking at other moderators and likely mediators that are tend to play significant role on those relationships

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