

Influence of Technological Environmental Factors on the Strategic Choice of Quoted Manufacturing Firms in Nigeria's Food and Beverage Industry

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Abstract

This study explores the influence of technological environmental factors on strategic choice of business organizations. It examines the relationship between technological factors and organisational choice of multi-product marketing strategies of quoted manufacturing firms operating in the food and beverage sector in Nigeria. Survey research design was used to collect the required primary data for this work and appropriate sample size determination formulae were used to arrive at six firms and 159 management staff for the investigation. The primary data was collected through a multi-options and likert scale questionnaire that was administered on the management staff of the six studied firms. The study utilized simple regression technique to analyse the data. The findings indicate that technological environmental factors prompted quoted manufacturing firms in the food and beverage industry to adopt multi-product marketing strategies. It recommends that responsible managers in Nigerian food and beverages industry desirous of success in their operating environment should pay particular attention to technological factor dynamism such as technological invention, advancement in technology, availability of the state of the art technology, nature of technological changes and diversity of technology in the manufacturing firms' operating environment.

Keywords: Technological Environmental factors, Strategic choice, Multi-product Marketing Strategy, Quoted Manufacturing Firms.

1.0 Introduction

Business organisations the world over are sufficiently environmental dependent and environmental serving because they do not exist in a vacuum. They depend on their environment for plethora of issues ranging from input resources such as information, ideas, raw materials, finance and labour among others, to the consumption of finished goods or services by the environment. Besides, their activities are also influenced and shaped by such environmental forces as social, economic, technological, competitive, and regulatory forces. Therefore, to succeed and achieve organisational objectives, business organisations adopt strategies that align them properly with operating environment, the aim of which is to avoid any mismatch between the organisation and its environment. So, for business firms in general and manufacturing firms in particular to succeed in their operating environment, they need to formulate and adopt appropriate policies and marketing programmes. In order for a manager to remain useful and relevant, he/she must be able to help shape and implement new strategies and new managerial processes and activities by understanding the socio-political, economic, technological and other forces at work (Aluko et al 1998).

Therefore, no organisation survives by being complacent and no organisation folds its hands without thinking of a well thought out marketing strategy. Little wonder that organisations are now intensifying their marketing efforts to be market leaders by bringing out new products (Aremu, 2003). Hall (1995) observed that it has been generally accepted or assumed within strategy literature that strategy type impacts on performance. Also, the environment of business and the strategy to adopt have been hypothesized and demonstrated empirically to have significant impact on organisational performance (Porter,1980 and Schever, 1980).

Porter (1981) also examined the linkage between environment and organisational performance and discovered that the environment is the primary determinant of organisational performance. Observers of Nigerian business environment stress that in spite the government's effort to promote core/ strategic industries in the country, the efforts have been confronted with a myriad of environmental factors which explains why manufacturing sector has performed below expectation (Mustapha 2007, Oviemuno, 2006, and Oshodi, 2006). Manufacturing firms are vulnerable to changes in their operating environment in many ways and these have great consequences on their operations. As a result of this vulnerability, manufacturing firms are required to be proactive firms, that is, to formulate and adopt appropriate marketing strategies as this will enable them to withstand their vulnerability to environmental risks such as changes in consumer needs, technological advancement, economic factors, political factors, socio-cultural factors and competitors' activities.

Thus, this study examines how the vulnerability of the quoted manufacturing firms in Nigeria's food and beverage industry to technological environmental factors prompts them to adopt multi-product marketing strategy. It was provoked by the paucity of empirical studies that specifically investigate the effect of technological environmental factors on the strategic decisions of manufacturing firms in Nigeria. Although, there are empirical studies in Nigeria that have assessed the impact of environmental factors on the performance or strategic decisions of business organisations in general such as Aluko (2005), Mustapha and Olatunle (2010), Eseroghene (2011), and Mustapha and Ekpunobi (2011), these studies are too broad in scope as the focus of their investigation is all the environmental factors put together, as such their studies have not adequately assessed the influence of technological environmental factors on strategic decisions or operations of business organizations. Hence, this study fills this gap by investigating the influence of technological environmental factors on the strategic decision of manufacturing firms in food and beverages sector of Nigerian Stock Exchange.

The central question this study specifically seeks to address is; *Does technological factor prompt manufacturing firms to adopt multi-product or diversification marketing strategy?* The remaining part of this paper is divided into six sections; the second section reviews extant literature on the subject matter, while third section deals with the methodological issues adopted in the conduct of the study. The fourth section presents the results of the study and the discussion of the results is contained in section five. Section six draws conclusion, while section seven makes recommendations.

2.0 Literature review

Business or marketing environment does not have definitional problematic like many terms in marketing. There seems to be consensus among the writers on its meaning. They seem to concur that business or marketing environment is the sum total of the physical and social forces and institutions that are relevant to organisational goal setting and goal attainment which are taken directly into consideration by members of the organisation when making business decisions and plans. This environment partly determines how the organisations perform, (Osuaagwu, 2009 and Obasan, 2001).

Thus marketing environment refers to the opportunities and challenges in a business operating environment which may impact positively or negatively on its operations and performance. In fact, business organisations and their environment are in mutually inter-dependent interaction with one another. A business organisation exists in the world of resources, opportunities, and limits. It can survive and thrive only when the environment desires its output of goods and services and is prepared to approve and endorse its activities. That is why Imaga (2003) and Ilesanmi (2000) pointed out that a business organisation does not exist in a vacuum. Business organisations live within the environment and can only survive, grow and expand when they continuously adapt and respond on time to their environment. Hence, marketing environment establishes the parameters within which companies must operate, but their success is a function of their interaction with each other as upon their interpretation of, and adaptation to the general environment (Baker, 1992).

According to Anugwom (2005), Kotler, (2003), Ilesanmi, (2000), Ekponubi (2008) and Osuaagwu (2009) an organisation must be in tune with its external environment to be successful overtime. There must be a strategic fit between what the environment wants and what the firm has to offer as well as between what the firm needs and what the environment can provide. Furthermore, to Osuaagwu, (2009), Ekpunobi, (2008), Anugwon (2005), Ogundele (2005), Kotler (2003), Imaga (2003), Stoner et al (2002), and Wilson, et al (1992), external environmental factors that influence business organisations' operations can be categorized into economic factors, socio-cultural factors, political and legal factors, technological factors, competitive factors, ecological factors, demographic factors etc.

However, this study specifically investigates the influence of technological factors on the strategic decisions of manufacturing firms. Technological environment is perhaps the most dramatic factor now shaping our destiny. Technology is the process of transforming scientific discoveries into realities. According to Kotler and Armstrong (2005) every new technology replaces an older technology and that technological environment is highly dynamic as new technologies render old ones obsolete while it also creates new markets and opportunities. Also, Thompson and Martin (2010) pointed out that technology in one respect is part of the organization and it is used for the creation of competitive advantage. Technological breakthroughs can create new industries which might prove a threat to existing organizations whose products or services might be rendered redundant, and those firms which might be affected in this way should be alerted to the possibility. Equally, new technology could provide a useful input, perhaps in both manufacturing and service industries, but in turn its purchase will require funding and possibly employee training before it can be used (Thompson and Martin, 2010).

In the views of Babatunde, and Adebisi (2012) technological factors include technological aspects such as research and development activity, automation, technology incentives and the rate of technological change. They can determine barriers to entry, minimum efficient production level and influence outsourcing decisions. Furthermore, technological shifts can affect costs, quality, and lead to innovation. Specifically, this study investigates how technological invention, advancement in technology, availability of the state of the art technology, nature of technological changes and diversity of technology affect strategic decisions of manufacturing firms. A technological innovation can have a sudden and dramatic effect on the environment of a firm. Firstly, technological developments can significantly alter the demand for an organisation's or industry's products or service (Barnat, 2005, and Business teacher, 2012). According to Barnat (2005) technological change can decimate existing businesses and even entire industries, since it shifts demand from one product to another. Moreover, changes in technology can affect a firm's operations as well its products and services. He further said these changes might affect processing, methods, raw materials and service delivery. Therefore, marketers should keep track of the advancement and invention in technology, nature of changes in technological environment as well as the diversity in technology in their operating environment.

It is this aspect of marketing environment, that is, external or uncontrollable environment which is of interest to this study. Indeed, the study specifically investigated how happenings in the technological environment influence the choice of operational strategy of manufacturing firms in food and beverage sector of Nigerian Stock Exchange. In line with this, Osuagwu, (2009) argued that firms that stand their vulnerability to these external environmental factors must possess many uncommon characteristics including an adaptive and flexible managerial style, a balanced portfolio of products, and a well-developed intelligence and information system designed to monitor and anticipate environmental changes. Furthermore Ansoff (1988) suggests that the more turbulent the environment is, the more aggressive the firm must be in terms of competitive strategies and entrepreneurialism or change orientation if it is to succeed.

Marketing strategy refers to a set of objectives, policies and rules that guide the organisation's marketing efforts over time. This involves responses to changing environment and competitive conditions, employing all the resources of an organisation towards attaining the desired goals in terms of sales, pricing and distribution (Olujide and Aremu, 2004). Strategy is a link between an organisation and its environment and it must be consistent with the goals, values, the external environment, resources, organisational structure and system (Ansoff and McDonnell 1990). Diversification or multi-product marketing strategy is a means by which a firm expands its business or product into other products or markets (Aaker, 2004, Dacin and Smith, 1994, Laforet and Saunders, 1999 and Morgan and Rogo, 2008). Essentially, diversification involves substantial change in the business definition - singly or jointly in terms of customer function, customer groups or alternative technologies of one or more of a firm's businesses (Kazmi, 2008, and Kotler, 2003).

Diversification growth strategies make sense when good opportunities can be found outside the present businesses. A good opportunity is one in which the industry is highly attractive and the company has the mix of business strengths to be successful (Kazmi, 2008, and Kotler and Keller, 2009, and Kotler, 2003). Multi-product or diversification is a form of corporate strategy for a company. It seeks to increase profitability through greater sales volume obtained from new products and new markets. Diversification can occur either at the business unit level or at the corporate level.

Thus, multi-product or diversification marketing strategy simply refers to a situation where a firm due to certain reasons such as poor performance, desire for increase sales or profits decides to venture or expand into new products and or markets.

There are three types of diversification or multi-product strategy and these are concentric, horizontal and conglomerate (Kazmi, 2008, and Kotler, 2003). However, this study examines the concentric and conglomerate multi-product or diversification strategy. Concentric multi-product or diversification strategy consists of a company seeking to add new products that have technological and/or marketing synergies with the existing product line and these products will normally appeal to new classes of customers. This means that there is a technological similarity between the industries, which implies that the firm is able to leverage its technical know-how to gain some advantage (Kazmi, 2008, and Kotler, 2003). Concentric diversification occurs when a firm adds related products or markets. The goal of such diversification is to achieve strategic fit. Strategic fit allows an organisation to achieve synergy.

Conglomerate multi-product or diversification strategy consists of a company seeking to add a new product that has no relationship to the company's current technology, products, or markets and these products will normally appeal to new classes of customers. The company markets new products or services that have no technological or commercial synergies with current products, but which may appeal to new groups of customers (Kazmi, 2008, and Kotler, 2003). The conglomerate diversification has very little relationship with the firm's current business. Therefore, the main reasons of adopting such a strategy are, firstly, is to improve the level of sales, profitability and the flexibility of the company, and secondly, to get a better reception in the capital markets as the company gets bigger. Even if this strategy is very risky, it could also, if successful, provide increased growth and profitability (Kotler, 2003). Synergy may result through the application of management expertise or financial resources, but the primary purpose of conglomerate diversification is improved profitability of the acquiring firm.

2.1 Review empirical studies

The survey of the extant empirical studies on the subject matter reveals that there are limited studies that have specifically investigated the influence of technological environmental factor on the choice of strategies by business organizations in Nigeria. Many of these studies have very broad scope looking at the totality of the environmental factors which denied the studies adequate and comprehensive analyses. Besides, none of the studies looked at the specific effect of technological factors on the choice of strategy. For instance, Tuanmat and Smith (2011) investigated the effects of changes in competition, technology and strategy on the performance of manufacturing companies in Malaysia and discovered that companies now recognize that advanced manufacturing technology have impact on organizational strategic behavior as their study's model shows a positive relationship between advanced manufacturing technology and organizational strategy.

Also, the study conducted by Adeoye and Elegunde (2012), examines the impact of external business environment on organisational performance in the food and beverage industry in Nigeria. It investigated the influence of economic and political environment on organisational performance. It utilized questionnaire instrument to collect information from the respondents based on a sample of 3 companies with 150 sample size. Data collected were analysed using multiple regression analysis. The findings of the analysis show that the external business environment with such proxies as political, economic, socio-cultural and technological factors among others have impacted on organisational performance measured as effectiveness, efficiency, increase in sales, and achievement of corporate goals. In the same vein, Mustapha and Ekpunobi (2011) measured the extent of the effect of each environmental factor on the performance of depressed textile manufacturing firms in Kaduna State and found that technological factor ranked first among other environmental factors first in terms of its negative impact on the performance of the depressed manufacturing firms operating in Kaduna State. Also, Osuagwu (2009) sought to determine the relative importance and impact of specific aspects of environmental factors on the marketing strategies of Nigerian banks and discovered that technology in banking is the third most important and impacting factor in the strategic marketing practices of Nigerian banks. Thus, the current study is slightly divergent from the purviews of the reviewed studies in many respects. It is focused squarely on the influence of technological factors on the strategic choice of firms in food and beverage industry. Unlike other studies, it did not examine the effect on the performance of these firms.

3.0 Methodology

The population of this study consists of the management staff of all the seventeen quoted manufacturing firms operating in the food and beverage sector of Nigerian Stock Exchange (NSE) as published in the 2010 edition of NSE Fact book.

The adoption of quoted firms as case study is not unusual as studies such as Tevfik and Oktay (2008) and Abubakar, (2011) used quoted firms as their case study. This study adopts Cochran (1977)'s formula for sample determination to arrive at six manufacturing firms investigated. The six (6) manufacturing firms were distributed equally across the two strata, namely; three (3) from conglomerate multi-product firms and three (3) from concentric multi-product firms. The selected concentric multi-product manufacturing firms are Nigerian Bottling Company Plc, UTC Nigeria Plc, and P.S. Mandrides and Co. Plc, while the Conglomerate multi-product manufacturing firms consist of Cadbury Nigeria Plc, Nestle Nigeria Plc and Flour Mills of Nigeria Plc. To arrive at the above selected firms, the study uses a combination of sampling techniques which is normally adopted when a single sampling technique is considered inadequate (Asika, 1991, Zahradeen, 2003, Adogbo and Ojo, 2003, Halliru, 2008 and Greener, 2008). The sampling techniques used for this work include purposive sampling, and stratified sampling.

Thus, Management staff of the six selected firms were used as the sole population of the study in determining the elements (respondents) to be studied. This work adopts purposive sampling technique to determine their inclusion as the sample of this study and the adoption of this criterion is not strange as Abdulsalam (2006), and Osuagwu (2009) used such a criterion in their studies. Furthermore, the adoption of purposive criterion for picking sample elements is due to the fact that management staff are knowledgeable and experienced enough to evaluate marketing strategies and the associated influences of environmental factors on business activities. Management staff in all the functional departments of the firms investigated were used as the study's element because strategic issues in an organisation affect every aspect of organisation's operations. The total number of management staff of the six selected manufacturing firms which constitutes the population of the study are 270 and the study used Krejcie and Morgan (1970)'s formula to determine the appropriate sample size. Thus, on the bases of this, 159 management staff of the firms were proportionally selected from the sample firms to serve as the study representative sample size.

This study uses both primary and secondary data. The primary data were sourced through structured questionnaire that was administered on 159 management staff of the firms under investigation. The questionnaire has three sections. Section A addresses demographic information. Section B solicits responses from the target elements on product diversity of their firms, while section C seeks responses from the target respondents on technological environmental factors that may prompt the adoption of multi-product strategy. The questionnaire comprises of a set of multiple choice as well as Likert scale questions.

Technological factor variables' prompting the adoption of multi-product strategy was measured by a five items questionnaire and the Likert scale options range from 1 for strongly disagreed to 5 for strongly agreed. The five items were averaged to form a composite measure with higher score indicating that technological environmental factor prompt manufacturing firms to adopt multi-product marketing strategy. We also asked the type of product diversity of the studied firms, that is, whether they operate conglomerate or concentric multi-product strategy and the responses to this question was coded 1 for conglomerate and 0 for concentric. This is because, the responses are qualitative responses and we used them as dummy variables in this study.

The internal consistency reliability of this measure was discovered to be acceptable with the Cronbach's alpha coefficient of 0.86. This exceeds the threshold of 0.7. The study used frequency distribution tables and percentages to present its data and the analytical technique used to test the study's hypothesis is regression analysis. Specifically, Statistical Package for Social Sciences (SPSS) version 15.0 was used to run the regression analysis.

The study hypothesized that; *technological environmental factor does not prompt manufacturing firms to adopt multi-product or diversification marketing strategy.*

3.1 Model specification

$$Y = a + bx$$

Where :

Y = Product strategies is dependent variable (which is represented by Dummy variables)

a = Intercept (constant)

b = Slope (rate of change in technological factor)

x = Independent variable (technological factor prompting the adoption of multi-product strategies)

The values assigned are;

1 for conglomerate multi-product strategy

0 for concentric multi-product strategy

4.0 Results

Out of 159 copies of questionnaire administered, a total of 147 completed and usable copies of the questionnaires were returned and this gives a response rate of 92%. Table I shows the frequencies and percentage of respondents according to their Sex, Educational Qualification, Length of Service, Department, Official Status and Product Diversity.

Table I shows that 67.3% of the respondents are males and 32.7% are females and this revealed that the distribution of respondents is positively skewed in favor of male respondents. This ordinarily implies that there are more male staff in the organisations under investigation that fell under the required target respondents for this study. The table also revealed that 57 % of the respondents are educated up to BSc./HND/ND, while 43% are holders PGD degree. This analysis showed that most of the respondents are educated and well informed to assess the issues addressed in the questionnaire.

With respect to the official status of the respondents in their respective organisations, 10.% are members of Management team, 34% are General Managers/Deputy Managers and Assistant General Manager and the remaining 56% are Principal Managers, Senior Managers and Managers. This simply implies that all the respondents met the criteria specified for the study elements. Majority of the respondents (62.3%) have worked with their organization for a period of 1 to10years, 27% of the respondents indicated that they have been with their organisations between 11-20 years, and the remaining 10% of the respondents said they have worked between 21years and above for their organizations. The implication of this is that the majority of the sample elements have stayed long enough with their respective organisations to assess strategic influence of environmental factors on their organisational activities.

In addition, Table I further revealed that 12% of the respondents are in Human Resources/Administrative Department, 25% are in Production Department, and 58% Marketing Department. The remaining 5% of the respondents work in other Departments. This result showed that the majority of the respondents are in Marketing/Sales Department and this is due to the fact that Marketing and Sales Departmental staff are usually more in number than staff in other Departments because of the strategic nature of their responsibilities in manufacturing firms.

Finally, Table I showed that 38.1% (56) of the total respondents claimed that their firms adopted multi-product marketing strategy with focus on concentric while the remaining 61.9% (91) of the respondents maintained that their firms adopted multi-product marketing strategy with focus on conglomerate operation.

4.1 Reliability and validity

The study computed Cronbach's alpha reliability test and item-to- total correlation to address the issues of common variance and to assess the internal consistency of the multiple scales (see Table II). Items having low item-to-total correlation may indicate that the items do not reflect the particular construct or may have tapped into another dimension of the construct.

Table II shows that Cronbach's alpha reliability test result is 0.86 and this is above the minimum threshold (0.7) suggested by Nunnally and Bernstein (1994), while the item-to-total correlations were all above the value (0.5) recommended by Hair et al (2006). Thus, the result indicates high internal consistency of the research instrument.

4.2 Test of Hypothesis

Table III shows that 10.5% of the total variation in the dependent variable (product strategies) is being explained by the independent variable (technological factor), the adjusted R^2 reveals that the regression model obtained can be used to predict the influence of technological factor in prompting manufacturing firms to adopt multi-product marketing strategies.

From table IV the independent variable (technological factor) shows that the P-value is 0.000 and the result is significant at 1% level, hence, we reject the null hypothesis and conclude that technological environmental factor prompts manufacturing firms to adopt multi-product or diversification marketing strategies.

5.0 Discussions of the Result

It is observable from the above result that technological factor in the operating environment of quoted manufacturing firms in Nigeria food and beverage industry influenced their organisations' operational and strategic decisions. The result showed that technological factor in the operating environment of firms studied prompted their adoption of multi-product marketing strategies as 10.5% of the total variation in the choice of the organizational strategies is explained by the happenings in the technological environment, while other variables that were not included in the study's model explain for 89.5 % variations in the organizations' choice of strategies.

This result is consistent with the findings of the studies of Tuanmat and Smith (1992) that discovered that changes in the business technological environment impact on organizational strategic behavior and that of Mustapha and Ekpunobi (2011) which ranked technology first among other environmental factors in terms of its impact on organisational activities as well as that of the work of Eseroghene (2011) that discovered that continuous analysis of the technological factor in organisations' environment has impact on the strategic decisions and performance of Nigerian organisations. The implication of this findings is that business organisations generally and manufacturing firms in particular should know that they are operating in a technologically dynamic environment and organisational managers need to manage this technological dynamism in order to produce and market products that could meet the changing needs of target customers in the market.

6.0 Conclusions

On the basis of the above finding, the study concludes that technological environmental variables such as technological invention, advancement in technology, availability of the state of the art technology, nature of technological changes and diversity of technology in the manufacturing firms' operating environment spurred them to adopt multi-product marketing strategies.

7.0 Recommendations

From the findings and conclusions of the study, it recommends that responsible managers in the manufacturing sector should note that the technological factor in their operating environment has profound influence on the marketing strategies and programmes of manufacturing firms in general and manufacturing firms in the food and beverages in particular. Thus, managers in the manufacturing sector need to be proactive in dealing with the pace and trend of invention and advancement in technology as well as the diversity and nature of changes in technological environment.

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Appendix

Table I: Demographic Characteristics of Respondents and Their Firms

Sex	Frequency	Percentage%
Male	99	67.3
Female	48	32.7
Total	147	100.00
Educational Qualification	Frequency	Percentage%
BSc/HND/ND	84	57%
PGD	63	43%
Total	147	100.00
Official Status	Frequency	Percentage (%)
Management Staff	15	10%
GM / DG M/AGM	50	34%
PM/SM/M	82	56%
Total	147	100.00
Length of service	Frequency	Percentage (%)
1 – 10 years	92	62.3%
11 – 20 years	40	27%
21 years and above	15	10%
Total	147	100.00
Departments	Frequency	Percentage%
Human resources/Admin	18	12%
Production	37	25%
Marketing/Sales	85	58%
Others	7	5%
Total	147	100.00
Product Diversity	Frequency	Percentage%
Concentric Multi-product operations	56	38.1
Conglomerate Multi-product operations	91	61.9
Total	147	100%

Source: Field Survey, 2013

Table II: Descriptive statistics and item-to-total correlations

Variables	Mean	Standard Deviation	Item to Total Correlations
Advancement in technology makes manufacturing firms to adopt multi-product strategy.	4.20	0.843	1.00
Inventions in the technological environment make manufacturing firms to adopt multi-product strategy.	4.17	0.871	0.602
Availability of state of the art technology spurs manufacturing firms to operate multi-product strategy.	4.08	0.763	0.567
Nature of technological change forces manufacturing firms to adopt multi-product strategy.	3.95	.863	0.531
Diversity in technology prompts manufacturing firms to operate multi-product strategy.	3.99	.887	0.775
Overall Cronbach's alpha			0.86

Source: Researcher's simulation from SPSS package.

Table III: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.324 ^a	.105	.099	.463

a. Predictors: (Constant), Technological factors

Source: Print out from SPSS

Table : IV Regression result

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.380	.069		19.866	.000
	Technological f actors	.022	.005	.324	4.119	.000

a. Dependent Variable: Product strategies

Source: Print out from SPSS