

## **Technological Capabilities and Product Innovation in the Beverage Industry in Nigeria (A Study of Nigeria Breweries Plc Awo – Omanma, Imo State)**

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### **Abstract**

*Global competition and environmental factors have continued to mount pressure on firms in making strategic decisions on the development of technology and technological processes that will enable them maintain levels of competitiveness. This study investigated the effect technological capabilities on product innovation in the beverage industry in Nigeria. The study adopted the descriptive research design on a population of 200 staff of Nigeria Breweries Plc. The stratified proportionate and simple random sampling were employed in drawing a sample size of 133. The simple regression analysis was used for data analysis. Result shows that technological skill has a significant positive effect on product innovation. Results also revealed that top management support has a significant positive effect on product innovation. It was recommended among others that the management of Nigeria breweries Plc should not relent in providing the necessary support needed for the firm to lead in the industry as a technology-driven organization. It was concluded that technological competencies have a significant positive effect on product innovation in Nigeria Breweries Plc, Imo State.*

**Key words:** *Technological, Capabilities, Product, Innovation, strategic, Resources*

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### **Introduction**

Global competition and environmental factors have continued to mount pressure on firms in making strategic decisions on the development of technology and technological processes that will enable them maintain levels of competitiveness. To this, Jiao, Chang, and Lu (2017) asserted that one of the most important strategic decisions facing management in today's globally competitive environment involves technological development. As argued by Lee (2015), the greater the firm's technological capabilities, the more quickly the firm will acquire technology and exploit other

complementary assets important to providing firms with the high levels of internal variety needed to fundamentally reshape traditional business strategy.

Technology is a strategic resource that when possessed and utilized effectively, increases firms profitability, innovative capabilities and thus, enables firms to gain competitive advantage (Amit and Schoemaker, 2014 in Obialor, 2020). Technology no doubt help firms to improve their business processes and decrease cost. Therefore, most firms across the globe use technology in carrying out their daily business processes and activity. Technology has contribution to the increase in a firm's business performance. Hence, the need to study the role of technological Capabilities in enabling business performance through product innovation.

### **Statement of the Problem**

Technological capabilities is a perceived strategic resource that built its role as a product innovation driver has not been fully understood by researchers. The concept of technological capabilities has been studied by many, however there seems to be a discrepancy in empirical findings. For instance, the studies of Love and Irani (2014) found no positive relationship between technological capabilities and a firm's business performance while Zhang and Tansuhaj (2014) and Jonker, Romijn, and Szirmai (2016) in their findings revealed that technological capabilities positively affects a firm's business performance. It is based on the above gaps in literature that this study investigated the effect of technological capabilities on product innovation in order to improve our understanding of the role of this perceived strategic resource.

### **Objectives of the Study**

The study aims to determine the effect of technological capabilities on organizational product innovation of Nigeria Breweries Plc. The specific objectives are to:

1. determine the effect of technological skill on product innovation of Nigeria Breweries Plc.
2. examine the influence of top management support on product innovation of Nigeria Breweries Plc.
3. ascertain the effect of technological competencies on product innovation of Nigeria Breweries Plc.

### **Research Question**

1. What is the effect of technological skill on product innovation of Nigeria Breweries Plc.
2. What is the influence of top management support on product innovation of Nigeria Breweries Plc.?
3. What is the effect of technological competencies on product innovation of Nigeria Breweries Plc. ?

### **Hypotheses**

1. H<sub>01</sub>: Technological skill have no significant effect on product innovation of Nigeria Breweries Plc.
2. H<sub>02</sub>: Top management support have no significant influence on product innovation of Nigeria Breweries Plc.

3. H0<sub>3</sub>: Technological competencies have no significant effect on product innovation of Nigeria Breweries Plc.

### **Review of Related Literature**

#### **Technology as a Strategic Resources: Technological Capabilities Concept**

Technology is the systematic application of scientific, other organized knowledge and the use of machines, material, and equipment etc. in the production of goods and services for the satisfaction of human wants. Technology has been said by many to be an asset for firms to increase their profitability and gain competitive advantage (Lee, 2015). According to Obialor, Emem, and Obialor (2022), technology has helped firm to improve their business processes and decrease cost. Firms invest in technology for several reasons. In their submission, Agulanna and Madu (2008) cited in Obialor (2020) stated that technology has exerted tremendous impacts on the structure, strategies, and operations, of various industries and organizations. They concluded by stating that technology have virtually changed the landscape of industries and organizations, leading to the production of new and/or superior products of lower cost. Lester and Tran (2014) listed the following reasons why firms decide to invest in technology to include a perceived cost savings and income generation benefits, external pressure from competitors, suppliers and buyers, organizational readiness, and perceived ease of use.

Nevertheless, almost all types of firms use technology to automate their business processes and to improve information gathering, access and quality (Dedrick, Gurbaxani, and Kraemer, 2013 in Obialor et al, 2022). Technology also provides firms access to external knowledge and financial resources, create trust and legitimacy through widespread information dissemination and create social network ties (Morse, Fowler, and Lawrence, 2014). The level of technology usage may differ between firms, though most firms would have applications such as payroll, human resource information system, sales and purchase system etc. Bigger firms may also implement more complex and sophisticated applications such as enterprise resource planning and customer relationship management system (Sulaiman, Yusniza, Abdul, 2010 in Obialor, 2020). Also, in the current global environment, many firms use internet technology to conduct part of their daily business.

With the different levels of technology adoption among firms subsequently will lead to different technological competencies. Although definitions of technological capabilities differ among authors, Bharadwaj (2010) defines technological Capabilities as the ability of a firm to organize other resources using their existing technological resources. Similarly, Jiao, Chang and Lu (2017) sees technological capabilities as ‘enterprise formation, transfer and deployment of enterprise technological resources to combine with other resources, support and improve other uniqueness functions that are competent at strength and skill, creating the latent potential for maintaining continuous competitive advantage’. Fai and Von (2001) cited in Felicia (2011) also defined technological capabilities as the ability to create and use particular field of technology effectively, which is gained through extensive experimentation and learning in its research, development and employment in production. Technological capabilities is equally regarded as the ability of the firm to innovate and come up with new and unique products through research and development (Njoroge, 2015).

Technological Capabilities has been hypothesized by many to be a key element in a firm’s performance achieved when firms can utilize equipment and technological information efficiently

(Jiao, Chang and Lu, 2017). With technological capabilities, firms can grow faster than the others and thereby increase their market share and business. Technological capabilities is viewed as the principal means of a firm and promote product differentiation which will end up being unique to a specific firm and promote product design that are beyond those of competitors. Firms that use technological-oriented strategy are in support of a strong research and development department, acquisition of new technologies and application of the most recent technologies which enhance superior turnovers and the difficult to be copied by competitors (Slater, Ims, and Kim 2012). Buttressing this further, Obialor (2020) noted that, for a firm that invests in technology to maintain its superior performance, it should focus on engaging in the search for new market opportunities and rebuilding existing area of operations to keep on producing unique products.

In the view of Baker and Sinkula (2010) cited in Jiao, Chang and Lu (2017), for a long time, technology has been identified as the key for commencing novel activities through risk-taking and firm pro-activity which results in a firm's high performance than competitors. Firms that focus on technological advancement through innovative research and development generate above-average performance. Also firms that employ technology are known for superior performance because they believe in the acquisition of new technologies for products which are hard to copy (Obialor et al, 2022). It is thus believed that firms that give attention to the development of technologies and capabilities will succeed in sustainability and profitability.

### **Dimensions of Technological Capabilities**

**Technological Skills:** Technological Skills may be understood as one of the “dimensions that distinguish and provide the knowledge-set needed to enable a core capability” (Leonard Barton, 2007 cited in Obialor et al, 2022). This dimension of skills encompasses the firm-specific techniques and scientific understanding (Encarnacion, Garcia-Morales, Rodrigo, 2018). It provides the basis for the firm's competencies and sustainable competitive advantage in a particular business. In applying this understanding to technological skills constitute the entire technical system, a system that usually traces its roots to the firm's first products ((Encarnacion et al, 2018).

**Top Management Support for Technology (TMS):** Top Management Support for Technology reflects the development of a work environment that supports knowledge management and information systems. This support can in turn provide the appropriate funds and resources, encourage teams and help teams overcome problems, fostering cross-functional cooperation, knowledge and communication (Garcia-Morales, Llorens-Montes, and Verdu-jover, 2008 in Obialor et al, 2022).

### **Theoretical Review**

#### **The Resource-Based View (RBV)**

This study is anchored on the resource-based view theory as it supports the concept of strategic resource of which technology is among them in improving a firm's competitive position. Over the last two decades, RBV has emerged as one of the most dominant theoretical perspectives in the field of strategic management. The resource-based theory supports the concept of resources and

was originally coined by Wernerfelt in 1984. Barney (2010) first formalized the term RBV perspective into a theoretical framework while clarifying the understanding of the impact of a firm's environment on firm performance and defined resources as "assets, capabilities, process, firm attributes, information and knowledge controlled by a firm that enables a firm to conceive and implement strategies that improve its efficiency and effectiveness". Amit and Schoemaker (2014) in Obialor, (2020) placed their resources into four different categories namely; technological resources, physical capital resources, human capital resources and organizational capital resources. Resources-based perspective, suggests that certain resources and asset differences may allow some firm to implement strategies that alter an industry's performance in way that uniquely benefits this firms (Barney 2010). Buttressing this further, Barney (2015) argued that firms that possessed resources that were valuable and rare would attain a competitive advantage and enjoy improved performance in the short term. Barney (2015) further maintain that for a firm to sustain these advantages over time, its resources must be inimitable and non-sustainable. Two theoretical approaches have been brought forth to compliment RBV. The first one was Valuable, Rare, Inimitable and Organization (VRIO) framework, which postulate that in addition to simple valuable, rare and inimitable and non-sustainable resources, a firm also needs to be organized in such a manner that it could fully exploit the full potential of these resources to attain competitive advantage (Barney 2015). Based on this theory, a firm can be effective only when there is a situation of resources heterogeneity (different resources across firms) and resource immobility which brings out the inability of competing firms to obtain resources from other firms, (Barney, 2010).

### **Empirical Review**

Sulaiman, Yusniza, and Abdul (2010) investigated the assessment of technological capabilities (technical capability, e-business practices and firm innovativeness) on professional service firm's business performance in Malaysia. In achieving the objective, the study employed a quantitative research design. The sample population in this study comprised of 200 professional service of SME owners who were all over Malaysia. Both descriptive and inferential statistic of regression was used in the analysis of data. The results of the study indicate that technological capabilities have a substantial impact on firm performance. It was recommended that SMEs should have a strong technical capability to effectively manage their business. The researchers concluded that technological capabilities have a substantial impact on firm performance.

Markus and Magnus (2013) studied technological capabilities and firm performance in Sweden that analyzed the importance of internal and external capabilities. These relationships are then analyzed empirically using Swedish microdata on 15,682 firms in 290 Swedish municipalities. Novel indicators based on occupational statistics were combined with measure of time-distance accessibility to study internal and external TC. The results provide evidence for a positive relationship between firm growth and technological capabilities. In particular, the combination of firm-internal and firm-external competencies seems to be conducive for growth. The researchers recommends that firm size should be seen as an important factor to further the understanding of these relationships. It was concluded that a significant positive relationship exist between firm growth and technological capabilities.

## Methodology

The research employed a descriptive survey research design on a population of 60 management staff Nigeria Breweries Plc Awo-Omanma, Imo State. A pilot testing was conducted using few populations in determining the efficiency of the questionnaires also as a way of determining the accuracy and validity of the gathered data. Self-completion questionnaires were employed using open and closed ended question and used the multiple regression method for data analysis.

## Data Analysis Results

**Table 1: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.824 <sup>a</sup>	.679	.659	.876	.679	33.783	3	48	.000

Source: research Data (2024)

The result in Table 1 shows that 0.659(65.9%) as the value of adjusted R Square showing the extent to which product innovation at Nigeria Breweries Awo- Omanma, Imo State is determined by the technological skills, top management support, and technological competence. Therefore, the remaining percentage (34.1%) should be studied to determine how other factors influence the product innovation at Nigeria Breweries Awo- Omanma, Imo State.

**Table 2: Analysis of Variance**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	77.818	3	25.939	33.783	.000 <sup>a</sup>
	Residual	36.856	48	.768		
	Total	114.673	51			

Source: Research Data (2024)

The value 0.000<sup>a</sup> shows the significance level is less than 0.05 showing a statistical significance of the model on how independent variables studied influenced the product innovation at Nigeria Breweries Awo- Omanma, Imo State. The results in Table. 2 also indicate that F calculated value is greater than the value of F tabulated ( $33.783 > 25.939$ ) at 5% significance level confirming the significance of the model.

**Table 3: Coefficients**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error			

1	(Constant)	0.524	1.075		1.790	.000
	Technological Skills	0.643	.268	5.275	2.395	.001
	Top Management Support	0.855	.087	3.882	9.772	.004
	Technological Competence	0.525	.344	1.367	2.981	.002

**Source: Research Data (2024)**

The findings in Table 3 revealed that holding independent variables constant (technological skills, and top management support) to a constant zero, the application of product innovation at Nigeria Breweries Plc would be at 0.524 factor, a unit increase in technological skills and top management support would lead to a unit increase in product innovation at Nigeria Breweries Plc by a factor of 0.643, 0.855, and 0.525 respectively. The established regression equation was as follows;  $Y = 0.524 + 0.643X_1 + 0.855X_2 + 0.525X_3$ ; Where  $Y =$  Product Innovation,  $X_1 =$  Technological Skills,  $X_2 =$  Top Management Support,  $X_3 =$  Technological Competence.

The result in Table 3 further indicate that top management support had the highest influence on product innovation at Nigeria Breweries Plc as shown by a factor of 0.855 followed by technological skills with a factor of 0.643 and technological competence with a factor of 0.525. The relationships ( $p < 0.05$ ) was all significant with top management support ( $t = 9.772, p < 0.05$ ). Top management support have a greater correlation with product innovation as it has a direct involvement in provision of organization’s product and services towards innovation of its product lines. Organization’s product lines are constantly improved by continuous improvement in areas of technological skills and competencies as stated by Encarnacion et al. (2018). David (2013) notes that technology in terms of skills and competencies is one of the critical resources in an organization which when properly utilized leads to successful product innovation.

**Discussion of Findings**

From the responses, the respondents are of the firm belief that the firm possesses the technological skill to engineer product innovation in their organization. Regarding the effect technological skill has on product innovation, Table.3 reveals that technological skill has a positive and significant ( $B=0.624, P_{0.004} < 0.005$ ) effect on product innovation. The result shows that, as technological skill is being improved, product innovation will increase by 62.4%. Hence, we reject the null hypothesis and accept the alternative by concluding that, technological skill has positive and significant effect on product innovation. The study’s findings are supported by that of Markus and Magnus (2013) that found a positive relationship between firm growth and technological capabilities. However, the findings are contrary to the findings of Sulaiman, Yusniza, and Abdul (2010) whose findings indicated that technological capabilities does not have a substantial impact on firm performance.

Capabilities and competencies in the area of technology cannot be acquired, improved, and sustained without management support. Management ensures adequate funding of technology research and development which is a prerequisite for product innovation. The influence of top management support and technological competencies on product innovation is revealed in the regression model of Table 3. The result indicated a positive and significant ( $B=0.855, \text{ and } 0.525, P_{0.003} < 0.005$ ) influence of top management support and technological competencies on product innovation. Implying that a support by management on technological improvement will increase product innovation by 85.5% and 52.5 % respectively. The study’s findings are supported by that

of Markus and Magnus (2013) that found a positive relationship between firm growth and technological capabilities. However, the findings indicated that technological capabilities does have a substantial impact on firm performance.

### **Recommendations**

1. For firm's survival and sustainability in turbulent environments, technological skill possesses by the employees should be updated continually through training and development to reflect the changes that occur in the technological environment. This can be done by enriching jobs, promoting empowerment and autonomy in the organization as it will encourage the development of workers willing to learn and adapt to a challenging situation.
2. Top Management should not relent in providing the necessary support needed for their firm leadership in the industry as a technology-driven organization. This support can be in the area of funding research and development for the facilitation of product innovation.
3. Management should facilitate product innovation through technological competencies by organizing regular training for employees.

### **Conclusion**

Technological Skill was found to have a significant positive effect on product innovation of Nigeria brewery Plc. Signifying that the studied firm possesses technological skill and thus have used such skill to produce new products and improve existing ones. Also, top management support was equally found to have a positive and significant effect on product innovation. The above implies that top management of Nigeria breweries Plc encourages learning, research and development in the area of technology through funding. Furthermore, technological competencies have a significant positive effect on product innovation in Nigeria Breweries Plc, Imo State. However, for firm's survival and sustainability in turbulent environments, technological competencies possesses by the employees should be updated continually through training and development to reflect the changes that occur in the technological environment. This can be done by enriching jobs, promoting empowerment and autonomy in the organization as it will encourage the development of workers willing to learn and adapt to a challenging situation



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