

TECHNOLOGICAL CAPABILITY AND STRATEGIC FLEXIBILITY OF FOOD AND BEVERAGE MANUFACTURING COMPANIES IN RIVERS STATE

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Abstract

The purpose of this study was to examine the relationship between technological capability and strategic flexibility of food and beverage manufacturing companies in Rivers State, Nigeria. The study adopted a cross sectional survey research design. The population of this study was the fifteen (15) registered food and beverage firms in Rivers State. Since the unit of analysis was at organizational level, only strategic managers were included. Census sampling was adopted because the population was small, hence all the fifteen (15) registered food and beverage firms in Rivers State were studied. Three (4) managers each were purposively selected for each company giving a total of 60 respondents. Primary data was collected using a 5-point Likert scaled questionnaire. The reliability of the instrument was achieved by the use of the Cronbach Alpha coefficient with all the items scoring above 0.70. The hypotheses were tested using the Spearman's Rank Order Correlation Coefficient with the aid of Statistical Package for Social Sciences version 23.0. The tests were carried out at 0.05 level of significance. The findings revealed that there is a strong positive relationship between technological capability and strategic flexibility of food and beverage manufacturing companies in Rivers State, Nigeria. The study therefore concludes that technological capability significantly and positively predicts strategic flexibility of food and beverage companies in Rivers State. The study recommends that food and beverage

companies should pay keen attention to the development technology capability by creating an environment for technology acquisition in order to enhance production flexibility.

Keywords: Technological Capability, Strategic Flexibility, Food and Beverage Companies

Introduction

Organizations face a lot of challenges, because of rapid and fluctuating changes in the work environment (Idris & Al-Rubaie, 2013; Qin & Nembhard, 2015). These changes are due to technological development, globalization, innovation, creativity, and changing customers' preferences (Tseng & Lin, 2011; Sherehiy & Karwowski, 2014). Companies have to cope with these changes and increase their competitiveness to survive within the market (Young, 2013; Sherehiy & Karwowski, 2014; Lee, Cho & Kim, 2015).

With the advancement of information technologies, company strategy focuses nowadays on sustainable competitive advantage, and gives importance to short-term advantages of flexibility and fast response. As a result, flexibility is accompanied by reorganization of resources and skills, strategic cooperation, and centrifugal hierarchical structure (Grant & Jordan, 2012). A company aims to absorb or exploit uncertainty through flexibility (Cannon & John, 2004). Flexibility is relevant to a company's ability to respond to

uncertainty in both macro and micro environmental scope, while product innovation is a reaction to competitive environment.

The food and beverages manufacturing firms have experienced an unparalleled degree of change due to highly uncertain environmental vigor (Singh, Oberoi & Ahuja, 2013). As a result of volatile and turbulent environment, the food and beverages manufacturing industry faces unpredictable situation characterized by very fast changes in technologies, rapidly shifting customer preferences aggressive variations in customer demands, rapidly shifting customer preferences, and all indicates that flexibility needs to be matched with environmental uncertainty to ensure firm success and survival (Chang, Lin, & Sheu, 2002). It is now vital for them to emphasize flexibility as opposed to economies of scale and property based resources in order to defend and improve their competitive positions (Nwankere, 2017). A manager equipped with strategic flexibility will enable the firm to support the development of future manufacturing strategy and this will enable it to react swiftly to the changing nature of their internal and environmental conditions. Adoption of strategic flexibility enables managers to be able to anticipate, recognize and deal with changes in the internal and external environment and also to remain competitive in her industry and be able to continuously sustain competitive advantage, hence, the need to establish the relationship between strategic flexibility and competitive advantage of food and beverages manufacturing companies.

Agile organizations are innovating new and fast ways to respond to changes through the development of the company's strategies, using technology, exploitation of human resources and improving their skills (Hosein & Yousefi, 2012), quick meeting of customers' needs, quick entry and exit in alliances (Oyedijo, 2012), offering new services in a timely manner (Shah and Ward, 2003), take advantage of opportunities and minimize the risks in a changing work environment (Qin & Nembhard, 2015). The relentless and increasing intensity of competition, the changing demands and dwindling expectations of customers and the

potential customer's need for quality products and services has led companies to constantly adapt, renew, reconfigure and recreate their resources and capabilities in line with competitive environment and building technological capabilities to cub the identified competitive issues (Addae-Korankye, 2013; Ozigbo, 2016).

Presently, the COVID-19 pandemic has had a significant negative impact on many industries including, the food and beverage manufacturing companies most of whom were hard hit as a result of the lockdown strategy imposed by most nations in which people were compelled to avoid physical contact and all forms of close social interaction. It is noted that the survival of firms, after the COVID-19 pandemic, rests on the ability to be flexible, resilient and possessing the ability be quick to innovate if they must be productive and see a recovery in earnings during the post COVID-19 era. It is in this respect that this paper aligns with the theme of this conference: Technological, Pandemic Disruptions, and Management Sciences' Theory and Practice: Challenges, Responses, and Strategic Choices. The purpose of this study is to examine the relationship between technological capability and production flexibility of food and beverage manufacturing companies in Rivers State.

More specifically, the following objectives were stated:

- i. To examine the relationship between technological capability and production flexibility of food and beverage manufacturing companies in Rivers State.
- ii. To examine the relationship between technological capability and marketing flexibility of food and beverage manufacturing companies in Rivers State.
- iii. To examine the relationship between technological capability and human resource flexibility of food and beverage manufacturing companies in Rivers State.

The following research questions also guided the study:

- i. What is the association between technological capability and production

- flexibility of food and beverage manufacturing companies in Rivers State?
- ii. What is the association between technological capability and production flexibility of food and beverage manufacturing companies in Rivers State?
 - iii. What is the association between technological capability and production flexibility of food and beverage manufacturing companies in Rivers State?

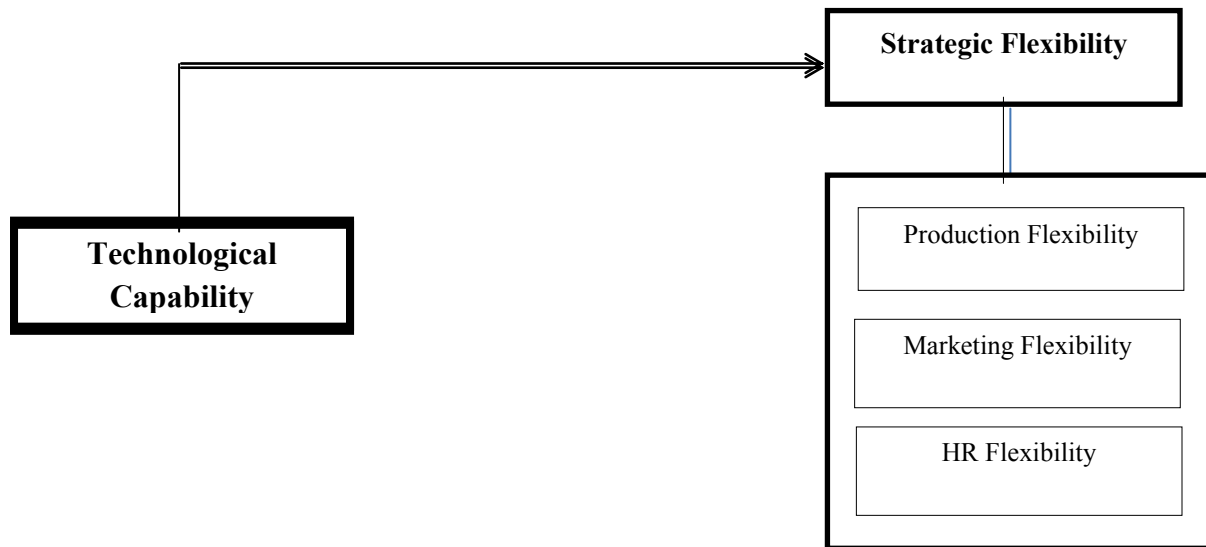


Fig.1 Conceptual framework for technological capability and strategic flexibility
Source: Desk Research (2021)

Theoretical Framework

This study is built on the dynamic capabilities theory. Dynamic capabilities was first coined by Teece in 1990 (Zaidi & Othman, 2012). According to Ambrosini and Bowman, (2009), Teece’s (1990) working paper is probably the first to contribute to developing explicitly the notion of dynamic capabilities. It was an outcome of Gary Hamel’s multinational strategy research, which led to his article titled “Core Competences of the Corporation” (Teece, Pisano & Shuen, 1997). In the words of Zahra, Sapienza and Davidson (2006) dynamic capabilities in literature is grounded in the evolutionary theory of the firm (Nelson & Winter 1982). Teece and Augier (2009) and Helfat Finkelstein, Mitchell, Peteraf and Singh (2007) also saw earlier theories discussions as foundations for dynamic capabilities theory. First the behavioral theory of the firm which was not as prescriptive and extended as dynamic capabilities theory, it is more narrowed to choices forced by the external environment. Transaction cost theory was also identified which does not explain new resource foundations and organizational learning so

much. Douma and Scheuder (2002) described DCT as a bridge between the economic-based strategy literature and evolutionary approaches to organizations.

The basic assumptions of this theory is that an organization’s basic competences should be used to create short term competitive positions that can be developed into longer-term cum sustainable competitive advantage (Nelson, 1982). This theory is relevant to this study because it seeks to explain what it is that enables organizations adapt to environmental changes to either sustain or acquire competitive advantage It explains how adopting dynamic capabilities in food and beverages manufacturing companies would enable them build capabilities in stable and turbulent periods that will enable their competitive advantage to be sustainable continuously

Technological Capability

Bergerk, Tell, Berggren and Watson (2008) and Coombs and Bierly III (2006) posit that technological capability (TC) comprising the system of activities, physical systems, skills and

knowledge bases, managerial systems of education and reward, and values that create a special advantage for an organization. Normally, a firm is capable of operating, maintaining, adapting, and assimilating the transferred technology. The two main dimensions of TC are activities and strategies (Bergerk, Tell, Berggren, & Watson, 2008). Activities consist of R&D activity in term of patenting, product launching, and problem solving whereas strategy will consider on the technology sourcing strategy. TC plays an important role in achieving competitive advantages and increasing performance of organizations, industries, industrial clusters, and as well as for the countries.

Technological capability is one of the foundations of a firm's competitive capability. It helps firms to increase their ability to apply technical knowledge in creating and delivering innovative products that consumers may value; and thus affect the overall business performance and new product development performance of a firm (Latip, Salleh, Omar, & Yaakub, 2013). Although it cannot be transferred quickly and costless along with equipment, blueprints, and user manuals. But rather has to be built up through purposeful technological efforts, that is, investment in time and resources aimed at assimilating, adapting and improving known technologies, and creating new technologies in-house.

It was suggested by Porter (1985) that the ability of an organization to employ and develop a high technology for its product goes a long way in determining the strategic position to adopt whether it is that of the differentiation position or the cost leadership position. Further speaking, he argues that the ability of an organization to be able to lead and maintain technological change in the industry eventually give such organization a justifiable competitive advantage over others. The ability of technological capability to control the ability of the organization to perform should be a positive step for the organization to gain the competitive edge over others. For instance, for an organization that adopt the cost leadership strategy, there can be the enjoyable positive advantage of the relationship between the

strategy adopted and performance if it has a significant technological capabilities. This implies that technological capabilities will help the organization to efficiently produce more products at the lowest cost possible thereby enhancing its economies of scale (Obembe, Ojo & Ilori, 2014).

Strategic Flexibility

With growing uncertainty in the business environment, it is essential for organizations to build flexibilities into the systems to cope with the dynamic environment, which point to the capability of an organization to respond effectively to the opportunities and challenges presented by the competitive environment (Nandakumar, Jharkharia & Abhilash 2014). Agility and versatility are needed by flexible organizations to change and innovate the strength and resilience to ensure stability and sustainability of competitive advantage (Rahrami 1992 cited in Xiu, Liang, Chen & Xu, 2017). Sanchez (2004) defines flexibility as an ability to respond to varying demands coming from a company's dynamic competitive environment. Hitt et al. (1998) cited in Xiu, Liang, Chen and Xu (2017) define flexibility as the company's ability to immediately respond to the changing conditions of the competition, and thus to maintain or improve its competitive advantage. Strategic flexibility is considered a vital feature, particularly for industries that have highly dynamic environmental conditions (Cannon & John, 2004).

From the resource-based perspective, strategic flexibility means the ability to redistribute and reorganize organizational resources, processes, and strategies of the company, based on the environmental change (Sanchez, 2004). Strategic flexibility plays a guiding role in many organizational features such as investments, enabling rapid shifts between competitive approaches, policies, encouraging learning, and structure. Decreasing structural inelasticity and creating a horizontal and flat organizational structure are important to providing desirable flexibility (Beraha, 2014). This flexibility supports adjustment to the competitive environment by decreasing costs and reducing need for time. By means of strategic flexibility, companies find a chance to

evaluate available opportunities and to minimize risks to their assets (Roca-Puig, Beltran-Martin, Escrig-Tena & Bou-Llusar, 2005).

Production flexibility

Production technology is closely relevant to process flexibility necessary to reach the required level of output flexibility (Urtasun-Alonso, Larraza-Kintana, Garcia-Olaverri & Huerta-Arribas, 2014). In terms of production, process flexibility means production of various products in the same plant or on the same production line. Therefore, process flexibility depends on the decisions concerning which plants and which production lines will produce the products (Beraha, 2014). When a company possesses few products and plants, decisions about flexibility will be relatively simple. As the variety of products and the number of plants increase, it becomes more difficult to assess benefits that flexibility brings (Jordan and Graves, 1995).

Cannon and John (2004) analyze flexibility in four aspects. The first is tactical input flexibility, which indicates procurement of raw materials of desirable quality, and the abilities to minimize deficiencies arising from suppliers (such as delays or undersupply) and shift to alternative suppliers for any kind of input. Second, strategic input flexibility emphasizes the ability to use new raw materials and inputs. Third, tactical output flexibility covers the abilities to modify product properties as customers demand, accommodate changes to order due dates and amounts, and make rapid modifications in the available products mix. Finally, strategic output flexibility covers the start of production of new products, making modifications in product design and new-product decisions (for the market, the company, or both).

Marketing flexibility

Johnson, Lee, Saini and Grohmann (2003) refer to the long-term strategic advantage of companies that proactively adjust themselves to change. When correlating market-based flexibility and environmental uncertainty, the authors emphasize that provision of high-level market-based strategic flexibility under

conditions of high uncertainty increases organizational performance in the long run.

In his research, Sanchez (1999) discusses process flexibility in terms of the marketing function. He points out the need to impose a modular property on marketing processes, so they can gain flexibility and adaptation skills against the flexibility of the market. Common marketing-process views depend on optimization of the supply and distribution channels, so that they can support a certain production line for a certain market segment. Contrary to this view, the author indicates the need to create a supply and distribution channel that supports a system to produce various products addressing various consumer segments. He also discusses marketing processes within the framework of marketing organizations, such as market research, market development, supply chain, distribution channels, and product design, and claims that these processes will improve their flexibility and fit with the modular structure (Beraha, 2014).

HR Flexibility

Becker and Huselid (1998) emphasize that flexible HR systems promote procurement, encouragement, and development of intellectual assets. These systems support environmental fit and add value as a source of competitive advantage (Bhattacharya Gibson & Doty, 2005). One of the approaches to maintaining a flexibility-based system relies on supporting workforce flexibility in changing conditions, and investing in it (Cannon & John, 2004). HR flexibility is conceptualized by Wright and Snell (1998) within the framework of three components: worker skills flexibility, worker behaviors flexibility, and HR management practices flexibility: (1) Worker skills flexibility relates to the amount (variety) of skills that workers possess and can transfer to alternative uses; and rapid reassignment of workers who possess various skills. (2) Worker behaviors flexibility refers to the ability to routinize behaviors. In other words, workers have a wide set of behavioural codes that are adjustable to specific needs. (3) HR management practices flexibility means the company can adapt HR practices and apply them to various situations in

various units. This type of flexibility also refers to the rate of these adjustments and practices.

Technological Capability and Strategic Flexibility

Oghojafor, Kuye, Ogunkoya & Shobayo (2014) reported the effect of competitive strategies and technological capabilities on organizational performance with emphasis on the Nigerian manufacturing industry. The result suggested that there exists no significant effect of the differentiation type of competitive strategy on organizational performance. It further revealed that technological capabilities go a long way in influencing the performance of organizations. Obembe *et al.* (2014) also carried out a study on the effects of technological capabilities, innovations and clustering on the performance of firms in the Nigerian furniture industry. They evaluated the effects of technological capabilities, innovations, clustering on the performance of firms in furniture making industry in South Western Nigeria. Of the 319 furniture makers evaluated, there was a positive impact of technological capabilities, innovations, clustering on the performance of firms on new furniture products produced monthly through adaptation or modification on office furniture making industry.

Similarly, Sobanke, Ilori & Adegbite's (2012) study on Technological Capability in Metal fabricating firms in South Western Nigeria assessed the technological capability in the metal fabricating firms in South Western Nigeria. They found out that majority of micro and small fabricating firms in South Western Nigeria had low technological capability. The medium fabricating firms operating in the same area had a technological capability which is at par with international best practice in the metal manufacturing firm. The major innovation found among the metal fabricating firms in South Western Nigeria are products and introduction of new production method. The study concluded the need for policy intervention to enhance the knowledge and skills of these operators with a view to improving the technological capability and productivity of the metal fabricating firms.

Oruwari, Jev and Owei (2002) examined the role local raw materials play in the acquisition of technological capability and the factors militating against performance in the building materials industry in Nigeria. The study focused on timber and clay and assessed availability and accessibility of needed raw materials, the technological capability and technical development profile of selected firms in the industry, the nature of the acquisition of technologies in use, and the roles of such other resources like finance and skill, in technological capability accumulation in the industry. The four indigenous building materials firms in Nigeria in this study are AT&P, Sapele; Woods (Nig.) Ltd, Port Harcourt, NBRRI, Lagos; and PRODA, Enugu. Multi-stage framework, desk research and comprehensive interview schedules was adopted. The results of the analyses were used to recommend policy changes that are expected to improve the acquisition of technological capabilities in the indigenous building materials firms in Nigeria.

A study by Adim and Mezeh (2020) examined technological capability and organizational survival of hotels in Port Harcourt, Rivers State, Nigeria. The study used a cross sectional design involving managers, supervisors and unit heads of 20 selected hotels in Port Harcourt. A sample size of 186 was adopted through the Krejcie and Morgan table and the simple random technique was used. The study findings confirm that there is a positive significant relationship between technological capability and organizational survival of hotels in Port Harcourt.

Furthermore, Karaoz & Albeni (2005) examined the technological capabilities development of 28 Turkish manufacturing companies. The study showed that most of the firms experienced ever lowering levels of learning speeds to last 10 years due to lack of findings in experienced and trained workforce, specifically in intermediate and high level positions, financial insufficiency, managerial and organizational obstacles at the firm level and utilization of old technologies.

Based on the foregoing, the study thus hypothesized thus:

- Ho₁:** There is no significant relationship between technological capability and production flexibility of food and beverage manufacturing companies in Rivers State.
- Ho₂:** There is no significant relationship between technological capability and marketing flexibility of flexibility of food and beverage manufacturing companies in Rivers State.
- Ho₃:** There is no significant relationship between technological capability and HR flexibility of flexibility of food and beverage manufacturing companies in Rivers State.

Methodology

The study adopted a cross sectional survey research design. The population of this study was the fifteen (15) registered food and beverage firms in Rivers State. Since the unit of analysis was at organizational level, only strategic managers were included. Census sampling was adopted because the population was small, hence all the fifteen (15) registered

food and beverage firms in Rivers State were studied. Three (4) managers each were purposively selected for each company giving a total of sixty (60) respondents. Primary data was collected using a 5-point Likert scaled questionnaire. A total of sixty (60) copies of questionnaire were administered out of which fifty (51) copies were returned as valid copies and thus used for data anlysis. The reliability of the instrument was achieved by the use of the Cronbach Alpha coefficient with all the items scoring above 0.70. The hypotheses were tested using the Spearman’s Rank Order Correlation Coefficient with the aid of Statistical Package for Social Sciences version 23.0. The tests were carried out at 0.05 level of significance.

Data Analysis and Results

The level of significance 0.05 was adopted as a criterion for the probability of accepting the null hypothesis in ($p > 0.05$) or rejecting the null hypothesis in ($p < 0.05$). It shall commence with the scatter plot to show the evidence of a linear relationship between technological capability and strategic flexibility

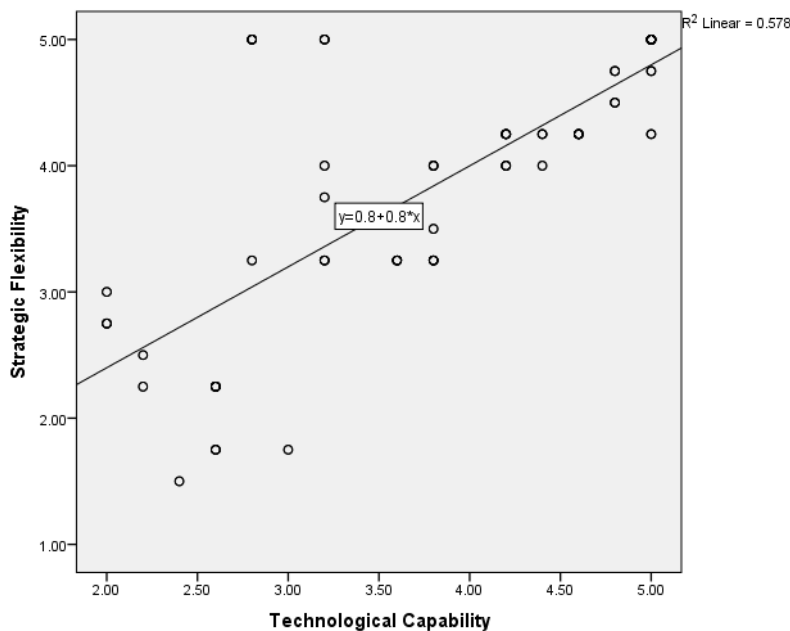


Figure 1: Scatter plot showing the direction of the relationship between technological capability and strategic flexibility

Figure 1 shows a very strong relationship between technological capability(independent variable) and strategic flexibility (dependent variable). The scatter plot graph shows that the linear value of (0.578) depicting a very strong

viable and positive relationship between the two constructs. The implication is that an increase in technological capabilities simultaneously brings about an increase in the level of strategic flexibility. The

scatter diagram has provided vivid evaluation of the closeness of the relationship among the

pairs of variable through the nature of their concentration.

Table 1: Correlations for technological capability and strategic flexibility

			Technological Capability	Strategic Flexibility
Spearman's rho	Technological Capability	Correlation Coefficient	1.000	.763**
		Sig. (2-tailed)	.	.000
		N	51	51
	Strategic Flexibility	Correlation Coefficient	.763**	1.000
		Sig. (2-tailed)	.000	.
		N	51	51

** . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output

Ho₁: There is no significant relationship between technological capability and production flexibility of food and beverage manufacturing companies in Rivers State.

indicates this relationship and it is significant at $p < 0.000 < 0.05$. The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between e technological capability and production flexibility of food and beverage manufacturing companies in Rivers State.

The correlation coefficient (r) shows that there is a significant and positive relationship between technological capability and production flexibility. The *rho* value 0.763

Table 2: Correlations for technological capability and marketing flexibility

			Technological Capability	Marketing Flexibility
Spearman's rho	Technological Capability	Correlation Coefficient	1.000	.780**
		Sig. (2-tailed)	.	.000
		N	51	51
	Marketing Flexibility	Correlation Coefficient	.780**	1.000
		Sig. (2-tailed)	.000	.
		N	51	51

** . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output

Ho₂: There is no significant relationship between technological capability and marketing flexibility of food and beverage manufacturing companies in Rivers State.

relationship and it is significant at $p < 0.000 < 0.05$. The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between e technological capability and marketing flexibility of food and beverage manufacturing companies in Rivers State.

The correlation coefficient (r) shows that there is a significant and positive relationship between technological capability and marketing flexibility. The *rho* value 0.780 indicates this

Table 3: Correlations for technological capability and strategic flexibility

			Technological Capability	HR Flexibility
Spearman's rho	Technological Capability	Correlation Coefficient	1.000	.845**
		Sig. (2-tailed)	.	.000
		N	51	51
	HR Flexibility	Correlation Coefficient	.845**	1.000
		Sig. (2-tailed)	.000	.
		N	51	51

** . Correlation is significant at the 0.01 level (2-tailed).

Source: SPSS Output

H₀₃: There is no significant relationship between technological capability and human resource flexibility of food and beverage manufacturing companies in Rivers State.

The correlation coefficient (r) shows that there is a significant and positive relationship between technological capability and human resource flexibility. The *rho* value 0.845 indicates this relationship and it is significant at $p < 0.000 < 0.05$. The correlation coefficient represents a high correlation indicating a strong relationship. Therefore, based on empirical findings the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between technological capability and human resource flexibility of food and beverage manufacturing companies in Rivers State.

Discussion of Findings

The study findings reveal that there is strong positive and significant correlation between technological capability and human resource flexibility of food and beverage manufacturing companies in Rivers State. This finding agrees with earlier studies by Oghojafor, Kuye, Ogunkoya and Shobayo (2014) whose study revealed that technological capabilities go a long way in influencing the performance of organizations. It also aligns with Obembe *et al.* (2014) and found that there was a positive impact of technological capabilities, innovations, clustering on the performance of firms on new furniture products produced monthly through adaptation or modification on

office furniture making industry. Similarly, the finding of this study is in agreement with the earlier finding of Adim and Mezeh (2020) whose study examined technological capability and organizational survival of hotels in Port Harcourt, Rivers State, Nigeria and found that that there is a positive significant relationship between technological capability and organizational survival of hotels in Port Harcourt.

Furthermore, the current study finding supports earlier studies of Latip, Salleh, Omar and Yaakub (2013) and Wang, Lo, Zhang and Xue (2006) that technological capability is one of the foundations of a firm's competitive capability. It helps firms to increase their ability to apply technical knowledge in creating and delivering innovative products that consumer may value; and thus affect the overall business performance and new product development performance of a firm. Technological capability has been recognized as an important input in industrial development (Aderemi, Oyebisi & Adeniyi, 2009).

Conclusion and Recommendations

Firms invest heavily in the building of technology capabilities that offer the skills and abilities to deploy and utilize various resources and know-how. According to Afuah (2002) and Zhou and Wu (2010) when a firm builds its technology capability, it invests substantial resources in research and development (R&D), which involves the discovery of new products, the accumulation of knowledge stores, and the training of technical personnel. A firm's

technology capability is developed over time and accumulated through its past experience. This study therefore concludes that technological capability significantly and positively predicts strategic flexibility of food and beverage companies in Rivers State. Specifically, the study concludes that technological capability significantly and positively predicts production flexibility, marketing flexibility and HR flexibility of food and beverage companies in Rivers State. The study therefore recommends that:

- i. Foods and beverages companies should pay keen attention to the technology capability by creating an environment for technology acquisition in order to enhance production flexibility.
- ii. Foods and beverages companies should invest in technology innovation and constantly evaluating the maintenance strategies for efficient and effective operations to maximise the benefits of marketing flexibility so as to enjoy competitive advantage.
- iii. Foods and beverages companies should give due attention to the impact of technological capability by specific efforts and strategies regarding choosing, establishing, comprehending, orientating, enhancing and improving technology which will aid human resource flexibility

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