

Impact of Technological Capability on Competitive Advantage of Selected Industrial Firms in South-East, Nigeria

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ABSTRACT

The study focused on the impact of technological capability on competitive advantage of selected industrial firms in South-East, Nigeria. The objective of the study was to examine the effect of technological capability on competitive advantage of selected industrial firms in South-East, Nigeria. The study adopted survey research design. The population of the study was 10420 selected industrial firms in South-East, Nigeria. A sample size of 385 (Three hundred and eighty-five) was drawn from the population using Taro yamani statistical formula. One hypothesis was formulated and tested with Simple Linear Regression model. The major findings in the study showed that: there is a significant effect of technological capability on competitive advantage of selective industrial firms in South-East, Nigeria. Hence, we concluded that new knowledge and new technology generated from R&D activities increase competitive advantage, not only at the firm's level, but also at the industry and national levels and that successful investments in R&D result in innovative products and services that enable the company to improve its sales revenue. We, therefore, recommended that for firms in the clusters to be strong collaborators and boost marketing alliances, there is a need to upgrade their activities relating to cost efficiency, quality, variety/diversification, responsiveness, acceptance of entrepreneurial risks, and a positive attitude towards change and innovation. These factors alone do not give a competitive advantage, but represent prerequisites for surviving in a globalized market., among others

Keywords: Technological capability, marketing performance, Resource based view theory and competitive advantage.

INTRODUCTION

The regional concentration of firms within a given geographic location is a phenomenon that is far more common than usually imagined (Morri and Stevens, 2020). The reasons for their origins can be linked to very distinct factors. While some industries may be concentrated in a region due to the availability of specific resources, proximity to consumer markets, or even as historical accidents, other industries do not have any natural tendency towards a concentrated location (Mori, Nikishimi, & Smith, 2019). Narver and Slater (2020) stated that since the early 1990s analyses of industrial clusters as a new alternative strategy of economic development have proliferated. Clusters are geographic concentrations of interconnected companies and institutions in a particular field, linked by commonalities and complementarities (Porter, 2003). Clusters, and their likes, have been recognized as a source of competitive advantage, capable of leveraging the competitiveness of countries and regions and providing firms located within their borders with superior performance (Nerka and Roberts, 2020). Perhaps the strongest reason for the growing interest in industrial clustering is precisely the emergence of evidence suggesting that location in these regions can provide superior performance to firms (Aloa, 2019). In the literature, examples abound of studies confirming a positive relationship between industrial concentration and firms' performance. Within some

more recent researches, operational measures such as innovation rates and staff turnover have been used to establish this relationship. Others have confirmed the influence of industrial clustering through measures of growth, such as the growth of demand, wages (Porter, 2003) and jobs (Potter and Watts, 2020). Even the market share of companies was used to confirm this relationship (Smpler, 2021). The results of these and several other studies may suggest that the evidence in favour of location in concentrations is unquestionable. However, these studies, prevalent as they are, have begun to share room with research that, at the very least, questions this relationship.

The South East part of Nigeria has one of the largest concentrations of manufacturing firms in the country and a bulk of this number are engaged in leather works, steel fabrication, motor cycle and auto spare parts, cable and wire production, garment making, switch gears, aluminum pots, personal care products, etc (Sevin, 2019). Many of these manufacturing firms in the South East States are geographically located in the form of industrial clusters. The South East Zone of Nigeria has also seen an increase in industrial activity in recent years with the development of industrial clusters in various axes of the region. These industrial clusters which include the Onitsha Plastic Cluster, Umuahia/Aba Garment Cluster, Aba Leather Cluster, Nnewi Automotive Cluster, are the flag-bearers of “made-in-Nigeria” products, and are in many cases, the only competition to foreign products that cost Nigeria significant amounts in foreign currency every year (Akinibinu, 2020). The Onitsha cluster market, Aba cluster market and Nnewi Automotive cluster market with their unprecedented growth have however contributed to industrial growth and development and economic growth at large (Tsai, 2020). In Nnewi technological learning is a common characteristic of the industrial clusters. He observed that firms acquired product capacity by copying designs from products imported from other parts of the world, and also firms learnt process technology of quality control and industrial engineering (Schmitz, 2020). Aba has one of the largest concentrations of SMEs in the South East of Nigeria and a bulk of this number is engaged in leather works, garment and textile production, and steel fabrication (Akinibinu, 2021). SMEs in Aba industrial clusters export over one million pairs of shoes and all kinds of leather products to other parts of Africa, although unofficially through indirect exports (Mugenda and Mugenda, 2019). By the year 2000, the informal shoe and garment clusters in Aba had combined annual turnover of nearly 200 million US dollars and employed some 50 thousand producers, workers and apprentices, all without the assistance of the state (Wills, 2020). Competitive advantage and the differences it creates on firm performance are often strongly related to the resources firms hold and how they are managed. To create new strategic growth alternatives, firms need to continue to invest in and upgrade their resources to achieve persistent competitive advantage and failure to respond to environmental changes severely hurt firm performance (Vaara and Durand, 2022). The business environment is continuously changing due to rapid and significant changes in technology, shorter product life cycles, escalating global competition and rapid diffusion of know-how and business practices. The ever changing dynamic nature of the Nigerian manufacturing business environment is affecting the performance of the companies giving rise to low investment, inadequate capacity utilization, and low importation of technology to boost local manufacturing. Failure to address these identified environmental problems will further affect firm’s performance negatively (Sheng, Zhou and Li, 2020).

It is against this backdrop that the study seeks to determine the effect of technological capability on competitive advantage of selected industrial firms in South East Nigeria; The research question of the study is what is the effect of technological capability on competitive advantage of selected industrial firms in South East Nigeria? The null hypothesis formulated to guide the study is that there is no significant effect of technological capability on competitive advantage of selected industrial firms in South East Nigeria.

Technological capability and marketing performance

The role of technological capability in generating perpetual stream of marketing performance is more important today than ever in improving firm’s performance in this rapidly changing technology, intense

global competition and shorter product life cycles (Wycherley, 2020). Thus fashioning a philosophy that value external capabilities and know-how is essential for collaborative performance (Yallop, 2020). Consequently, the major disquiet to firm's managers is managing the complexity of marketing performance. In this regard technological capability may be essential to resolve the concern in managing marketing performance. Technological capability enable firms create differentiation in responding to changing marketing environment through efficient innovation process (Yallop and Aliasghar, 2020). Thus technological capability is a strategic resource in facilitating the process of acquiring and combining emerging knowledge into valuable new products, and the development of complementary abilities to facilitate the production and distribution of those products (Nerkar and Roberts, 2020). Technological capability, as an important strategic resource enables firms to achieve competitive advantage within its industry. Therefore firms that develop superior technological capability are bound to achieve greater efficiency in marketing performance and superior differentiation by innovating products that response adequately to the rapidly changing market demand. (Wills, 2020). Albaladejo (2020) sees technology capability as the ability to make effective use of technological knowledge in order to assimilate, use, adapt and change existing technologies as well as the ability to create new technologies and to develop new products and processes in response to the changing economic environment to the advantage of the firm.

There are many studies that have evidenced that technology is one of the critical success factors for firms in emerging economies (Tadajewski and Jones, 2021). Firm level technological capability allows firms to reduce cost, increase efficiency, develop new knowledge and technology rapidly, reconfigure foster firm international structure, and upgrade its products and processes. Firm-level technological capability has been classified into three distinctive levels: technological acquiring capability (TAC), technological operating capability (TOC), and technological upgrading capability (TUC) (Schwarzkopf, 2020). Technological Acquiring Capability (TAC) refers to capabilities to acquire new knowledge through formal, informal, internal and external channels. In general, they form their own technological capability by gradually absorbing, digesting and improving this knowledge. Technological Operating Capability (TOC) refers to capabilities to operate, use and sustain production equipments and facilities. Accompanying with the technological capability promotion, firms will shorten the gaps with other leading companies when they continuously introduce more advanced and more complex products and process innovation and finally they will be able to produce the original product and process innovation. Technological Upgrading Capability (TUC) refers to capabilities to improve greatly on products and processes depending on firm's own strength and adjust the current product and process parameters according to changing market demands. The upgrading results will allow the firms to reach higher technological capability level (Jirayuth, Nabi and Dornberger, 2020). The positive relation between technology and marketing performance has been supported by various arguments and theories. Firstly, Firm-level technology confers market power and consequently facilitates better marketing performance. Secondly, firms with greater market presence require more proactive and aggressive technological capabilities and. lastly, technology plays an outstanding role in ensuring that firms achieve a higher level of marketing performance and to compete successfully in consumer markets (Flur and Oltar, 2020). Iyer, (2020) has observed that firms with higher productivity are more likely to increase more of their sales. Practically, managers pursue sales growth to reduce firm risk, and to escape low growth in markets (Gourlay and Seaton, 2021). Lal (2020) observed that technological collaboration between local and foreign firms can have a positive impact on marketing performance of firms. Technological collaboration in this respect can be in the form of foreign direct investment in a subsidiary of a multinational firm or technology licensing, technical agreements, trademarks, etc (Adeoti, 2020).

Competitive advantage

Competitive advantage evolves from the comparative advantage theory by the classical economist, David Ricardo, which was centred on primary production of assets and in 1985, as the society and market

advanced. Michael Porter developed the concept of cost leadership with focus on cost leadership and differentiation in product (Wikipedia, 2019). Porter (2003) defined “competitive advantage as superior differentiation and/or lower costs by comparison with the marginal (breakeven) competitor in the product market”. A firm is seen to have a competitive advantage over its competitors if it creates more economic value than the marginal competitors in its product market. Competitive advantage simply means having an edge over the competition (Ehmke, 2020). Ehmke (2020) also added that “competitive advantage is an advantage gained over competitors by offering customers great value, whether through lower prices or by providing additional benefits and service that justifies similar or possibly higher prices”. Thus, “a firm is said to have competitive advantage when it is engaging in activities that increase its efficiency or effectiveness in ways that competing firms are not, regardless of whether those other firms are in a particular firm’s industry”. Competitive advantage answers the question of “why should the customer purchase from this operation rather than the competitor’s?” that is, having an edge over ones competitors (Ehmke, 2020). He further added that competitive advantage is often a single key element that gives an edge to a business beyond what competition has or does. According to Porter (2003), there are four major components that are needed in order to maintain competitive advantage in firms. They are; the ability to respond as an organization; the ability to compete at a low cost; having an effective supply chain management; and the ability to differentiate and innovate products as needed.

Porter (2003) proposed cost leadership, differentiation and niche strategies as strategies to be adopted to have a competitive advantage over rivals. Tsai (2020) further added nine more strategies for competitive advantage, thus, growth strategy; alliance strategy; innovation strategy; operational effectiveness strategy; customer-orientation strategy; time strategy; lock in customers or suppliers’ strategy; and increased switching costs strategy. These will translate into higher margins, higher returns and superior performance. Competitive advantage is gained through strategy based on scope. To achieve this, it is necessary to look at an industry segment, a geographic area, a customer type and so on, by this advantage is gained. Possessing superior resources, defining the competitive scope in which a firm is operating and concentrating on competitive capabilities than ones competitors is not sufficient; firms need to adapt strategies that will make use of the resources effectively for it to establish a competitive advantage. For a firm to create a competitive advantage its resources should be used in the most appropriate manner to achieve the organization’s mission. Ehmke (2020) supported by stating that a firm can gain a competitive advantage over its rivals either by having sufficient lower cost structures in an industry or creating a unique image in minds of customers that the firm or its products are superior to those of its competitors. Smith and Prieto (2019) argued that firms must use and renew their tangible and intangible resources and capabilities to achieve and sustain a competitive advantage. To build competitive advantage, strategic managers ought to understand the needs of the market (customers) and devise a strategy that will make use of available resources to set the business apart from the competition. The strategy to be adopted should take into account the target market, the business’ strengths and weaknesses, the business’ goals, the product/service the business has developed, and the strategies of the competitors (Ekmke, 2008).

Competitive advantage has also been hinged on performance that is, a firm experiences competitive advantages when its actions in an industry or market create economic value and when few competing firms are engaging in similar actions. (Qing, Weijing and Wenhui,2020). Competitive advantage will mean that organizations possess resources and capabilities that are superior to that of its competitors, thus enabling it to deliver superior value to customers (Porter, 2003). These are sweeping forces in today’s business environment which drive competition, as well as rapidly transform traditional approaches to competition. These forces, brought about by globalization and changes like increasing volatility in market position, ubiquity of information, blurred company and industry boundaries, growing concern about the social and ecological environment and changing organizational structures make the competition hyper and more intense.

Resource Based Theory – Barney, (1991)

The resource-based view (RBV) emphasizes the firm’s resources as the fundamental determinants of competitive advantage and performance. It adopts two assumptions in analyzing sources of competitive advantage (Barney, 1991; Peteraf and Barney, 2003). First, this model assumes that firms within an industry (or within a strategic group) may be heterogeneous with respect to the bundle of resources that they control. Second, it assumes that resource heterogeneity may persist over time because the resources used to implement firms’ strategies are not perfectly mobile across firms (i.e., some of the resources cannot be traded in factor markets and are difficult to accumulate and imitate). Resource heterogeneity (or uniqueness) is considered a necessary condition for a resource bundle to contribute to a competitive advantage.

The argument goes “If all firms in a market have the same stock of resources, no strategy is available to one firm that would not also be available to all other firms in the market”. Like the Chicago School tradition, the RBV is an efficiency-based explanation of performance differences (Barney, 1991; Peteraf and Barney, 2003). Performance differentials are viewed as derived from rent differentials, attributable to resources having intrinsically different levels of efficiency in the sense that they enable the firms to deliver greater benefits to their customers for a given cost (or can deliver the same benefit levels for a lower cost (Peteraf and Barney, 2003). The assumed heterogeneity and immobility are not, however, sufficient conditions for sustained competitive advantage. According to Barney (1991), a firm resource must, in addition, be valuable, rare, and imperfectly imitable and substitutable in order to be source of a sustained competitive advantage. Peteraf and Barney (2003) presented four conditions underlying sustained competitive advantage: superior resources (heterogeneity within an industry), ex post limit to competition, imperfect resource mobility and ex ante limits to competition (Reibstein, Day and Wind,2020). .Peteraf and Barney (2003) made it clear that Barney’s (1991) and Peteraf’s (1993) frameworks are consistent once some terms are unambiguously defined. The RBV has developed very interesting contributions, among others, with regard to imitation with the concepts of isolating mechanisms , time compression diseconomies, asset mass efficiencies, and causal ambiguity Recently, much resource-based research has focused on intangible assets, which include information and dynamic capabilities (Sampler, 2021).

RESEARCH METHODOLOGY

The study adopted a survey design method because its approach provides a holistic and in-depth investigation of the phenomena and is compatible with a critical interpretive research paradigm. The design was descriptive and analytical in nature employing both quantitative and qualitative approaches. Survey approach allowed the researcher to solicit information that can be aggregated and quantified. The population of the study comprised of manufacturing firms in selected industrial clusters in South East Nigeria. The population that was used in the study was captured by the Development Facility Phase II

Table 1: Population distribution of the SMEs in selected Industrial clusters in South East, Nigeria

S/N	LOCATION/ ADDRESS	APPROX. NUMBER OF PRODUCERS/ SHOPS	APPROX. MINIMUM NUMBER OF EMPLOYEES	TOTAL NUMBER
	ABA LEATHER CLUSTER			
1.	Powerline	650 Shops	5	3250
2.	Shoe Plaza	1290 Shops	3	3870
3.	Bakassi	200 Producers	3	600
4.	Nwaogu	300 Shops	3	900

	ONITSHA PLASTIC CLUSTER			
5.	Osakwe Industrial Cluster, Awada	85 Industries	–	1800
	Grand Total			10420

Source: Development Facility Phase II (2018), Ihediora, (2006) and Onwuchekwa, Emele, Onwuchekwa, (2017)

Sample size Determination.

To obtain the sample from the population, Yamane (1967) sample size determination formula was used. The population of the study as stated above was 10,420 and using the Yamane’s formula, the sample size was thus;

$$n = \frac{N}{1 + N(e^2)}$$

Where n = sample size

N = Total population

e = error (0.05)

Note: Here, the researcher assumed a 5% level of significance (95% confidence level).

Thus
$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{10420}{1 + 10420(0.05)^2}$$

$$n = \frac{10420}{1 + 10420(0.0025)}$$

$$n = \frac{10420}{27.05}$$

n = 385 respondents.

Therefore, a sample size of 385 respondents was used for the study.

Data Analysis;

Table 2: Technological capabilities in the selected industrial firms in South East Nigeria

Questions	SA	A	N	D	SD	TOTAL
1. Your firm strongly emphasizes research and development, technology leadership and innovation	125 34%	146 40%	8 2%	58 16%	28 8%	365 100%

2. There is continuous in-house R&D intensity and increased manufacturing quality in components and materials in current products	189 52%	170 47%	6 1%	—	—	365 100%
3. There is a strong tie with the technology suppliers in the market.	133 36%	167 46%	—	44 12%	21 6%	365 100%
4. You manufacture with advanced technologies	170 47%	177 48%	—	11 3%	7 2%	365 100%
5. You have more skillful technical workers and operational workers.	91 25%	127 35%	16 4%	72 20%	59 16%	365 100%
6. You frequently modify your production processes to remain current in the market	184 50%	175 48%	6 2%	—	—	365 100%
7. There is strong sharing of information on production techniques and technology inputs in the cluster	179 49%	186 51%	—	—	—	365 100%
8. You improve greatly on production process based on your own ideas	138 38%	152 42%	18 5%	30 8%	27 7%	365 100%
9. Your firm develops and tests new product designs generated by it.	198 54%	167 46%	—	—	—	365 100%
10. Your products can compete favorably with foreign products	242 66%	123 34%	—	—	—	365 100%

Source: Field Survey, 2024

Table 2 contains responses on technological capabilities in the selected studied clusters in South East Nigeria. It was revealed that 34% of the respondents strongly agreed that firms in the selected studied clusters in South East Nigeria strongly emphasize on research and development, technology leadership and innovation, 40% agreed to the same item, 2% were neutral to the same item, 16% disagreed to the same item, while 8% totally disagreed to the same item. This proves that firms in the selected studied clusters in South East Nigeria are strongly emphasizing on research and development, technology leadership and innovation. It was revealed in Table 1 that 52% of the respondents strongly agreed that there is continuous in-house R&D intensity and increased of manufacturing quality in components and materials in current products in the selected studied clusters in South East Nigeria, 47% agreed to the same item, while 1% were

neutral to the item. This proves that there exists continuous in-house R&D intensity and increased manufacturing quality in components and materials in current products in the selected studied clusters in South East Nigeria.

Table 2 also revealed that 36% of the respondents strongly agreed that there is a strong tie with technology suppliers in the selected studied clusters in South East Nigeria, 46% agreed to the same item, 12% disagreed to the same item, and 6% strongly disagreed to the same item. This shows that there is a strong tie with technology suppliers in the selected studied clusters in South East Nigeria. Table 1 also revealed that 47% of the respondents strongly agreed that firms in the selected studied clusters in South East Nigeria manufacture with advanced technologies, 48% agreed to the same item, 3% disagreed to the item, while 2% strongly disagreed to the item. This shows that firms in the selected studied clusters in South East Nigeria are manufacturing with advanced technologies. It was further revealed in Table 2 that 25% of the respondents strongly agreed that firms in the selected studied clusters in South East Nigeria have more skilful technical and operational workers, 35% agreed to the same item, 4% were neutral to the item, 20% disagreed to the item, while only 16% strongly disagreed to the item. This indicates that firms in the selected studied clusters in South East Nigeria employ skilful technical and operational workers. It was revealed in Table 2 that 50% of the respondents strongly agreed that firms in the selected studied clusters in South East Nigeria frequently modify their production processes to remain current in the market, 48% agreed to the same item, while 2% were neutral to the same item. This implies that firms in the selected studied clusters in South East Nigeria are frequently modifying their production processes on order to remain current in their business markets. Table 2 also showed that 49% of the respondents strongly agreed that firms in the selected studied clusters in South East Nigeria strongly share information on production techniques and technology inputs in the cluster, while 51% agreed to the same item. It implies that firms in the selected studied clusters in South East Nigeria are strongly sharing information on production techniques and technology inputs in the cluster. It was equally revealed in Table 2 that 38% of the respondents strongly agreed that firms in the selected studied clusters in South East Nigeria improve greatly on production process based on own ideas, 42% also agreed to the same item, 5% were neutral, 8% disagreed, while 7% strongly disagreed. This implies that firms in the selected studied clusters in South East Nigeria are improving greatly on production process based on own. In Table 2, it was revealed that 54% of the respondents strongly agreed that firms in the selected studied clusters in South East Nigeria develop and test new product designs developed by them, while 46% also agreed to the same item. This implies that new product designs are developed internally by firms in the selected studied clusters in South East Nigeria. It was further revealed in Table 2 that 66% of the respondents strongly agreed that products from firms in the selected studied clusters in South East Nigeria can compete favourably with foreign products, while 34% also agreed to the same item. This implies that firms in the selected studied clusters in South East Nigeria have products that can compete favourably with foreign products.

Table 3: Marketing performance in the selected industrial firms in South East Nigeria

ITEMS	0-20%	21-40%	41-60%	61-80%	81-100%
	1	2	3	4	5
1. Sales growth	–	11	54	199	101
	–	3%	15%	55%	27%
2. Competitive advantage	–	17	77	154	117
	–	5%	21%	42%	32%
3. Market share	23	68	81	98	95
	6%	19%	22%	27%	26%
4. Profitability	76	90	144	40	15

	21%	25%	39%	11%	4%
5. Overall performance	–	38	92	146	89
	–	10%	25%	40%	24%

Source: Field Survey, 2024

Table 3 contains responses on marketing performance of firms in the selected studied clusters in South East Nigeria. It was revealed that 3% of the respondents said that their firm’s sales growth between 2016 and 2018 was within 21% – 40%, 15% of the respondents said that their firm’s sales growth between 2016 and 2018 was within 41% – 60%, 55% of the respondents said that their firm’s sales growth between 2016 and 2018 was within 61% – 80%, while 27% of the respondents said that their firm’s sales growth between 2016 and 2018 was within 81% – 100%. This shows that most of the firms in the selected studied clusters in South East Nigeria had high sales growth between 2016 and 2018. It was also revealed that 5% of the respondents said that their firm’s competitive advantage over competing firms between 2016 and 2018 was within 21% – 40%, 21% of the respondents said that their firm’s competitive advantage over competing firms between 2016 and 2018 was within 41% – 60%, 42% of the respondents said that their firm’s competitive advantage over competing firms between 2016 and 2018 was within 61% – 80%, while 32% of the respondents said that their firm’s competitive advantage over competing firms between 2016 and 2018 was within 81% – 100%. This shows that most of the firms in the selected studied clusters in South East Nigeria had strong competitive advantage over competing between the years of 2016 to 2018.

Table 3 also revealed that 6% of the respondents said that their firm’s industry market share within 2016 and 2018 was between 0%-20%, 19% of the respondents said that their firm’s industry market share within 2016 and 2018 was between 21% – 40%, 22% of the respondents said that their firm’s industry market share within 2016 and 2018 was between 41% – 60%, 27% of the respondents said that firm’s industry market share within 2016 and 2018 was between 61% – 80%, while 26% of the respondents said that their firm’s industry market share within 2016 and 2018 was between 81% – 100%. This shows that most of the firms in the selected studied clusters in South East Nigeria had fair share of their respective industries between the years of 2016 to 2018. Table 2 also revealed that 21% of the respondents said that their firm’s profitability within 2016 and 2018 was between 0%-20%, 25% of the respondents said that their firm’s profitability within 2016 and 2018 was between 21% – 40%, 39% of the respondents said that their firm’s profitability within 2016 and 2018 was between 41% – 60%, 11% of the respondents said that firm’s profitability within 2016 and 2018 was between 61% – 80%, while 4% of the respondents said that their firm’s profitability within 2016 and 2018 was between 81% – 100%. This shows that most of the firms in the selected studied clusters in South East Nigeria made good profits between the years of 2016 to 2018. Table 2 also revealed that 10% of the respondents said that their firm’s overall industry performance between 2016 and 2018 was within 21% – 40%, 25% of the respondents said that their firm’s overall industry performance between 2016 and 2018 was within 41% – 60%, 40% of the respondents said that firm’s overall industry performance between 2016 and 2018 was within 61% – 80%, while 24% of the respondents said that their firm’s overall industry performance between 2016 and 2018 was within 81% – 100%. This shows that most of the firms within the selected studied clusters in South East Nigeria performed well between 2016 and 2018.

Test of Hypothesis

HO1. Technological capability does not have any significant effect on competitive advantage of selected industrial firms in South East Nigeria

HA1. Technological capability does have significant effect on competitive advantage of selected industrial firms in South East Nigeria

Effect of technological capability on competitive advantage of selected industrial firms in South East Nigeria

Table 4: Regression on the effect of technological capability on competitive advantage of selected industrial firms in South East Nigeria

Model	Coefficient	Std. Error	t-value
Constant	1.735	0.236	7.351
Technological Capability	0.702	0.217	3.235**
F-statistic	35.21		
R	0.646		
R ²	0.583		
N	365		

Source: Field Survey, 2024

Note: ** Regression significant at 5% probability level

Table 4 shows the effect of technological capability on competitive advantage of selected firms in South East Nigeria. From the simple regression analysis table, technological capability was found to be statistically significant at 5% and with a positive figure. This implies that an increase in technological capability will result to an increase in competitive advantage of firms in selected clusters in South East Nigeria. The R square value of 0.583 shows that 58% of the variation in competitive advantage of firms in selected clusters in South East Nigeria was accounted for by technological capability. Similarly, the f-ratio value of 35.210 indicates that the model specification was correct while significant at 5%. Thus, investment in technological capabilities by firms in selected clusters in South East Nigeria can positively influence the competitive advantage of such firms. This assertion is at the 95% confidence level. Therefore, the null hypothesis stating that technological capability does not have any significant effect on competitive advantage of firms in South East Nigeria is rejected and the alternative hypothesis accepted. It can be concluded that technological capability does have significant effect on competitive advantage of firms in South East Nigeria.

DISCUSSION OF FINDINGS

In the present study regression result showed that technological capability statistically exerts significant and positive effect on sales growth and competitive advantage of firms in selected clusters in South East Nigeria. This implies that technological innovation is an important source of sales growth and a key determinant of competitive advantage for firms in industrial clusters in South East Nigeria. This is in agreement with previous studies. (Adeoti,2020). Over the past decade, the technological capability of firms has been regarded as an important strategic resource, enabling firms to achieve competitive advantage within their industry. Those firms with superior technological capability can secure greater efficiency gains by pioneering process innovations and can achieve higher differentiation by innovating products in response to the changing market environment (Tsai, 2020). For instance, the Nnewi Automotive Parts Industrial Cluster is a huge success story. Its key critical success factors include active participation of private industry associations such as Nnewi Chamber of Commerce, Industry, Mines and Agriculture and the Nigerian Association of Small Scale Industries, a social – cultural milieu characterized by competitiveness, high entrepreneurial spirit as well as investment in training and capacity to imitate and assimilate foreign technology. Many authors have further linked technological capability to firm knowledge (Gourlay and

Seaton, 2021); Flur and Oltar, 2020). Jirayuth, Nabi and Domberger (2020) proposed seven dimensions for measuring technological capability which include: technology learning, R&D, resource allocation, manufacturing ability, marketing skill, organizational skill/strategy and scale related ability. Based on the dimensions above, Wang (2020) stated that new knowledge and new technology generated from R&D activities increase competitive advantage, not only at the firm level, but also at the industry and national levels. Thus, the firms within industrial clusters in South East Nigeria need to be constantly aware of the changing environment while keeping and developing new technological capabilities in order to survive. The development of technological capability by firms in industrial clusters in South East Nigeria will no doubt be crucial for them to overcome the fast-changing and fiercely competitive domestic and global markets in which they operate.

CONCLUSION

The forms of cooperation between agents within the South East industrial clusters in terms of sharing of resources, information, technical expertise and knowledge have helped firms to grow overall sales and develop competitive strength. Industrial clusters are useful in reducing the industrial isolation that individual firms would otherwise have faced. They enable firms to specialize and improve on their competitive advantage. However, the clusters in South East Nigeria have not reached a high level of dynamism, and some depend on low technology and low skills.

RECOMMENDATIONS

In a digital age, it is expected that firms in clusters key into online platforms to promote visibility, improve information and global appeal. Such approach is necessary to enable individual firms to reposition themselves to meet up with a changing environment. For firms in the clusters to be strong collaborators and boost marketing alliances, there is a need to upgrade their activities relating to cost efficiency, quality, variety/diversification, responsiveness, acceptance of entrepreneurial risks, and a positive attitude towards change and innovation. These factors alone do not give a competitive advantage, but represent prerequisites for surviving in a globalized market.

It is also important that firms in the clusters acquire new knowledge and new technology generated from R&D activities to increase competitive advantage, not only at the firm level, but also at the industry and national levels. The successful investments in R&D result in innovative products and services that enable the company to improve its sales revenue.

The firms within industrial clusters in South East Nigeria need to be constantly aware of the changing environment while keeping and developing new technological capabilities in order to survive. The development of technological capability by firms in industrial clusters in South East Nigeria will no doubt be crucial for them to overcome the fast-changing and fiercely competitive domestic and global markets in which they operate.

REFERENCES

1. Adeoti, J. O. (2020). Investment in Technology and Export Potential of Firms in Southwest Nigeria, African Economic Research Consortium, Nairobi
2. Akinbinu, B. (2020). Informal Small Enterprises Clusters: A Case Study of Auto-Mechanic Villages in Ibadan; NISER Monograph Series, 5, 8-24, Ibadan, Nigeria.
3. Akinbinu, A. F. (2021). Industrial Reorganization for Innovations: Current Knowledge on small and Medium Enterprises Clusters in Western Nigeria: NISER Monograph Series, No 87, pp. 30-35, Ibadan, Nigeria.
4. Alao, M. (2019). *Leather Industry gets boost, as BOI embraces made in Aba*. Nigerian Tribune.

- Accessed online via www.tribuneonlineng.com/leather-industry-gets-boost-as-boi-embraces-nade-in-aba/
5. Albaladejo, M. (2020). Industrial Realities in Nigeria from bad to worse. QEH Working Paper Series – (QEH WPS 101).
 6. Barney, J. (1991). Firm Resources and Sustained Competitive Advantage”, *Journal of Management*, 17(1), 99-120.
 7. Ehmke, C. (2020). *Strategies for Competitive Advantage*. In Niche Markets: Assessment and Strategy Development for Agriculture. Western Extension Marketing Committee. University of Nevada, Reno, Technical Report UCED2007/08-13.
 8. Flur, M. and Oltra, M. J. (2020). The influence of firms’ technological capabilities on export performance in supplier dominated industries: the case of ceramic tiles firms’, *R&D Management*, 35(3), 333-347.
 9. Gourlay, A. and Seaton, J. (2021). Export intensity in UK firms, *Applied Economics Letters*, 10(8), 471-477.
 10. Iyer, K. (2020). The determinants of firm-level export intensity in New Zealand agriculture and forestry, *Economic Analysis & Policy*, 40(1), 75-86.
 11. Jirayuth, C., Nabi, M. N. and Dornberger, U. (2020). Impact of Technological Capability on the Export Performance of SMEs in Thailand
 12. Lal, K. (2020). E-Business and Manufacturing Sector: A Study of Small and Medium-Sized Enterprises in India. *Research Policy*, 31(7).
 13. Mori, T., Nikishimi, K., and Smith, T. E. (2019). A divergence statistic of industrial localization. *The Review of Economics and Statistics*, 87(4), 635-651.
 14. Morris, M., and Stevens, P. (2020). Evaluation of a New Zealand business support programme using firm performance micro-data. *Small Enterprise Research*, 17(1), 30–42. <https://doi.org/10.5172/ser.17.1.3>
 15. Mugenda, O. M. and Mugenda, A.G. (2019). *Research methods: Qualitative and qualitative approaches*. Nairobi, Kenya: Acts Press.
 16. Narver, J. C. and Slater, S. F. (2020). The effect of market orientation on business profitability. *Journal of Marketing*, 54(4), 20-35.
 17. Nerkar, A., and Roberts, P. W. (2020). Technological and product-market experience and the success of new product introductions in the pharmaceutical industry. *Strategic Management Journal*, 25, 779-799.
 18. Peteraf, M. A., and Barney, J. B. (2003). Unraveling the resource-based tangle. *Management Decision and Economics*, 24(4), 309-323.
 19. Porter, M. E. (2003). The economic performance of regions. *Regional Studies*, 37(6/7), 549-578.
 20. Potter, A. and Watts, H.D. (2020). Evolutionary agglomeration theory: Increasing returns, diminishing returns, and the industry life cycle. *Journal of Economic Geography*, 11(3), 417-455.
 21. Qing, Z., Weijing, D., and Wenhui, H. (2020). Technological Standard Alliance in China: Partner Selection and Innovation Performance. *Journal of Science and Technology Policy in China*, 3(3), 196–209.
 22. Reibstein D. J., Day G.,and Wind J. (2020). Guest editorial: is marketing academia losing its way? *Journal of Marketing*, 73(4), 1–3. <https://doi.org/10.1509/jmkg.73.4.1>.
 23. Sampler, J. (2021). Redefining Industry Structure for the Information Age. *Strategic Management Journal*, 19(4), 343-355.
 24. Schmitz, H. (2020). Collective Efficiency: Growth Path for Small-scale Industry. *Journal of Development Studies*, 31(4): 529-566.
 25. Schwarzkopf S. (2020). In search of the consumer: The history of market research from 1890 to 1960. In Jones B., Tadajewski M. (Eds.), *The Routledge Companion to Marketing History* (pp. 61–83). Routledge. <https://doi.org/10.4324/9781315882857-4>.
 26. Sevin, C. H. (2019). *Marketing Productivity Analysis*; New York: McGraw Hill.
 27. Sheng, S., Zhou, K. Z.,and Li, J. J. (2020). The effects of business and political ties on firm

- performance: Evidence from China. *Journal of Marketing*, 75, 1–15
28. Smith, M. E. and Prieto, I. M. (2019). Dynamic capabilities and knowledge management: An integrative role for learning. *British Journal of Management*, 19, 235–249.
 29. Tadajewski M., and Jones B. (2021). Historical research in marketing theory and practice: A review essay. *Journal of Marketing Management*, 30(11/12), 1239–1291. <https://doi.org/10.1080/0267257x.2014.929166>.
 30. Tsai, K. (2020). The impact of technological capability on firm performance in Taiwan's electronics industry. *Journal of High Technology Management Research*, 15, 183-195
 31. Vaara E., and Durand R. (2022). How to connect strategy research with broader issues that matter? *Strategic Organization*, 10(3), 248–255. <https://doi.org/10.1177/1476127012452827>.
 32. Wang, E. (2020). R&D efficiency and economic performance: A cross-country analysis using the stochastic frontier approach. *Journal of Policy Modeling*, 29, 345-360
 33. Wills S. (2020). *A New Era for insight management*, insight management academy. available at: <https://www.insight-management.org/>.
 34. Wycherley J. (2020). *Transforming insight: The 42 secrets of successful corporate insight teams*. Royal Leamington Spa, Warwickshire, Insight Management Academy.
 35. Yallop A. C. (2020).. *New data privacy rules are coming in NZ – businesses and other organisations will have to lift their games*. The Conversation, <https://theconversation.com/new-data-privacy-rules-are-coming-in-nz-businesses-and-other-organisations-will-have-to-lift-their-games-149425>.
 36. Yallop A. C., and Aliasghar O. (2020). No business as usual: A case for data ethics and data governance in the age of Coronavirus. *Online Information Review*, 44(6), 1217–1221. <https://doi.org/10.1108/oir-06-2020-0257>.