



Technology Orientation and Corporate Innovativeness of Quoted Manufacturing Firms in Rivers State

Martina Ofuchi Nwosisi

Post Graduate Student, Department of Management, Faculty of Management Sciences, Rivers, State University, Nkpolu- Oroworukwo, PMB 5080, Port Harcourt, Nigeria

Email: mizzmartina@gmail.com

ABSTRACT

This study examined the relationship between technology orientation and corporate innovativeness of quoted manufacturing firms in Rivers state. It adopted the cross-sectional survey in its investigation of the variables. Primary data was generated through self-administered questionnaire. The population of the paper was 20 managers of four (4) manufacturing companies in Rivers state and due to the small population, the census method of sampling was adopted. The research instrument was validated through content validity while the reliability of the instrument was achieved by the use of the Cronbach Alpha coefficient with all the items scoring above 0.70. Data generated were analyzed and presented using both descriptive and inferential statistical techniques and the hypotheses were tested using the Spearman's Rank Order Correlation Statistics. The tests were carried out at a 95% confidence interval and a 0.05 level of significance and findings revealed that there is a significant and positive relationship between technology orientation and corporate innovativeness of the quoted manufacturing firms in Rivers state. This study recommends that manufacturing firms should make use of technology orientation to develop artificial intelligence to enhance their work process and add more value to their products in order to compete on a global scale.

Keywords: Technology Orientation, Corporate Innovativeness, Product Innovation. Process Innovation

INTRODUCTION

In this globalization, integration and liberalization era of business, innovation remains a major strategy and driving force for firms' growth and survival. The introduction of novel products and services has remained the thrust behind the spring-up of new manufacturing companies and the expansion of the existing ones. Manufacturing companies must then deploy certain innovative principles and practices which basically involves the ability to sustain part or all-round improvement in products and processes to maintain competitive advantage (Roman, Piana, Lozano & Mello, 2012). Corporate innovativeness can therefore be product improvement, new production method, new market, and new source of supply or new forms of organization. Generally, organizational innovation is related to the competitive advantage of the organization, firm performance, sales growth and the success or failure of the organization. According to Popa, Preda and Boldea (2003), organizations that possess high level of motivation to innovate and therefore situate themselves in climates that would allow and encourage innovative ideas are exactly those that will innovate quickly and successfully and benefit thereof an achieved competitive advantage.

As much as corporate innovation is important for business organizations, technology orientation is also important for them. Technology orientation therefore involves regular research and development of new tools and equipment that could make work flow better (Rizwan, Gao & Ramiz-ur-Rehman, 2016). Technology has evolved over time and in this modern age of industry 4.0, orientation about technology does not only involve hardware but much emphasis is being placed on artificial intelligence software. This therefore means that manufacturing companies that are involved in technology orientation would be wise to guide their research and development team through the direction of artificial intelligence to gain competitive advantage.

The growth and development of developing nations lies in the innovative ability of its citizens, SMEs and manufacturing companies within the nation. The essential role of manufacturing companies in the growth and the development of nations' economy cannot be disputed. Manufacturing companies have remained the catalysts for economic development both for the developed and developing nations in terms of employment generation, development of indigenous entrepreneurship, forward integration with large-scale enterprises and added value to gross domestic product (GDP) (Ussahawanitchaki, 2012). It is therefore important to study these companies to derive findings capable of enhancing performance. This is why the main purpose of this paper is to examine the relationship between technology orientation and corporate innovativeness in quoted manufacturing companies of Rivers state.

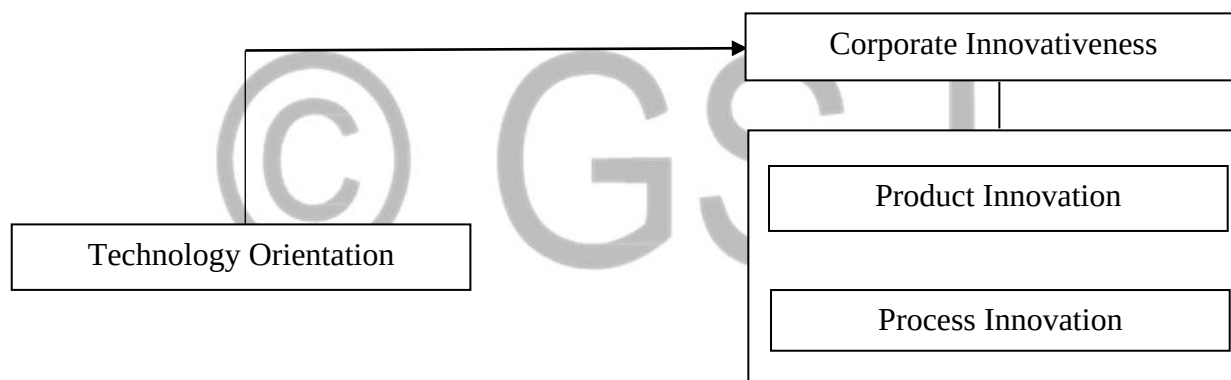


Figure 1: Conceptual Framework of Technology Orientation and Corporate Innovativeness

LITERATURE REVIEW

Theoretical Foundation

The resource-based view of the firm provides the theoretical foundation for this paper (Barney, 1991). The resource-based view of the firm argues that superior performance rests on resources and capabilities that are valuable and rare, that strategies based on these resources are costly to imitate, and finally that procedures and policies are organized to exploit the resources and capabilities. In this perspective, firms' technological orientation represents strategic capabilities that guide strategic actions for superior performance (Day, 2011). The resource-based view argues that resources that are simultaneously valuable, rare, difficult to imitate and non-substitutable are the source of competitive advantage and dynamic capabilities govern the changes in these firms' specific, unique resource bundles (capabilities) (Ambrosini and Bowman 2009). The resource based view focuses on resource heterogeneity and immobility as potential sources of competitive advantage (Barney 1991). Ray, Barney and Muhanna (2004) advocate that firms must translate efficiently and effectively their resources and capabilities into business processes, otherwise they cannot expect to realize the competitive advantage potential of their resources.

Technology Orientation

Technology orientation suggests that consumers prefer products and services of technological superiority. According to this philosophy, firms devote their resources to research and development, actively acquire new technologies, and use sophisticated production technologies (Srinivasan et al., 2002). Accordingly, a technology oriented firm is one with the ability and will to acquire a substantial technological background and use it in the development of new products. Because of their strong commitment to research and development and application of latest technologies, technology-oriented firms can build new

technical solutions and offer new and advanced products to meet customer needs. Consequently, technology-oriented firms have a competitive advantage in terms of technology leadership and offering differentiated products, which can lead to superior performance (Gatignon and Xuereb, 2007). The value of a technology orientation, however, likely depends on technological turbulence, which refers to the rate of technological changes within an industry. When the level of technological changes is relatively low, firms can benefit from relying on and making full use of their current technologies. However, because of their commitment to technological superiority, technology-oriented firms devote their resources to research development activities, which incurs substantial costs and expenses that may not be worthwhile when the pace of technological change is low. When the market environment is marked by rapid technological advances, the value and impact of prior technology deteriorates very quickly, firms must allocate more resources to technology development, experiment with new technologies, and manage uncertainty through innovations; otherwise, they will be driven out of the market due to increasingly obsolete technology (Srinivasan et al., 2002). Hence, a higher level of technology orientation is needed to cope with high levels of technological turbulence.

Corporate Innovation

Different researchers are trying to understand the phenomenon of organizational innovation. There is no consensus definition of the term “Corporate innovation” and different authors using their own approach (Lam, 2005). The term innovation means coming up with a novel or new idea. According to Linder et al (2003) innovation is “implementing new ideas that create value”. Innovation is what most organizations depend on in today’s business world (Kenter 1999). Organizational innovation relate to developing new products and processes. Process innovation can be in form of material substitution or changing the way of manufacturing with the purpose of cost reduction or quality improvement. On the other hand,

product innovation can be the form of changing the product size or shape; it can be the way of introducing new product or improving existing one. Martinez-Rose (1999), found that product innovation and process innovation are interrelated. Factors that drive organizational innovation are internal and external factors. Internal factors can be motivation, technical background, working experience and innovative ideas of entrepreneurs. On the other hand, external factors of innovation includes: customer requirements, information given by the supplier, market opportunity, availability and accessibility of institutional support, economic incentives, competition and etc.

Measures of Corporate Innovation

Product Innovation

Product innovation is the introduction of new products to the market, redesigning already well-known goods, or make use of improved resources in the production of goods that are already in the market. Danneels & Kleinsmith (2001) defined product innovativeness as product that possesses newness or a degree of newness. Product innovation refers to a product which is new, at least in some respects if not all, for the market which the product is being introduced. Innovation is driven by customer and market requirements as well as competition among suppliers in order to satisfy a certain need. Technology evolution is key in innovation of products and services (Adner and Levinthal, 2001). Innovation does not have to arise from new discoveries but it can result from products processes and organizational changes and a combination of technologies that are already in existence (Bockova & Zizlavsky, 2016). Product innovation is key, if an organization desires to be differentiated from its competitors, or it can be put across that, for an organization to remain competitive then it must consistently innovate new products and services. An improvement in product innovation leads to improved revenue growth, share performance and market capitalization, and profitability. (Drucker, 1985) Product innovation may be measured in a number of ways;

there are both input and output measures of innovation. Research and development expenditure is an input measure of innovation; while the number of new or redesigned products introduced into the market, the percentage of revenue from new or enhanced products and overall firm performance are some of the output measures of product innovation. Another potential set of output measures are intellectual property such as patents and trademarks registered (Bockova & Zizlavsky, 2016).

Process innovation

The OECD Oslo Manual (OECD, 2005) defines process innovation as “the implementation of new or significantly improved production or delivery methods. This includes significant changes in the techniques, equipment and/or software. Process innovation can be intended to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products”. While Reichstein & Salter (2006) describes process innovation as the acquisition of new capital equipment which facilitates the adoption of new and improved production process. According to Cabral, R., & Leiblein (2001), process innovation occurred through the practices of learning-by-doing and learning-by-using. Some Scholars such as Polder et al (2009) are of the view that process innovation is related to management innovation, in the sense that the management systems usually complement the technical ones.

There is ample evidence that the adoption of process innovation leads to increase productivity and growth in the long run (Polder et al., 2009). The adoption of new process innovation have been described by many scholars (Oke, 2007; Prahalad, Hamel, & June, 1990; Yamamoto & Bellgran, 2013), as radical form of innovation as it involves the phasing out of the old and obsolete equipment, and in place bring new efficient and effective machines. This may require huge capital investment, which in most cases are at the preserve of larger companies. It also increases cost of operations initially, but in the long run leads to higher growth and

profitability. In the same vein, the adoption of improved process innovation requires the blend of new and the existing production equipment, which may lead to higher operational, cost, but lower than the new process. This requires the training and the upgrading of the technical know-how of the manpower. In the long run empirical research have recorded that an adoption of improved process leads to an increase in productivity and growth (Damanpour, Szabat, & Evan, 1989; Damanpour, Walker, & Avellaneda, 2009; Hassan et al., 2013).

Technology Orientation and Corporate Innovativeness

Yang, Wang, Zhu and Wu (2012) found that technology orientation, and inter-functional orientation significantly influences new product success. Zhou, Yim, Tse (2005) examined the effects of strategic orientations on technology and market based breakthrough innovations. The results showed that technology orientation is beneficial to technology-based innovations but has no impact on market-based innovations, and an entrepreneurial orientation facilitates both types of breakthroughs. Different market forces exert significant influence on administrative- and market-based innovations, and these two types of innovations affect competitiveness differently.

Given the empirical studies that have been carried out on technology orientation and corporate innovativeness, the following null hypotheses were formulated for this paper:

- H₀₁:** There is no significant relationship between technology orientation and product innovation of quoted manufacturing companies in Rivers State
- H₀₂:** There is no significant relationship between technology orientation and process innovation of quoted manufacturing companies in Rivers State

METHODOLOGY

A cross sectional survey design was adopted for the study. The population of this paper was limited to 20 managers (senior, middle and lower management) from four manufacturing organizations quoted on the Nigerian Securities and Exchange Commission and also duly registered with the Manufacturers Association of Nigeria in Rivers State. Due to the small size of the target population, this paper adopted the census method wherein the whole population was studied. This paper was based on primary and secondary sources of data. Primary data was collected through a structured questionnaire that was designed using a five point Likert scale to allow for ease of summarization and quantification. The questionnaires were validated through content validity and tested for reliability by using Cronbach's Alpha Coefficient. The result of the reliability test is displayed in the table below:

Table 1: Cronbach's Alpha of the Paper Variables

Variables	Cronbach's Alpha (α)	No. of Items
Technology Orientation	.718	4
Product Innovation	.729	4
Process Innovation	.793	4

Source: SPSS 22.0 Output based on 2019 field survey data

20 copies of the questionnaire were distributed to the respondents of this paper of which all were retrieved and suitable for analysis. This therefore indicates a 100% response rate. data from the questionnaire were therefore analyzed using Spearman Rank Correlation Coefficient as aided by Statistical Package for Social Sciences (SPSS version 22.0).

DATA ANALYSIS AND RESULTS

The Spearman Rank Order Correlation coefficients was therefore used to test these stated null hypotheses. The 0.01 significant level was adopted as a criterion for the probability of either accepting the null hypotheses at ($p > 0.01$) or rejecting the null hypotheses at ($p < 0.01$).

Table 2: Correlations Matrix for Technology Orientation and Corporate Innovativeness

			Technology Orientation	Product Innovation	Process Innovation
Spearman's rho	Technology Orientation	Correlation Coefficient	1.000	.607**	.602**
		Sig. (2-tailed)	.	.005	.005
		N	20	20	20
	Product Innovation	Correlation Coefficient	.563**	.764**	.822**
		Sig. (2-tailed)	.010	.000	.000
		N	20	20	20
	Process Innovation	Correlation Coefficient	.607**	1.000	.852**
		Sig. (2-tailed)	.005	.	.000
		N	20	20	20

Source: Research Data , 2019 (SPSS output, version 22.0)

H₀₁: There is no significant relationship between technology orientation and product innovation of quoted manufacturing companies in Rivers state.

From the result in the table above, the correlation coefficient (rho) shows that there is a significant and positive relationship between technology orientation and product innovation. The correlation coefficient 0.563 confirms the magnitude and strength of this relationship and it is significant at $p\ 0.005 < 0.01$. The correlation coefficient represents a moderate correlation between the variables. Therefore, the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between technology orientation and product innovation of quoted manufacturing companies in Rivers state.

H₀₂: There is no significant relationship between technology orientation and process innovation of quoted manufacturing companies in Rivers state.

From the result in the table above, the correlation coefficient (rho) shows that there is a significant and positive relationship between technology orientation and process innovation. The correlation coefficient of 0.607 confirms the magnitude and strength of this relationship and it is significant at $p\ 0.005 < 0.01$. The correlation coefficient represents a high correlation

indicating also a strong relationship between the variables. Therefore, the null hypothesis earlier stated is hereby rejected and the alternate upheld. Thus, there is a significant relationship between technology orientation and process innovation of quoted manufacturing companies in Rivers state.

DISCUSSION OF FINDINGS

This study using descriptive and inferential statistical methods investigated the relationship between technology orientation and corporate innovativeness of manufacturing companies in Rivers state. The findings revealed a positive and significant relationship between technology orientation and corporate innovativeness and reinforces the view of Zhou, Yim and Tse (2005) in that, technology orientation is beneficial to technology-based innovations. In order to avoid obsolesce and promote innovation, a firm must be aware of technological changes that might influence its industry. Creative technological innovations can suggest possibilities for new products, for improvements in manufacturing or marketing techniques. (Pearce & Robinson, 2005), argue that a company can use innovation create a competitive advantage by creating barriers that deter entry of rivals, introducing novel products or technology processes that attract new customers, or changing the rules of competition in the industry and that high performing firms match investments in technology with strong managerial and technical skills (Meeta, 2009). Salge and Vera (2012) explains that innovation in an organization context may be linked to positive changes in efficiency, productivity, quality, competitiveness, and market share. However, recent research findings highlight the complementary role of organizational culture in enabling organizations to translate innovative activity into tangible performance improvements.

CONCLUSION AND RECOMMENDATIONS

Organizations are realizing that technology orientation helps them to attain innovativeness. As such much emphasis is being placed on acquiring the best and latest technology to serve as a catalyst to product and process innovation. The paper thus concludes that technology orientation influences the corporate innovativeness of manufacturing companies in Rivers state positively.

Based on the discussion and conclusion above, the following recommendations are hereby made:

- i. Management of manufacturing companies should make use of technology orientation based to make it easier for the company to analyze data through data warehousing and predict future behavior of members. The paper clearly proves that if information technology is improved then corporate innovativeness will increase.
- ii. Manufacturing companies should channel the efforts of their research and development team towards the development of artificial intelligence. Only then can they compete evenly with the best companies of the world.

REFERENCES

- Adner, R. & Levinthal, D. (2001). Demand heterogeneity and technology evolution: Implications for products and process innovation. *Management Science Review*, 47(5), 611-628.
- Ambrosini, V. & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management. *International Journal of Management Reviews*, 11(1), 29-49.
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99-120.
- Baridam, D.M. (2001). *Research methods in administrative sciences*. Port Harcourt: Scherbrooke Associates.
- Bockova, N., Zizlavsky, O. (2016), The innovation and financial performance of a company: A study from Czech Manufacturing industry. *Transformations in Business & Economics*, 15(3) 56-175.
- Cabral, R. & Leiblein, M. J. (2001). Adoption of process innovation with learning-by-doing: Evidence from the semiconductor industry. *The Journal of Industrial Economics*, 49(3), 269-280.
- Danneels, E., & Kleinschmidt, E. J. (2001). Product innovativeness from the firm's perspective: Its dimensions and their relation with project selection and performance'. *The Journal of Product Innovation Management*, 18: 357-73
- Day, G.S. (2011). Closing the marketing capabilities gap. *Journal of Marketing*, 75(4), 183-95.
- Drucker, P. F. (1985). Innovation and entrepreneurship: practice and principles.
- Gatignon, H., & Xuereb, J. M. (1997). Strategic orientation of the firm and new product performance. *Journal of Marketing Research* 34(1), 77-90.
- Kanter, R.M., (1999). From spare change to real change: The social sector as Beta site for business innovation. *Harvard Business Review*, 77 (3), 122-132.
- Lam, A., 2005. Organizational innovation. In: Fagerberg, J., Mowery, D.C., Nelson, R.R. (Eds.), *The Oxford Handbook of Innovation*. Oxford University Press, Oxford, pp. 115-147.
- Linder, J.C., Jarvenpaa, S., and Davenport, T.H., (2003), Towards an innovation sourcing strategy. *MIT Sloan Management Review*, 44 (4), 43- 47.
- Martinez-Ros, E. (1999). Explaining the Decisions to Carry out Product and Process Innovations: The Spanish Case. *The Journal of High Technology Management Research*, 10 (2): 223-42.
- Meeta, D. (2009). Technological Innovations and Role of Technology Strategy Towards Development of a Model. Global Conference on Business and Economics.

- Oke, A. (2007). Innovation types and innovation management practices in services companies. *International Journal of Operations and Production Management*, 27(6), 564-587.
- Pearce, J.A & Robinson, B. (2005). *Strategic Management, Formulation, Implementation and Control, 9th edition*. Chicago, Irwin Inc.
- Polder, M., Leeuwen, G., Mohnen, P. & Raymond, W. (2010). Product, process and organizational innovation: Drivers, complementarity and productivity effects. *SSRN Electronic Journal*,
- Prahalad, C. K & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 79-91
- Ray, G., Barney, J. B., & Muhanna, W. (2004). Capabilities, business process and competitive advantage: Choosing the dependent variable in empirical tests of resource-based view. *Strategic Management Journal*, 5, 23-37.
- Reichstein, T. & Salter, A. (2006). Investigating the sources of process innovation among UK manufacturing firms. *Industrial Corporate Change*, July, 2006, 1-30.
- Rizwan, A., Gao, L. & Ramiz-ur-Rehman, X. (2016). The impact of technology orientation and customer orientation on firm performance: Evidence from Chinese firms. *International Journal of Management and Marketing Research*, 9(1), 1-11.
- Roman, D. J. Piana, J., Lozano, M. S. P., Mello N. R., & Erdmann, R. H. (2012). Organizational competitiveness factors. *Vitória*, 9(1), 25-42.
- Salge, T.O., & Vera, A. (2012). Benefiting from public sector innovation: The moderating role of customer and learning orientation. *Public Administration Review*, 72 (4).
- Srinivasan, R., Lilien, G. L., & Rangaswamy, A. (2002). Technological opportunism and radical technology adoption: An application to e-business. *Journal of Marketing*, 66(3), 47-60.
- Ussahawanitchakit, P. (2012). Administrative innovation, technical innovation, competitive advantage, competitive environment, and firm performance of electronics businesses in Thailand, *International Academy of Business and Economic*, 12(1): 13.
- Yamamoto, Y. & Bellgran, M. (2013). Four types of manufacturing process innovation and their managerial concerns. *Precedia CIRP*, 7(2013), 479-484.
- Yang, Y., Wang, Q., Zhu, H., & Wu, G. (2012). What are the effective strategic orientations for new product success under different environments? An Empirical Study of Chinese Businesses. *Journal of Production Innovation Management*, 29, 166-179.
- Zhou, K.Z., Yim, C.K., & Tse, D.K. (2005). The effects of strategic orientations on tech- and market-based breakthrough innovations. *Journal of Marketing*, 69(2), 42-60.