



**EFFECT OF TOTAL QUALITY MANAGEMENT AND JUST-IN-TIME ON
OPERATIONAL PERFORMANCE OF FLOUR MILLS COMPANIES IN LAGOS
STATE**

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Abstract

In the manufacturing industry, the food and beverage manufacturing sector are one of the important sectors which helps in boosting of the Nigeria economy. Due to the prevailing issues such as crime, tax rates, access to finance, business licensing, political instability, competitions, the food and beverage manufacturing firms around the globe are facing some challenges such as waste, low productivity and reduction in profit which in return affect the entire performance level. Hence, this study investigated the interaction effect between Total Quality Management (TQM), Just-In-Time (JIT) and operational performance of selected flour mills companies in Lagos State, Nigeria. The study adopted cross-sectional survey research design. The research was carried out using three leading food and beverage companies under flour mill production in Nigeria, which is also listed on the Nigeria stock exchange market. Data were obtained through primary sources using self-structured and validated questionnaire. The total population was 2246 and multistage sampling technique was used for the study. The sample size was 428 calculated with Raosoft sample size calculator. The Cronbach's alpha reliability coefficient for the constructs ranges from 0.71 and 0.89 while the overall reliability coefficient was 0.914. The response rate was 78.7% and data were analysed using descriptive and inferential statistics. The findings of the study revealed that there was a statistically significant effect of TQM and operational performance of selected food and beverages manufacturing companies in Lagos State ($F_{(1,335)} = 80.742$, $R^2 = 0.194$, $p < 0.05$) and significant effect of JIT and operational performance of selected food and beverages manufacturing companies in Lagos State ($F_{(1,335)} = 35.953$, $R^2 = 0.097$, $p < 0.05$). The result also shows that there was a statistically significant effect of TQM, JIT on operational performance. The study concluded that TQM, JIT have a positive and significant effect on operational performance of selected food and beverages manufacturing companies in Lagos State, Nigeria. The study recommended that the Nigerian food and beverages industry should employ strategies to properly implement TQM and JIT practices in order to ensure that customers are satisfied; cost is reduced therefore increasing productivity and profitability.

Keywords: Flour Mills Companies, Total Quality Management, Just-In-Time, Operational performance, Waste elimination

1. Introduction

Manufacturing companies have been on pressure to improve all aspects of operational performance in terms of customer response time, flexibility and quality, as well as reducing cost of production in order to remain in the competitive environment. Among manufacturing companies especially flour mill manufacturing companies clamouring and subjected to foreign competition benchmark on the basis of quality, production cost, productivity and technological advantage. To compete and achieve sound operational performance, indigenous flour mill manufacturing companies must view customers and competitors in global terms, in order for them to remain globally relevant.

In the era of globalisation, flour mill manufacturing companies' focus on maintaining its competitiveness at the global level by offering quality products and good service. Flour mill manufacturing companies around the globe face some challenges such as waste, delay in production time, low productivity and reduction in profit which in turn affect the entire operational performance level. It has been emphasised that the operational performance of any manufacturing company is greatly affected by the type of manufacturing practices adopted which outcome can either be a profit or loss for the firm (Openda, 2013). From the Statistic of the World Bank Report, it was revealed that there has been a consistent decline in the United State manufacturing, value added GDP of 12.15%, 12.12%, 12.03%, 11.96%, 11.92%, 11.60% between 2011 and 2016 (World Bank, 2019). The USA manufacturing sector is recovering from the falling output over the past few years in order to grow the sector.

It was discovered that the factors that helped in the growth rate is the workforce quality, transportation, energy cost and the regulatory environment. According to West and Lansang (2018), there have been important changes over the past few decades in country ranking based on the manufacturing output. A relative number of nations show a fairly stable pattern over the past 40 years but a few have increased their performance. India has improved its performance from 14th in 1990 to 6th in 2015. In contrast, Spain dropped from 9th in 2005 to 14th in 2015 while Russia also dropped from 2nd in manufacturing output in 1980 to 15th in the world (West & Lansang, 2018). Other countries like United Kingdom, China, Japan, South Korea and Germany remain competitive in the manufacturing sector and keep working on improving their performance steadily. Contemporary organizations that are competitive around the world have encountered a change in perspective in their organisational exercises because of an increase in competition, environmental disorder, globalization, diversity in the workforce, increase in operation cost and change in consumer needs and wants (Ismaylis & Moschidis, 2015).

In Africa, the manufacturing industry has been constrained by some factors which lead to the problems/issues that affect their performance, which are electricity, crime, tax rates, access to finance, business licensing, political instability, bad competitions including poor education (Dinh & Clarke, 2012), although this constraints vary by country, firm size and sectors. In Kenya, the manufacturing sector which is growing is enhanced by the food, beverage and tobacco industry (KIPPRA, 2017). However, the manufacturing sector in Kenya still faces challenges such as overhauled in efficiency, high cost, outdated equipment due to political uncertainty, currency fluctuation, poor infrastructure, corruption and investment levels are low and declining which in general affect the performance of the industry (World Bank, 2018). The instability in the Kenyan currency, insecurity and political uncertainty led to the decline in the investment levels (Kamau, 2016). In the context of Ghana, the operational performance of manufacturing sector is gradually declining, the GDP of the manufacturing industry was 10.2% in 2006, reduced to 6.8% in 2010 and still reduced to 6.7% in 2011 (Dorcas, Agyeman, & Boun, 2017). Aside every other problem, power supply has been attributed to the reduction in GDP which negatively affects the performance or efficiency being the largest form of energy used by the industrial sector (Dorcas, Agyeman, & Boun, 2017).

In Nigeria, manufacturing sector is one of the lowest contributors to the GDP of the economy at 6.8%, causing an adverse effect on the economy leading to limited production of goods, hence importing large volume of goods and also increase in the preference of foreign goods to local goods because of wide difference in the quality (Ohiomah & Aigbavboa, 2015). The food and beverage industry seems to be one of the stable sectors in the manufacturing industry. It is the largest sub-sector of the Nigeria Manufacturing firms listed on the Nigeria Stock Exchange (Osundina, 2014), even at that, there are some challenges that affect the operational performance of the firm. There is a decline in the contribution of food and beverage industry over the years to overall manufacturing GDP of 64.23%, 58.92%, 56.25%, 52.73%, and 48.83. 47.5%.45.8% and 45.1% between 2010 and 2017 (CBN Statistical Bulletin, 2014; NBS, 2017).

Studies have been conducted examine effect of TQM and JIT on organisational performance of an organisation (Adeyeye, Ogunnaike, Amahian, Olokundun & Inelo, 2016; Al-Manhaway, 2013; Egbunike & Imade (2017); Ettayyem & Al-Zu'bi, 2015; Khalili, Ismail, Karim, & Daud, 2017; Nassar, Yahaya & Shorun 2015; Oisamole

& Wogu, 2014). The finding of this above studies varies therefore creating a gap in knowledge that exists on the effect and relationship between TQM & JIT and operational. The prevailing system of management has been a major cause company's face today which is the pressure to continually improve the quality of their product and at the same time reducing cost to meet the ever-increasing legal and environmental requirements and shorten product life cycles to meet changing customers' needs and remain competitive (Kim, 2016). Numerous Nigerian organizations perform abysmally because of non-implementation of Total Quality Management. They are ignorant of the programme, which reduces defect rate, and cost. Total quality management streamlines are efficient and cost effective system and process that reduce overhead and improve performance. It also emphasizes error prevention in place of error correction that increases cost (Chukwu, Adeghe, & Anyasi, 2016). Many employees lack the prerequisite skills to execute TQM successfully, it has been observed that some organisations fail to develop plans that indicate how to make TQM part of the organization, implement the plan and take all the necessary steps to improve processes of manufacturing and distribution in order to satisfy customers. This problem has not been resolved by some food and beverages companies in Nigeria. From the annual report of companies like Dangote Flour mills, it has been discovered that their profit at the end of the year has been fluctuating particularly over the past five years and this could have resulted because of the above issues (Dangote annual report, 2017). Aside from these issues affecting the profitability and productivity of manufacturing organisations, it has also resulted in poor customer satisfaction as a result of customers not being satisfied with the poor quality product/services (Ezeani & Ibijola, 2017) .

In the area of just-in-time system, this has to do with the inventory management system in an organisation, which aim is to achieve on-time delivery as well as eliminating waste as a means of reducing cost. In the flour mills companies, inventory management has been accused of incurring high cost; this is usually because of goods stock in the warehouse, excess production and poor delivery services. Just-in-time (JIT) system faces some challenges that affect the delivering/ inventory system of the organisation such as lack of top management support, lack of training and education, poor facility planning and layout, lack of resource to invest/financial constraints and poor forecasting (Jadhav, Mantha, & Rane, 2015; Machado, Scavarda, & Vaccaro, 2014). Just-in-time system is important both in manufacturing sector as well as in the service sector. Researchers such as Qureshi, Iftikha, Bhatti, Shams and Zaman, (2013) noted in their work that inventory management is a continuous issue for some organisations which does not usually have to do with cost but also production process, there have also has been issues of utilization of capital. Flour mills companies have been known to have high inventories at the end of their annual report like that of Honeywell Flour Mill. This led to high expenses and increases cost which also results to waste and in return brings about low productivity and profitability. It also has a negative impact on customer due to poor service been rendered. However, these issues have been a prevailing issue in the flour mills companies which has an adverse effect on cost by allowing organisation to increase their expenses than usual which in return reduce their profitability level due to heavy cost and also slows down the rate of production. The objective of this paper is to determine the effect of TQM and JIT on operational performance of selected flour mills companies in Lagos State, Nigeria

2. Literature Review

This sub-section of the paper focused on the conceptual and empirical review of study variables such as total quality management and just-in-time in relation with operational performance as well as theoretical framework.

2.1 Total Quality Management

Total Quality Management (TQM) concept was first propounded by Deming (1986) who created 14 points which are creation of constant purpose for improvement of product and service, adoption of quality management as a new policy, cease dependence on inspection to achieve quality, end the practice of awarding business on the basis of price tag, improve constant and forever system of production and service and to improve quality and productivity, new method of training, new method of supervision, drive out fear, cooperation between staff areas, eliminating management by objective, eliminating numerical quotas, break barriers that hinder hourly worker, new program of education and training and top management involvement of quality management (Ogbari & Borishade, 2015). Different authors have varies definition of TQM but they all identified that the quality of the product is essential to improve performance. According to Sahoo and Yadav (2017), Total Quality management is long-term strategy of an organisation whose focus is on continuous improvement and innovation, satisfying customers, satisfying employees and product quality assurances in all its stages. Al-Damen (2017); Suleman & Gul, (2015) defines Total Quality Management is a management approach used in an organisation which focus is on quality in order to ensure organizational development and long term success. This implies TQM is an approach used to improve quality, efficiency and productivity in an organisation. TQM is described as a helpful philosophy with a complete set of guiding steps and principles that plays an important role in the continuous improvement routine in organizations (Ng & Ghobakhloo, 2018)

There are some basic set of tools for TQM such as Pareto Principle, Scattered Plots, Control Charts, Flow Charts, Cause and Effects, Fishbone or Ishikawa diagram, Histogram or Bar Graph, Check list and Check Sheets. TQM leads to the manufacturing of better products at a lower cost; it focuses on using high quality information to improve processes, reduce waste, saves time, leading to expenses being reduced to be given to customers at lower prices; it helps to reduce variability; it also provides consistency that is valued by customers, it creates loyal customers ensuring that their organisation still continue/exists (Gartenstein, 2019). TQM helps in improving the image the organisation as well as their reputation within the market and it reduces cost (Alexis, 2019). Organisations find it difficult to be committed to quality improvement, due lack of management support and that of the employees and lack of effort/resources is one of the disadvantages, the inability of the management to fully implement TQM programs. (Gartenstein, 2019).

For this study, the researcher defines TQM as a strategy used by management to improve quality product at a least cost and to ensure that customers are satisfied. This implies that organisation partake in strategies planning to ensure that product and service are made to customer specification and are of good quality, at a low cost and customers are satisfied with it.

2.2 Just in Time

Just-In-Time (JIT) is a Japanese manufacturing management method developed in 70's, which was first adopted by Toyota manufacturing Plant by Taiichi Ohno who is the father of JIT. Womack and Jones (2003) referred to JIT as a method that states that the right item should be produced at the right time by an organisation. JIT is defined as a process of manufacturing which major aim is to improve productivity, reduce/eliminate waste with the company being involved and all support from employees (Rasit, Satar, & Ramli, 2018). Just-In-Time practice is regarded as a tool that helps in reducing waste and inefficiency, increases production process and delivery performance (Masudin & Kamara, 2018). JIT is a common inventory model and lean practices used in supply chain to ensure that the right amount of product is produced at the right time and quality requirement is satisfied (Durakovic, Demir, Abat, & Emek, 2018). The American Production and inventory control Society defined JIT "as a manufacturing philosophy focused on planned elimination of waste and continuous improvement of productivity (Logesh, Sankaran, & Raj, 2017). Just-in-time is a technique that focuses on the production or delivery or precisely the required amount of materials at the right time and precisely where needed (Banjoko, 1989). Just-In-Time (JIT) is an inventory management method where goods, labour, materials are slated to arrive or restocked exactly when it is necessary in the production process. JIT is achieved by laying emphasis on elements such as inventory reduction, Kanban & pull production System, Small lots & quick setups, uniform plant loading, flexible resources, efficient facility layouts (Prakash & Mothilal, 2018).

JIT has some tools, however the common tools are one piece flow, pull system, takt time, cell manufacturing, Kanban, visual control (Belekoukias, Garza-Reyes, & Kumar, 2014). There are characteristics of JIT which are requiring a long-term focus for developing production and supplying needs; supporting intense coordination to ensure a stable and regular stream of material for production, exhibiting strong relationship between the suppliers and the manufacturers, efficiency in the supply process and constant improvement to help eradicate problems during production, issues with quality and drive for more basic operations (Acevedo, 2017).

The consistent benefit of JIT is reduction in the level of inventory and/or increase in turns of inventory (Fullerton & McWatters, 2001) One of the benefits derived from JIT is that it helps organisation to effectively and efficiently meet the demand of customers and sustain competitive advantage (Rasit, Satar, & Ramli, 2018). Other benefits are increase in productivity, decrease in total production cost, improved quality process, waste reduction, and reduction in inventory. (Durakovic, Demir, Abat, & Emek, 2018). JIT benefits are high customer's satisfaction, cost savings and lower, manufacturing costs may be appreciated over an extended period (Acevedo, 2017 In JIT, less space is required, waste is being reduced, smaller investment can be made, which however results in saving cost for the organisation (Barlow, 2015).). JIT has a number of disadvantages which can have significant impact on the company when they occur such as running out of stock, no control on the time frame, poor planning (Barlow, 2015). Another disadvantage of JIT is that the cost of introduction is high and the inability of customer getting their product because there is no extra stock put in place, therefore could lead to customer dissatisfaction. Change in the economy can also negatively affect JIT. The need to tie down a large amount of money in inventory is also a disadvantage (Banjoko, 1989). The cumulative effect of this practice would result in cost reduction of operation and performance improvement and productivity of an organisation (Banjoko, 1989).

The researcher defines, JIT as a technique that is used to guarantee that the right materials are available as at when due for production, ensuring in-time delivery of goods and services to customer, satisfying customers' needs and maintaining a good relationship with them.

2.3 Theoretical Framework

2.3.1 Theory of Constraints (TOC)

This theory was propounded by an Israeli Physicist, Eliyahu M, Goldratt, 1984, in his book titled “The Goal: A Process of Ongoing Improvement”, which is geared to help organisation continually achieve their goals, he defined TOC as a thinking process that enables people to invent simple solution to complex problems. The theory of constraints is a management model that allows business and organisations to achieve breakthrough improvement in their performance. Theory of constraint is a comprehensive managerial philosophy that offers new approach to management and continuously improves operations in the company; it is a method for increasing performance and better efficiency (Sukalova & Ceniga, 2014). The underlying principle under the theory of constraints emphasizes the need to identify and eliminates bottlenecks i.e. constraints in the manufacturing process not only to increase productivity but measure and control the flow of materials (Izmailov, 2014). TOC is based on the notion that at least one bottleneck affects a system, a constraint is define by Goldratt and Cox (1992) as any element of factor that limits the system from doing more of what it was designed to accomplice goal achievement. Theory of constraints simply is the methods of identify limitation and how to solve it.

This theory of constraints has wide range of implementation scale, it can be applied in different areas of management which are production, logistics, sales and marketing, supply chain, distribution, accounting research and development, project management, and many more. The application of theory of constraint involves three ways; five focusing steps, thinking processes and throughput accounting. The five (5) steps which a identifying the constraints, exploring the constraints effectively, subordinating every related decision to the constraints, elevating the constraints and starting from first step again when the constraint elevated (Şimsit, Günay, & Vayvay, 2014).

The key assumption of the theory of constraints it that organisation can be measured and controlled by variation, the three measure are; throughput, operational expenses and inventory. Throughput is the rate at which the system generates money through sales. Operational expenses are all the money the system spends in order to turn inventory into throughput. Inventory is all money that the system has invested in purchasing thing which it intends to sell (Okutumus, Kahveci, & Kartasova, 2015). The successful implementation of theory of constraints has the following benefits, which are; increased profit, quick improvement, capacity improvement, reduction lead time and reduced inventory and customer satisfaction. One of the strength of TOC is that it is based on systematic thinking by focusing on improving efforts on critical components of the system unlike other improvement approaches that optimize performance in each areas of the system (Aguilar-Escobar, Garrido-Vega, & González-Zamora, 2016). Simatupang, Wright, Sridharan (2004) applied TOC thinking process in identifying problems in the apparel logistics management and describe the bringing together of mangers from different firms to cooperate in improving the overall firm profit.

Some authors/researcher have however criticised the theory. Trietsch D. (2004) form university of Auckland argues that drum-bifferOrope methodology is inferior to competing methodologies. Linhares (2009) also criticise this approach showing that TOC approach to establish optimal product mix unlikely to yield optimum result. Research has also claimed that this theory was borrowed from previous management science research and practice, majorly from program evaluation and review technique / critical path method and the Just in time strategy. Goldratt has been criticised on his lack of openness in his theories (Rahman, 1998). Nave (2002) argues that TOC does not regard employs and fails to empower them in the process of production; he also argued that TOC failed to address unsuccessful policies as constraints. In disparity, the critics of Goldratts work focused on lack of rigour in his work and not the bottleneck approach, which ae two different aspects of the issues (Mukherjee & Chatterjee, 2007)

2.3.2 Resources based view

This theory is an approach in achieving competitive advantage. It emerged in 1980s and the mid's-1990s which was propounded after the major works of Wernerfelt (1984) “firms as bundles of resources” as well as works of Rumelt (1984) and Barney (1986). The resource based view theory is a managerial framework used to determine strategic resource with the potential to deliver comparative advantage of a firm. RBV propose that firm are heterogeneous because they possess heterogeneous resources, meaning firms can have different strategies because they have different resource mixes. The focus of RBV is on the managerial attention of the firm's internal resource in an effort to identify the assets, capabilities and competencies with the potential to deliver superior competitive advantages

The resource-based view is interdisciplinary such that it was developed within the disciplines of economics, ethics, law, management marketing, supply chain management and general business (Hunt, 2013). The assumptions of this theory are as follows; this theory holds that a firm can be profitable in a highly competitive market as long as it can exploit advantageous resources is not always true. According to Barney (1991), the theory rests on three assumptions: that firms seek to earn above average returns; that resources are asymmetrically distributed across competing firms; and that differences in resources lead to differences in product or service characteristics that result in variations in firm performance

The supporters of this theory argue that organisations should look inside the company to find the sources of competitive advantage instead of looking at the competitive environment. Key theorists who have contributed to the development of coherent body of literature include George S. Day, Gary Hamel, Shelby D. Hunt, Hooley G. and Prahalad C.K. Sulastrri (2006) argued that RBV approach is useful by employing various strategies in controlling inventories in the organisation through optimal utilization and allocation in order to be more competitive and improve performance. RBV also uses technique such as values analysis to study the function of materials, component in identifying areas of unnecessary cost as it forms a key component of an inventory control strategy that minimises cost to the bottom line (Husnah, 2013)

RBV theory has been criticised by some researchers. It is believes that it is difficult, if not impossible to find a resource which satisfies all Barney VRIN criteria. Rumelt (1991) criticised the assumption that a firm can be profitable in a highly competitive market as long as it can exploit advantageous resources is not always true, it ignores external factors concerning the industry as a whole. Further criticism of this theory emphasised more on sustainable competitive advantage while less attention is given on competitive survival of the firm in the market (Akio, 2005). On the other hand, this led to the development of dynamics capability theory in order to fill the gap for resource based view theory.

The RBV argued that organisations have funds, a subset of which empowers them to achieve competitive advantage, and a part of those that quick predominant lengthy haul performance. RBV also highlighted that human capital assets creates competitive advantages and improve organisational performance through employee's behaviour. Basically, RBV is represented as a direction and application of relational lean manufacturing practices to support organisation to reach competitive advantages towards manufacturing performance.

2.4 Empirical Review

Manjunath and Kumar (2013); Rachmat (2015) examined the effect of total quality management on productivity, which shows that there is a significant relationship between the TQM implementation on productivity. Akhtar, Zameer and Saeed (2014); Klan (2003) researched on the impact of total quality management on the performance and productivity respectively. The finding of the study shows that there is a positive relationship between TQM and productivity which could also lead to an increase in performance. Kampouridis, Yiannopoulos, Giannopoulos and Tsirkas (2015); Nguyen, Pham and Pham (2016) examined total quality management and performance of construction companies. This study was use to evaluate the practices of TQM and also examine the relationship between TQM and performance. The study shows those organisations who implement the activities of TQM will positively increase the performance. The work of Nassar, Yahaya and Shorun (2015) shows that TQM has a positive relationship on customers' satisfaction. Total quality management tools can be used to reduce scrap thereby saving cost directly (Kumar, Mantha, & Kumar, 2009). Klan (2003); Manjunath and Kumar (2013) study was the impact of total quality management on productivity and it was revealed that when TQM is effective it can lead to greater productivity. Nguyen, Pham and Pham (2016) study was used to evaluate the practices of TQM and also examine the relationship between TQM and organisational performance. Authors like Chen, Chen and Wu (2014); Kim (2016) carried out a research on TQM and customer satisfaction both using structural equation modelling inclusive. They both discovered that when TQM increases it would have a positive impact on customer's satisfaction. Also, it show that continues improvement and quality management are one of the dimension that have impact on customer satisfaction.

Kim (2016) discovered that a lot of firms do not consider TQM to be appropriate tool for creating value and do not identify its potential for strategic contributions. Chukwu, Adeghe and Anyasi (2016) recommend that further study should evaluates customers' satisfaction level using customer perceptions rather than relying on customers' self-reported indicators. Although, there has been a positive relationship, however, further research should be based on manufacturing firms in Nigeria as there are limited resources regarding this finding. Mazanai (2012) stated that shortages of stock results to a difficult situation for most organisations and it leads to customer's dissatisfaction which eventually leads to low performance of a firm. Therefore, this study hypothesizes that

Adeyeye, Ogunnaike, Amaihian, Olokundun and Inelo (2016); Egbunike and Imade (2017); Ogbo and Ukpere (2014) study was on just-in-time/ inventory on performance. The aim of this study examines the influence of inventory on performance. The findings of this study show that there is a positive relationship between the implementation of just in time/ inventory control on performance. Researchers such as Oisamole and Wogu (2014); Sharma and Gangrade (2015) discovered that the implementation of JIT would provide companies with a competitive edge and can lead to achieving the goal of satisfaction. It shows that JIT is a continuous process and it helps in ensuring quality service as well as meeting the needs of the customers. Studies like Bhausahab and Routroy (2010); Eckert (2007); Thogori and Gathenya (2014) carried out a study on inventory management on customer satisfaction. It was revealed that inventory management plays an important role in enhancing customer's satisfaction. It shows that companies are keen in managing the inventory in other to lower cost and ensure satisfaction of customers. Poojary (2015) shows that the implementation of JIT helps to reduce buffer stock reduce cost and increase flexibility as well as enhancing profitability. Fullerton, McWatters and Fawson (2003); Juárez, Pérez and Useche (2017) shows that firm who implement JIT and maintain JIT manufacturing system would have an increase in profits between the cost components and the profitability of small and medium scale enterprises. Fullerton and McWatters (2001) study mentioned that JIT is a vital strategy in manufacturing that helps to build and sustain competitive advantage. Thogori and Gathenya, (2014) discovered that company experience shortage in terms of inventory which results in both profit and loss of customers. This shows that inventory management has an impact on customer's satisfaction.

According to Ahmad, Mehra and Pletcher (2004), the researchers assert that the effects of JIT practices on financial performance are almost non-existent. It was noted that it is very difficult to attribute improved financial performance to implementation of the new production system because companies' financial results are influenced by many factors (Demeter & Losonci, 2012). Mogere, Oloko and Okibo (2013) did not indicate what extent the control system of inventory reduces the cost of a firm. Cannon (2008) did not find support for the role of inventory reduction as a robust indicator for financial performance (Chavez, Yu, Jacobs, Fynes & Wiengarten, 2015). Due to this conclusive study, there is room to provide more insight into the relationship. This study proposes that;

Ho₁: TQM and JIT have no significant effect on operational performance of selected flour mills companies in Lagos State

3. Methodology

3.1 Theoretical Framework and Measures

The theoretical framework in this study is illustrated in Figure 1. The independent variable is total quality management and Just in Time System while the dependent variable is operational performance. The primary data for this study were collected through self-developed structured questionnaire

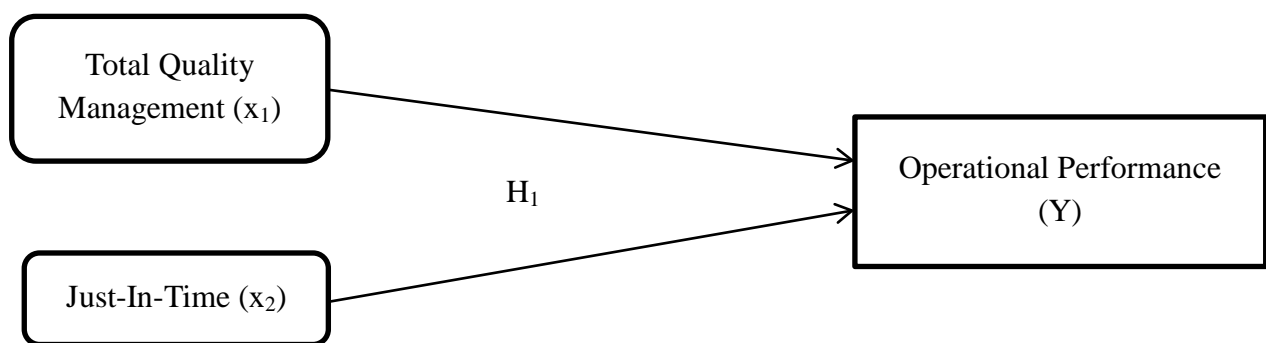


Figure 1: The theoretical model for the research variable and their relationships

Source: Developed by the Researchers (2020)

3.2 Research Design

This study used cross-sectional research design. This design was appropriate for this study because it extensively describe the relationship and effect between the variables. This design was used in order to assess the effect contributing to the observable facts (Ogbe, 2016). The survey research design was adopted in order obtain information from the focus population concerning the current status of the phenomena through primary

data collection. This research design helps to gain insight into methods of instruction, it provides for transferability, use to determine what is best for population and researcher can have control over the variables. This method was also used by (Nawanir, Gusman, Othman, Siti, & Teong, Lim., 2010; Rasit, Satar, & Ramli, 2018).

3.3 Population and Sample

The targeted population for the study was Dangote Flour mills, Flour mills of Nigeria and Honeywell Flour Mill Plc with the total of 2246 population. The justification of selection is that these companies are quoted companies in the Nigeria stock exchange, they have operating base in Lagos State, Nigeria. This companies have been established over 10 years, they produce other variety of product and the flour mills companies reports have identified them has been affected by some of the problems enumerated in this research and availability of relevant company information to aid the research. The sample size of this study was 428 which were calculated from the population of the study using Raosoft sample size calculator. After the questionnaire has been administered, 291 copies were return which was used for the analysis. Applying the formula where:

n = sample size

Confidence level = 95%

N = Finite population size which is 2813 i.e. total number of personnel within the population.

e = Maximum acceptable error margin which is 5%

Table 3.1: Summary of Sample Size

S/N	Company	Number of Staff	Sample Size	Sample %
1.	Dangote Flour Mills Plc	627	120	28.04%
2.	Flour Mills of Nigeria Plc	918	175	40.89%
3.	Honeywell Flour Mill	701	133	31.07%
	Total	2246	428	100%

Source: Researcher's survey, 2019

Multi-Stage sampling technique was used to provide an assurance that every element of the population has an equal chance of being selected in order to avoid bias in the selection of respondents. At first, the research used stratified sampling method to determine the quoted and non-quoted food and beverages companies in order to select the target population. The second stage used proportional stratified sampling techniques, selecting % out of the total number of quoted food and beverage companies. In the last stage, simple random sampling will be used to select the sample size in proportion to total respondents.

3.4 Data collection

For the purpose of the study, primary source of data collection was adopted. The primary data was sourced using questionnaire in gathering data from the top, middle and low level management staff of the selected flour mills companies in Lagos State. According to Asika (2004), Questionnaire is a good choice because it allows the anonymity of the respondents who tries to be bold to fill the appropriate answers to the questions. The study used a self-developed structured questionnaire that reflects the study objectives and questions the reason for choice because of the direct response, feedback and literacy level of the proposed respondents. The questionnaire contained information on total quality management, just in time system and operational performance. A six-point Likert scale format was adopted, the weight scale ranges from; Very high (VH) = 6, High (H) = 5; Moderately high (MH) = 4; Moderately low (ML) = 3; Low (L) = 2; Very low (VL) = 1. The data were analysed using simple linear regression through Statistical Package for Social Sciences (SPSS) version 21.

4. Data Analysis and Result

To ascertain the validity and reliability of the instrument used for data collection, a pilot was carried out. For the validity of the research instrument, content, it was evaluated using exploratory factor analysis (EFA) was used to statistically measure construct validity and the Composite reliability was used to evaluate the reliability. The results of the validity and reliability test are shown below;

Table 4.1: Construct Reliability and Validity

Variable	Number of Items	AVE	Composite reliability (CR)	KMO	Bartlett's test of Sphericity	Sig
Total Quality Management (TQM)	5	0.588	0.765	0.687	138.497	0.000
Just-In-Time (JIT)	5	0.626	0.893	0.675	30.294	0.001
Operational performance	5	0.548	0.827	0.687	294.156	0.000

Source: Extracted from SPSS

Table 4.1 displays the validity and reliability of construct of the study. Construct validity and reliability were tested using the Average Variance Extracted (AVE) and Composite Reliability (CR) which was also used by (Sadikoglu & Olcay, 2014). Composite reliability coefficient should be ≥ 0.7 while AVE coefficient should be ≥ 0.5 . Item loadings should be above 0.5. From Table 4.1, all items met the minimum criteria for a valid and reliable questionnaire.

Table 4.2: Effect of TQM and JIT on Operational Performance

Model	B	Std. Error	Beta	T	Sig.	R	Adj.R ²	F-Value	Sig.	Durbin-Watson
(Constant)	1.461	.315		4.632	.000	0.235	0.231	51.370	0.000	1.613
Total Quality Management (TQM)	.385	.058	.385	7.772	.000					
Just-In-Time (JIT)	.210	.047	.210	4.233	.000					

Dependent Variable: Operational Performance

Source: Authors' Computation (2020)

The result presented in Table 4.3 shows that total quality management and just in time has a positive significant effect on operational performance of selected flour mills companies in Lagos State Nigeria. From table 4.3, adjusted r-square is 0.231 which means that 23.1% of the variations in operational performance of selected flour mills companies in Lagos State is accounted by total quality management, just-in-time. However, the regression did not explain 76.9% of the variation in operational performance which was not captured in the model. The result shows that the model fits the data well; the total variation in the observed behaviour of operational performance is jointly explained by variation in total quality management and just-in-time up to 23.1%. The test for the overall significance of the model, the ANOVA of the F-statistics was ($F_{(2,334)} = 51.370, p < 0.05$). This indicates that there was a statistically significant effect of total quality management and just-in-time on operational performance of selected flour mills companies in Lagos State ($F = 51.370, \text{Adj.R}^2 = 0.231, p < 0.05$). Using the statistical result the regression model can be fitted as follows:

$$OP = 1.461 + 0.385TQM + 0.210JIT \dots\dots\dots\text{eq. (4.3)}$$

Where: OP= Operational Performance; TQM= Total quality management; JIT= Just In Time

Equation 4.3 presents the model's coefficients value from the regression. The results shows that total quality management and just in time were all positively correlated to operational performance of selected flour mills companies. The result further reports that a unit change in total quality management leads to 0.385 increase in operational performance of selected flour mills companies and a unit change in just in time leads to 0.210 increase operational performance of selected flour mills companies.

The results further reported that the coefficients are: total quality management ($\beta = 0.197, t = 7.772, p < 0.05$) and just in time ($\beta = 0.210, t = 4.233, p < 0.05$) are statistically significant. In the result, the just in time had the greatest and significant effect on operational performance of selected flour mills companies in Lagos State followed by just in time ($\beta = 0.210, t = 4.233, p < 0.05$). For testing the hypothesis, the regression coefficient should be significantly ($\beta \neq 0$). Therefore, since most regression coefficient was significant and also statistically difference from zero as indicated in Table 4.3c, the hypothesis was rejected. Hence, the null hypothesis (H_{01})

which states that total quality management, just-in-time do not significantly affect operational performance of selected flour mills companies in Lagos State was rejected.

4.2. Discussion of Findings

This study investigated the effect of total quality management, just in time system on operational performance of selected flour mills companies in Lagos State. The result of the study revealed that total quality management, just in time system have a positive effect on operational performance. Several conceptual studies have pointed that TQM helps in improving the image the organisation as well as their reputation within the market and it reduces cost (Alexis, 2019) and JIT is that it helps organisation to effectively and efficiently meet the demand of customers and sustain competitive advantage (Rasit, Satar, & Ramli, 2018). Other benefits are increase in productivity, decrease in total production cost, improved quality process, waste reduction, and reduction in inventory. (Durakovic, Demir, Abat, & Emek, 2018)

Empirically, researchers like Masudin and Kamara (2018) researched on the impact of just-in-time, total quality management on organisational performance: A review perspective. The aim of this study is to examine the relationship between JIT, TQM and SCM on firms and the impacts on operational performance. The result shows that the above practice individually and jointly impact organisational performance which is consistent with authors like Kannan and Tan (2005); Kayank (2003). Kampouridis, Yiannopoulos, Giannopoulos and Tsirkas (2015); Nguyen, Pham and Pham (2016) examined total quality management and performance of construction companies. This study was used to evaluate the practices of TQM and also examine the relationship between TQM and performance. The study shows those organisations who implement the activities of TQM will positively increase the performance. Adeyeye, Ogunnaike, Amaihian, Olokundun and Inelo (2016); Egbunike and Imade (2017); Ogbo and Ukpere (2014) study was on just-in-time/ inventory on performance. The aim of this study examines the influence of inventory on performance. The findings of this study show that there is a positive relationship between the implementation of just in time/ inventory control on performance.

The theoretical evidence of the effect of TQM, JIT on operational performance is evident in theory of constraint. Simatupang, Wright, Sridharan (2004) applied TOC thinking process in identifying problems in the apparel logistics management and describe the bringing together of managers from different firms to cooperate in improving the overall firm profit. It is likely that the right resources and funding for enhancing every part of a firm, even the biggest and flourishing firm have scarce resources and time available to invest in creating changes needed to advance their organisation (Mohamed & Mwanyota, 2018). Evidence has shown that changes started by management and owners to enhance their firm do not result in improvement that are measurable in performance and a substantial percentage of these alterations worsen organisational performance (Alan, 2010)

5. Conclusion and Recommendation

The study investigated the interaction of TQM, JIT and operational performance of selected flour mills companies in Lagos State. The study concluded that TQM, JIT plays an important role in enhancing the operational performance of selected flour mills companies in Lagos State. The first hypothesis result shows that TQM have significant effect on operational performance of selected flour mills companies in Lagos State. The second hypothesis result shows that JIT have significant effect on operational performance of selected flour mills companies in Lagos State. The fourth hypothesis result shows that TQM, JIT have significant influence on operational performance of selected flour mills companies in Lagos State. Based on the findings, this study offers a variety of recommendations to be implemented by the various parties concerned with the improvement of TQM, JIT in flour mills companies, Lagos State as well as in Nigeria as a whole. The study recommends that the management team of the selected companies ensure they follow the right procedure on TQM, JIT to increase operational performance.

The study has some limitations which can be viewed in line with the sequence used in carrying out the study. The distance to the study areas was a limitation which was mitigated with the use of research instrument. The method of data analysis used in this research work included the descriptive statistics and the inferential statistics. The limitation of descriptive analysis is that it only allows for summations of individuals which have actually been measured; however the use of the inferential statistics mitigated this shortcoming. The present study experienced some limitation that need to be considered. The research was limited to one state as all the participating companies are located in Lagos State; a broader geographical sampling would provide a better reflection of the national profile. Further research is required across wider geographical areas. Despite these limitations, the findings have contributed to the body of knowledge and extend literature on the effect of TQM,

JIT on operational performance of flour mills companies; unlike the automobile industry, construction industry that had been the focus of several studies in literature.

To overcome the limitation of the study the researcher suggests the need for further investigations such as further researchers could employ longitudinal survey research design to capture the dynamics of TQM, JIT and operational performance. Also, further analysis could be conducted on indigenous companies and multinational companies for comparative analysis

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