

# **OPERATIONS MANAGEMENT ACTIVITIES AND ORGANIZATIONAL SUSTAINABILITY IN MANUFACTURING COMPANIES IN RIVERS STATE, NIGERIA, WEST AFRICA.**

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## ***Abstract***

The study examined the relationship between operations management activities and organizational sustainability in manufacturing firms in Rivers State. The study draws 200 respondents which consisted of heads of departments, managers and supervisors as sample size from the population of 400 respondents, using Krejcie and Morgan's sample table, and focused on eight manufacturing companies in Rivers State. The study adopted quasi-experimental research design as it was a cross-sectional survey research. 200 copies of questionnaire were distributed out of which 126 copies were retrieved and analyzed using Spearman's Rank Order Correlation Coefficient Statistic which was facilitated by use of SPSS version 21.0. The findings revealed a positive and significant relationship between operations management activities and organizational sustainability. Hence, the study concluded that operations management activities affect organizational sustainability in manufacturing firms in Rivers State, and recommended that management should make effective use of the models of facilities layout and facilities location in decision making process. They should also develop proper inventory control mechanisms to reduce costs and wastage of materials by avoiding overloading or poor handling of materials and human resources which may cost the firm and damage the environment and the society thereby reduce the level profitability of the firm.

**Keywords:** *Operations Management Activities, Facilities layout, Maintenance, Organizational sustainability, Economic sustainability, Environmental sustainability, Social sustainability, Manufacturing Companies, Rivers State.*

## **INTRODUCTION**

The environment is highly competitive and businesses find it quite difficult to contend with sustainability. Organizational sustainability is known as ‘the triple bottom line’ (TBL) (Elkington, 1997) also known as three pillars that sustain the organization (Elkington, 1999; Savitz & Weber, 2007; Oliveira, 2002; Callado, 2010; and Wentworth, 2012). However, Munk, Dias, & Borim-De-Souza, (2012) examined the influence of competence on organizational sustainability. The above authors noted that, for the reason that firms aligned their competences into a particular management model is just the beginning for strategic plan development to attain sustainability.

Petrini and Pozzebon (2010) worked on integrating sustainability into business practices; a learning study for Brazilian. They proposed a conceptual model that enhanced the ability to the practice of “sustainability” into businesses operations. In their result, they identified a number of industrial variables that are related and enhanced understanding of putting sustainability ‘into business practices’ (Petrini & Pozzebon, 2010).

Schaltegger, Ludeke-Freund and Hansen (2011) also examine sustainability as business case, and business model role play, in the practice of innovation in organizations. They found out extant literature that explained the creation of economic value, focusing on corporate environmental and social indicators. They further expressed that the case for business sustainability is highly seen to be an ad-hoc measure, to core business practice. Moure-Eraso and Coletiva, (2003) examined the relationship between competitive capitalism in relation to how the three bottom lines which includes: the economic prosperity, environmental quality, workplace, and social justice, could be applied with other genuine approach to sustainability model (the integrated human ecosystem approach developed by the international development research center of connate in 2001) with the three bottom lines by Elkington (1999). The findings indicate that, the approach of triple bottom line is a difficult mechanism for new development of resources for sustainable development (Moure-Eraso & Coletiva, 2003). However, despite the series of research studies that has been conducted in relation to organizational sustainability, there is no examination as to how effective operations management activities would lead to organizational sustainability in manufacturing companies in Rivers State. Thus, this present study will examine the relationship between the dimensions and measures of organizational sustainability as adopted in this work, focusing on manufacturing companies in Port Harcourt in order to make recommendations on how effective operations management activities would lead to organizational sustainability in manufacturing companies in Rivers State

## **STATEMENT OF THE PROBLEM**

The major problem of non-sustainability in manufacturing companies in Rivers State is traced to lack of effective facility layout and poor inventory control mechanism which has caused low productivity level. Robbins, Judge, and Vohra (2011) noted that lack of adequate application of scientific management approach to business operations (Operations Management Activities), with regard to effective facility layout and proper inventory management may result in loss of production. In an empirical study conducted in the public sector, on productivity in Nigeria, it was identified that, the causes of low productivity were due to lack of manager’s unwillingness to manage effectively (Nwachukwu, 2006). Ineffectiveness in these areas of operations management activities has resulted in poor manufacturing process, low production quality and quantity, low market share, low growth rate, and loss of effective skilled personnel. Furthermore, lack of social sustainability in considerations of workers and societal health conditions and safety, poor facilities layout and

design that does not facilitate and improve production process, poor vehicle maintenance as mechanism for distribution of goods. These problems are detrimental to effective production and operations management activities which will actually affect organizational sustainability. Hence, these problems have prompted this study to examine the relationship between operations management activities organizational sustainability in manufacturing firms in Rivers State.

### FRAMEWORK OF THE STUDY

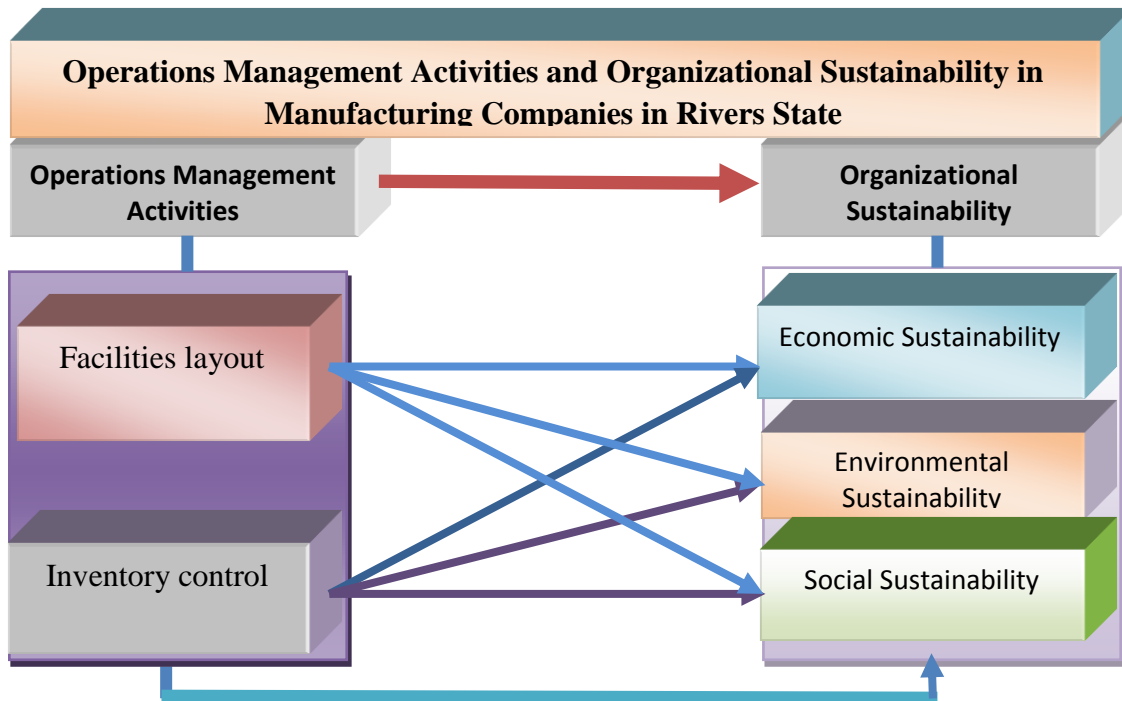


Figure 1. Operations Management Activities and Organizational Sustainability

Source: Dimensions of operations management activities were adopted from the work of Prajogo & Goh (2005). And measures of organizational sustainability were adapted from the work of Miidom, Anyanwu, & Nwuche, (2016).

**AIM AND OBJECTIVES OF THE STUDY:** The aim of the study is to examine the relationship between the dimensions of Operations Management activities and measures of Organizational sustainability as adopted in this work focusing on manufacturing Companies in Rivers State. The specific objectives of the study are to examine the relationship between facility layout and economic sustainability, facility layout and environmental sustainability, facility layout and social sustainability; maintenance and economic sustainability, maintenance and environmental sustainability, maintenance and social sustainability.

### RESEARCH QUESTIONS

The following research questions were developed to guide the study.

1. What is the relationship between facilities layout and economic Sustainability?
2. What is the relationship between facilities layout and environmental Sustainability?
3. What is the relationship between facilities layout and social Sustainability?
4. What is the relationship between inventory control and economic Sustainability?
5. What is the relationship between inventory control and environmental Sustainability?
6. What is the relationship between inventory control and social Sustainability?

### **RESEARCH HYPOTHESES:**

The following research hypotheses in null form were formulated to guide the study:

**H<sub>01</sub>:** There is no significant relationship between facilities layout and economic Sustainability.

**H<sub>02</sub>:** There is no significant relationship between facilities layout and environmental Sustainability.

**H<sub>03</sub>:** There is no significant relationship between facilities layout and social Sustainability.

**H<sub>04</sub>:** There is no significant relationship between inventory control and economic sustainability.

**H<sub>05</sub>:** There is no significant relationship between inventory control and Environmental sustainability.

**H<sub>06</sub>:** There is no significant relationship between inventory control and Social sustainability.

**SIGNIFICANCE OF THE STUDY:** It is certain that good written work can inspire a reader to know what is hidden and benefit from it by consuming every piece of information available, to add to one's knowledge. This work would add to the existing knowledge of readers to understand the concept of operations management in literature. This research study would also add to knowledge on organizational sustainability from a triple bottom-line perspective. Hence, scholars would benefit maximally from this work as it may serve as an avenue for knowledge improvement on further research studies. This work would be valuable to production/operations managers, financial managers, marketing managers, especially in decision making and control of organizational resources to attain organizational sustainability in the organizations.

**SCOPE OF THE STUDY:** The content scope of the study focused on the concepts of operations management activities and organizational sustainability in manufacturing organizations. However, the geographical scope of the study focused on manufacturing firms within Rivers State of Nigeria. Finally, the study unit is at the organizational level, which focused on the Departmental heads, Managers and Supervisors in eight manufacturing firms operating within Rivers State.

### **LITERATURE REVIEW (CONCEPT OF OPERATIONS MANAGEMENT ACTIVITIES)**

The concept of operations management is dated back to the time of Frederick Taylor, Emerson in the 1913s and Frank Gilbreith and others who started the race for development of operations management in a sense of improving productivity (Jaja & Obipi, 2005). The scientific selection (division of labour), training and empowering workers through pay or remunerations (the four scientific techniques by Taylor) were started by Frederick Taylor and his contemporaries during the early times. Close co-operation between those who plan jobs (planners) and those who do the jobs (performers) necessitate the division of equal responsibilities by management and labour (Griffin, 2005). Emerson in the 1913s developed twelve principles of efficiency that demonstrated the orientation of the scientific theories of solving problems emanated from low productivity and low workers' morale at the workplace through cost cutting and economic motivating factors to improve workers performance (Kumar & Suresh, 2008). Hence, the importance of operations management to organizational productivity and sustainability cannot be overemphasized.

### **CONCEPT OF ORGANIZATIONAL SUSTAINABILITY**

Organizational sustainability is one of the very essential elements for the survival of organizations. As Dylick and Hockets (2013) argued, sustainability has become a sound or

prayer that is repeated again and again during this 21<sup>st</sup> century that involves promising of societal changes for better in relation to a more justifiable and wealthy generation by paying and focusing on national environment and where our cultural achievements are protected and kept for the benefit of the future generations. Moneva, Archel, & Correa (2006) argued that in considerations of the traditional business dimensions, ecological and social problems were despised in management objectives as they do not have a viable financial impact, but immediately that Brundtland report in 1987 was published, sustainable development (SD) becomes a concept that is implemented by business organizations and some corporations around the world. Although Moneva et al. (2006) observed that some companies have considered sustainable development or sustainability in their policies (Adams & Robers, 1995). In addition to this, Munck et al. (2012) argued that the pursuits of economic growth and social justice were the major issues that need attention over the past 150 years. Furthermore, having a concern for the holding capacity of natural systems makes the concept of sustainability tie together with the current and foremost problems facing humanity.

**Economic sustainability:** Stavins, Wagner. & Wagner (2003) defined economic sustainability as the maintenance of the present well-being by paying attention to inter-temporal distributional equity, dynamic efficiency and international equity. Azapagic (2002) contented that when considering economic viability, the whole sense many organizations focused on is since it serves as the most critical foundation for organizational sustainable development and the benefits that emanate from its job growth affords society and the organizations the extent to which they improve their living standards.

**Environmental Sustainability:** This shows the extent to which manufacturing organizations conform to all the requirements in ISO 14001:2004 standards (see Chiapetta, 2013) which stressed the need to incorporate the required standard into environmental management systems. Moure-Eraso et al. (2003) argued that under the environmental, sustainability model is considered to be one of the important factors that management of manufacturing organizations need to seek. Cella-de-Oliveira (2013) supported this view that the concept of environmental sustainability is discussed frequently with how the biodiversity resources (human, animal and vegetations) need to be preserved from destruction. It was in the same vein that Dyllick and Hockerts (2002) argued that companies that are familiar with the environmental sustainability, only focus on consuming natural resources normally below its natural capacity, or below how this resources could be used in the production. Thus, manufacturing firms need to constant attention to recycling and waste generation, focusing on appropriate capacity to consume at a given period without waste of resource or dumping of hazardous byproducts that could damage the environment. Following ISO 14001, standards revised in 2004 will depends on factors such as; environmental policy; nature of the firm and its activities, its products, services, the location where it operate, and the conditions that it functions (Chiapetta, 2013).

**Social sustainability:** The concept of social sustainability focus on social justice, equality and involvement of social groups in the system's equilibrium maintenance by fair distribution of rights with responsibilities (Lorenztti, Cruz & Ricioli, 2008), and has its root in environmental sustainability with a strong ethical considerations based on moral obligations to future generations. Brundtland (1987) posited that even the physically narrow aspect of sustainability indicates attention for social justice between generations, and this concern must be logically extended to have a balance of equity within each generation. Therefore, humans are the central focus of social sustainability issues. Thus, triple bottom lines as indicator of organizational sustainability were thoroughly discussed as the main focus in this research



work. Wentworth (2012) argued that the condition of the environment is the basis for the considerations of the social and economic issues, but examining the boundary of all the three elements is a precondition for attaining high level of sustainability which is needed to measure and assessing sustainability and effort to enhance it (Hupples & Ishikawa, 2005; Rosen & Kishawy, 2012).

However, Eden (2011) cited in Moneva, et al. (2006) contented that the unique fact about sustainability which Scholars agreed upon is the idea of no clear definition of sustainability and it is an aspect of the challenges that induced for policy-makers and other Lobbying groups. This implies that sustainability of organizations and that of the society rests on their approach to attain to availability of goods and services, profitability, the ecological factors and human wellbeing as the focal areas that demands greater attention and considerations.

### **FACILITIES LAYOUT AND ECONOMIC SUSTAINABILITY**

Kumar and Suresh (2008) asserted that, inventory models considered idle recourse which include; men, material, machines and money. Basically two decisions emanate from inventory model. (1) How many and how much to order in terms of purchase or to produce. (2) At what particular time will they be ordered in order to minimize the total cost? Concerning the first decision, there are two basic costs which include; carrying costs and ordering costs. While the Economic Order Quantity (EOQ) is the proportion size of order that reduces total costs of goods ordered, when holding cost balances with ordering cost. In any firm, based on the type of business activities carried out, inventory need to be managed effectively. When the number of items in inventory is very large it attracts a huge sum of money to pull such level of inventory. It has becomes a concern for management to have an effective control of ordering stock, and how the stock is maintained and consumed (Kumar & Suresh, 2008).

Facilities could be seen as the workspace and the equipment necessary to perform the activities of the organization (Kumar & Suresh, 2008). These include: offices, computers, factories, and trucks. The layout, design, and location of this company's facilities serve as the integral aspect of smooth production process that is necessary to maximize the entire operations system efficiently. There are many factors that influence location decisions with respect to new producing plants (Kumar, 2012). For facility location and layout, these are: good labour climate, closeness to markets, quality of life, accessibility to the resources and suppliers, issues of utilities, the costs of real estates and taxes (Kumar, 2012). Conducive labour climate is a friendly labour climate which is one of the essential factors in decisions location issues. As Kumar (2012) noted, those firms that placed more emphases on labor and, industries like furniture and textiles industry including consumer electronics demand good labour climate which includes; satisfying pay, effective training, and motivational attitudes to work, improved work productivity and reliable strength of union. Closeness to markets is when the needs for goods and services increase, management needs to choose the location for effective facility function that will satisfy the demand.

Location that is near to markets is very essential especially when finished goods are large and possess heavy load that leads to high transportation rates. For instance those who manufacture products like plastic pipes and heavy metals need closeness to their markets to reduce costs of transportation. Quality of life which is important to Human health is at stake, therefore good health, quality education, cultural arrangements, recreation, and frequent training exercise will no doubt lead to better life. Although, some might see this factor as somehow not important, but in reality, location decisions may affect it. On the other hand,

when considering closeness to suppliers and resources, in some companies, the components of their plants are supplied to other facilities for effective management, and for effective support of staff. These may require constant decisions on coordination strategies and frequent communication that sometime becomes more challenging to control if the gap increases. Under Utilities, taxes, and real estate costs, in this aspect we talk about the cost of communication on telephone, water and energy and government taxes levied on businesses; the cost associated with relocating to another place and the cost of land (Mac'Odo, 2005). Thus, facilities location and layout may actually lead to economic sustainability.

### **FACILITIES LAYOUT AND ENVIRONMENTAL SUSTAINABILITY**

A company that have good facilities layout will not cause damage or degrade the environment (internal and external). Ayres and Ayres (2002) in Lung and Levrat (2014) argued more precisely that, for industrial companies, they need to consider environmental issues and put them into their strategy to attain sustainability. This means that industrial system is highly connected to an eco-system that demand its material flows to be analyzed which is referred to as 'industrial metabolism' and to the energy Lanes of the real world, and predispositions to consider the services to give way to the economic system to function (i.e to produce and consume). Savitz and Weber (2007) argued that a sustainable firm is the organization that is profitable to its shareholders and at the same time refused to damage the environment and strive to meet the expectation of the society or community. This implies that an organization must not maintain one of the objectives above the others, which required balances. It also means that if the company generates profits and do not consider to maintain the environment and social conditions of the community or society where they are operating, there could be insecurity for the organizational assets (Ologunorisa, 2013; Agbola, & Olurin, 2003; Ite et al., 2013). Furthermore, these companies avoid involvement in activities degrading eco-system (Dyllick & Hockerts, 2013). Lovins et al. (1999) support the above issues that ecological sustainability depends on the idea and realization that on a finite earth, the depreciating of natural capital will not go on without end, therefore, proper consideration should be given to environmental sustainability in terms of how not to use the natural source in rations to human health, climate stabilization, weather purification, soil remediation, reproduction of plants and animals (Dyllick & Hockerts, 2002).

The Environmental Rights Action (ERA) also confirmed that the chemical components of flared gas comprise of elements such as hydrocarbons, sulphur oxides, nitrogen oxides, carbon oxides, ozone, particulate, photochemical ash and hydrogen sulphide must be controlled because they have detrimental effects on human lives and the ecological environment. These chemicals threaten the survival of both human and wild life. Besides, these devastating effects is the attribution of acid rain to gas flaring (NDES, 1997) as well as the emission of about 30% of the flared gas as methane, with a global warming potential of 64 times more than carbon dioxide.

### **FACILITIES LAYOUT AND SOCIAL SUSTAINABILITY**

Under the discussion of facilities layout and environmental sustainability above, '*Quality of life*' was amongst the variables that managers need to consider when making effective choice in facilities location. Kumar and Suresh (2008) asserted that Quality of life: Good schools, recreational facilities, cultural events, and an attractive lifestyle contribute to quality of life or human needs. Adequate arrangement should be made for social issues like; cloakroom, washroom, lockers, drinking water, toilets and other employee health facilities, proper provision should be made for disposal of effluents, if any. Other factors noted by (Kumar, 2012), include: the weather of the community, the future of the community, the other

businesses in the community, and the age distribution of the population in the community. These factors are important to consider in facility layout decisions, as humans lived by these factors which might affect them.

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### **INVENTORY CONTROL AND ECONOMIC SUSTAINABILITY**

The benefits of inventory management cannot be overemphasized. Some of the important benefits of inventory management are as follows: improved customer service. An inventory policy is designed to respond to individual customers and/ or organizations request for products or services in an instantaneous manner (Kumar & Suresh, 2008). It also reduces costs. Inventory holding (or carrying) costs are the expenses that are incurred for storage of items (Garrison & Noreen, 1994). However, holding inventory items in the warehouse can indirectly reduce operating costs such as loss of goodwill and/or loss of potential sale due to storage of items. It may also encourage economics of production. It involves maintenance of operational capability. The inventory of raw material and work-in-progress items act as buffer between successive production stages so that downtime in one stage does not affect the entire production process (Kumar & Suresh, 2008). It ensures Regular supply and demand. Any unexpected changes in production and delivery schedule of a particular product and service rendering may adversely affect operating costs including level of service for customers. Hence, an optimum level of inventory and efficient delivery schedules improves customer service level by meeting customer's demand. It leads to quantity discounts. Large size replenishment orders help to take advantage of price-quantity discount (Garrison & Noreen, 1994; Kumar & Suresh, 2008). Hence, these advantages must maintain a tradeoff between storage costs and ordering costs due to obsolescence, damage, theft, insurance, etc. investment on large stock of inventory due to bulk purchases, reduces costs and the remains



may be invested in further project. Avoiding stock outs (shortages) under situations like labour strikes, natural disasters, variations in demand, and delays in supplies, etc. Inventories act as buffer and provide protection against reputation of constantly being out of stock as well as loss of goodwill (Garrison & Noreen, 1994). Garrison and Noreen (1994) observed that the reason why companies understate the cost of holding a unit of inventory is because they only consider the variable costs of holding goods and disregard other costs that are necessary which includes: accounting costs, depreciation costs, administrative costs, rent on facilities, and materials handling costs. Yet these other costs may be more important in the computation of economic order quantity than the variable costs (Garrison & Noreen, 1994).

### **INVENTORY CONTROL AND ENVIRONMENTAL SUSTAINABILITY**

It is certain that proper control of inventory could result in sustainability of the organization. The effectiveness of inventory control lies in the ability of the company to practice the model in their planning and decision making. While efficiency in inventory models focused on achieving the minimum cost of operations that maximized the organizational objectives, improper control of inventories through unsound vehicles, aircraft, railing, shipping and others may cause series of accidents and hazards to the environment. Overloading of products during conveying is another threat to the environment. Dyllick and Hockerts (2002) argued that companies considering environmental sustainability only used the natural resources moderately as it can consume, or below the rate of production so that other resources can be substituted. Furthermore, such companies do not generate emissions that affect the environment which it cannot absorb (Dyllick & Hockerts, 2002). Hence, there is need to convey only appropriate level of inventories that will not cause hazards to the environment.

### **INVENTORY CONTROL AND SOCIAL SUSTAINABILITY**

Effective inventory control practices can lead to social sustainability. A situation where the company dumped residues or waste products that could cause danger to Public health could be referred to as inappropriate inventory control practice. Lack of adequate provision medical assistance for the society after operations could also be an inappropriate inventory control. Provision and proper control of quality water for human health may lead to social sustainability. Quality Water is important for health maintenance because potable water does not cause health problem, even if you consume it for the rest of life (Huttly, Morris & Pisani, 1997; Ezzati, Hoorn, Rodgers, Lopez, Mathers, & Murray, 2003). Studies showed that about 1.1 billion people drink unsafe water (*Water Supply and Sanitation Assessment, 2000*), while those who drink unsafe water and contacted diarrhea diseases amount to 88% of over four billion cases of diarrhea diseases around the globe yearly, and those who died numbered 1.8 million from drinking contaminated water. Drinking unsafe water is also responsible for 50% of children having malnutrition traced to diarrhea diseases, and about 860,000 children died yearly from drinking contaminated water (Prüss-Üstün, Bos, Gore, & Bartram, 2008). On the other hand, lack of providing adequate and proper control of quality education may also result in social negligence which may not ensure social sustainability in the organizations.

### **METHODOLOGY**

The research design for the study is the cross section type of survey research which is an aspect of quasi-experimental design since it was not conducted in a laboratory. The study found out that there are 29 registered manufacturing firms in Port Harcourt (<http://www.Manufacturers Association of Nigeria, Rivers State chapter>). Hence, the study draws 200 respondents which consisted of heads of departments, managers and supervisors as sample size from the population of 400 respondents, using Krejcie and Morgan's sample table. The study focused on eight manufacturing companies in Rivers State. The data for this

study were collected through a well-designed questionnaire and other valuable information was collected from literatures in relation to the variables discussed. This method assisted greatly in the data collection necessary for the study. However, out of the two hundred copies of questionnaire distributed, 126 copies were retrieved and used for the analysis of the study variables.

## **MEASURES**

Facilities layout was measured using effective plant layout, and effective Building design and location etc. Five (5) items were obtained from the work of Kumar & Suresh (2008) and were used to measure this variable on the Likert 1-4 points scale. The scale consists of strongly agree, to strongly disagree. Where; strongly agree scored 4-points, Agree scored 3-points, disagree will scored 2 points, and strongly disagree scored 1 point.

Inventory control was measured using availability of buffer or safety stock and effective Control of excess stock etc. Five (5) items were adapted from the work of Borysowich (2010) and were used to measure this variable on the Likert 1-4 points scale. The scale consists of strongly agree, to strongly disagree. Where; strongly agree scored 4-points, Agree scored 3-points, disagree scored 2 points, and strongly disagree scored 1 point.

Economic Sustainability was measured: using financial feasibility or financial commitment and organizational economic growth etc. Five (5) items were derived from the work of Miidom, et al., (2016), and were used to measure this variable on the Likert 1-4 points scale type ranging from strongly agree, to strongly disagree.

Environmental Sustainability was measured using effective implementation of environmental policies: Minimized greenhouse and acidic emissions, adequate disposal of by-products and residues, minimized leaks of hazardous substances in the environment, contingency plan in case of environmental disasters etc. Five (5) items were adopted from the work of Miidom, et al., (2016), and were used to measure this variable on the Likert 1-4 points scale type.

Social Sustainability was measured using Provision of quality education and training, participation in community affairs and provision of societal health facilities. Five (5) items were derived from the work of Miidom, et al., (2016), and were used to measure this variable on the Likert 1-4 points scale type.

## **VALIDITY AND RELIABILITY OF THE STUDY INSTRUMENT**

The study adopted content and face validity. To assess the face validity, copies of the questionnaire were made available to experienced researchers in the field of management science and were confirmed as valid items. For the Reliability of the Study Instrument, the strength of the internal consistency of the instruments, were tested using Cronbach's Alpha reliability test (Cronbach, 1951) as noted in Nunnally (1978) as a super-correlation of all the items on the scale which gave a reliability alpha of 0.7. and above.

## THE STRENGTH OF THE RESEARCH VARIABLES

**Table 1. Results of Reliability Test**

Variables	Cronbach's Alpha level	Number of Cases
Facilities layout	0.744	5
Inventory control	0.789	5
Economic Sustainability	0.764	5
Environmental Sustainability	0.798	5
Social Sustainability	0.866	5
<b>Total</b>		<b>25</b>

Source: Version 21.0 SPSS Data Output, (2016).

## DATA ANALYSIS ON DEMOGRAPHIC VARIABLES

**Table 2. Response Rate on Gender**

Gender	Response Rate	Percentage
Male	90	72.0
Female	35	28.0
<b>Total</b>	<b>125</b>	<b>100%</b>

Source: Researcher's Desk, (2016).

Table 2 showed that 90(72%) of the Respondents are male while 35(28%) are female. This indicates that the majority of the respondents are male.

**Table 3. Response Rate on Marital Status**

Marital Status	Response Rate	Percentage
Single	75	60.0
Married	50	40.0
<b>Total</b>	<b>125</b>	<b>100%</b>

Source: Researcher's Desk, (2016).

Table 4.31 showed that 75(60%) of the Respondents are single while 50(40%) are female. This indicates that the majority of the respondents are single.

**Table 4. Response Rate on Age**

Age	Response Rate	Percentage
20-30 years	45	36.0
31-40	50	40.0
41-50	24	19.2
50 above	6	4.8
<b>Total</b>	<b>125</b>	<b>100%</b>

Source: Researcher's Desk, (2016).

Table 4 reports on the analysis of age of the respondents and revealed that 36% are 20-30 years, 40% are within the age of range of 31-40 years, 19.2% are 41-50 years, while only 4.8% are above 50 years. This implies that the majority ages of respondents are between 31-40 years represented by 40%.

**Table 5. Response Rate on Tenure of Respondents**

Tenure of Respondents	Frequency	Percentage
1-5 years	50	40.0
6-10 years	34	27.2
11-15 years	21	16.8
Above 15 years	20	16.0
<b>Total</b>	<b>125</b>	<b>100%</b>

Source: Researcher's Desk, (2016).

From the table 5 above, 40% said that they have served the company 1-5 years, 27.2% said 6-10years, while 16.8% said 11-15yrs and 16% indicated above 15yrs. Therefore the majority of the respondents have served the organization from 1-5yrs as observed above.

**Table 6. Response Rate on Education Qualifications**

Education Qualification	Frequency	Percent
Valid: WAEC/SSCE/NECO	20	16.0
Diploma(s)/certificate(s)	37	29.6
First Degree	53	42.4
Post Graduate Degree	15	12.0
<b>Total</b>	<b>125</b>	<b>100%</b>

Source: Researcher's Desk, (2016).

Table 6 above reports on educational qualification of the respondents. It shows that 20(16%) of the respondents are holders of WAEC/SSCE/NECO, 37(29.6%) of them are holders of Diploma (s)/ Certificate (S), 53(42.4%) of them are holders of first degree. While 15(12%) are holders of post graduate degree. The majority of the respondents in the organizations are holders of first degree accounted for (42.4%).

**Table 7. Response Rate Present position**

Present position	Frequency	Percentage
Directors	21	16.8
Production managers	48	38.4
Marketing managers	56	44.8
<b>Total</b>	<b>125</b>	<b>100%</b>

Source: Researcher's Desk, (2016).

From the table 7 above, 21(16.8%) are directors, 48(38.4%) are marketing managers, while 56(44.8%) are production managers. This shows that the majority of the respondents are production managers.

#### **DATA ANALYSIS (Univariate Analysis of Items)**

The study embarked on the analysis of the items on the questionnaire retrieved and examined whether the respondents strongly disagree, agree or strongly agree with the questions on the questionnaire. The remark whether to reject or accept the response rate on the items is based on the mean score of the items on the Likert's 4-point scale given as:

$\left\{ \frac{1+2+3+4}{4} \right\} = \frac{10}{4} = 2.5$ . The mean of the response rate that falls below 2.5 is rejected, while 2.5 and above is accepted.

Table 8 below shows the Mean score results on the study variables.

**Table 8. Mean Score Results on the Study Variables**

S/N	Variables	N	Mean Score	Remarks
1	Facilities layout	125	2.92	accepted
2	Inventory control	125	2.75	accepted
3	Economic sustainability	125	3.04	accepted
4	Environmental sustainability	125	3.01	accepted
5	Social sustainability	125	3.02	accepted

Source: Researcher's Desk, (2016).

The coded data were run using Spearman's Rank Order Correlation Coefficient Statistic which was facilitated by the use of SPSS version 21.0. The summarized result is shown below.

**Table 9. Summarized Results and Decisions from the Tested Hypotheses**

Tested Hypotheses	Correlations	P-value Results	Interpretation	Decision
Hypothesis 1 FL vs ECS	.686**	P-value 0.000 < 0.01	Strong Relationship	Rejected Ho
Hypotheses 2 FL vs ENS	.774**	P-value 0.000 < 0.01	Strong Relationship	Rejected Ho
Hypotheses 3 FL vs SS	.673**	P-value 0.000 < 0.01	Strong Relationship	Rejected Ho
Hypotheses 4 IC vs ECS	.669**	P-value 0.000 < 0.01	Very Strong Relationship	Rejected Ho
Hypotheses 5 IC vs ENS	.768**	P-value 0.000 < 0.01	Strong Relationship	Rejected Ho
Hypotheses 6 IC vs SS	.581**	P-value 0.000 < 0.01	Moderate Relationship	Rejected Ho

Source: Researcher's Desk, (2016).

Where;

FL= facility layout; IC = inventory control; ECS = economic sustainability; ENS = environmental sustainability; SS = social sustainability.



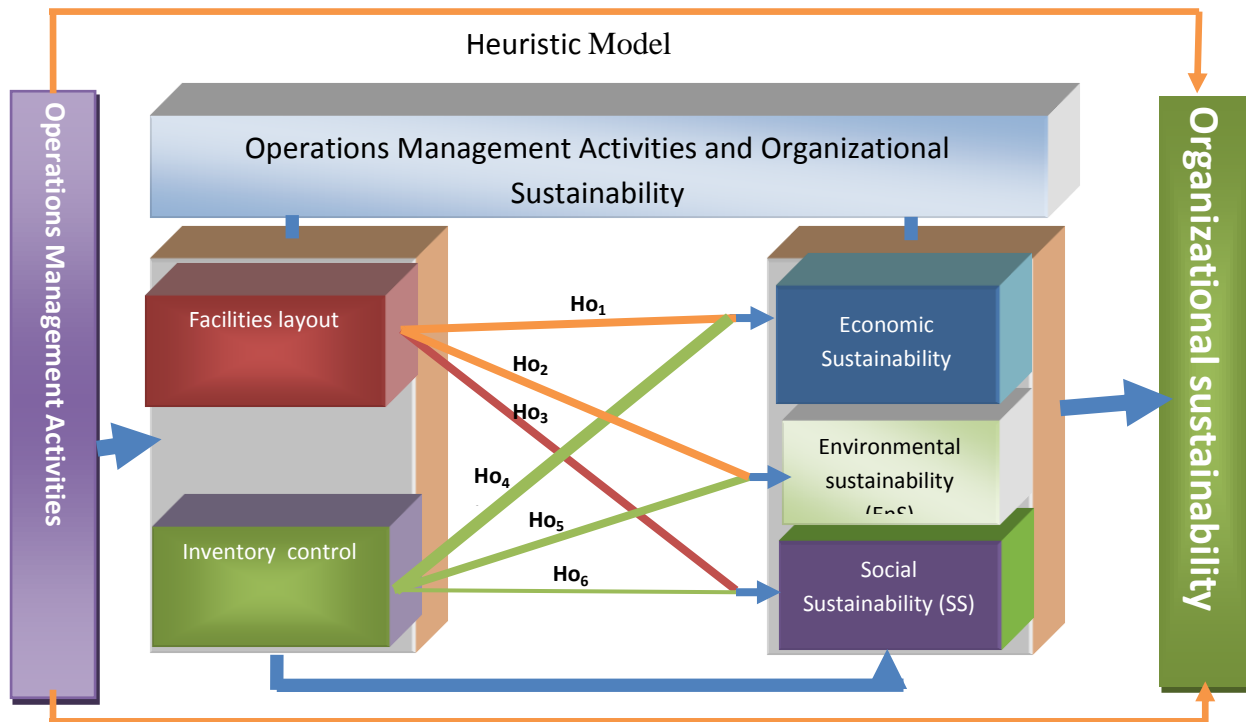


Figure Heuristic model of operations management activities and organizational sustainability.

**Key:**

- = Very Strong Relationship
- = Strong Relationship
- = Moderate Relationship

### CONCLUSION

Based on the findings, operations management activities affect organizational sustainability in oil and gas companies in Rivers State. Specifically, from the foregoing, it is also observed that operations management activities are carried out by oil and gas companies but the extent to which these activities are performed have become a serious issue that confront them to attain organizational sustainability. Lack of organizational competence has also affected the relationship between in operations management activities and organizational sustainability, which demands that the oil and gas firms need to train their key personnel for effective performance in the activities of operations management to attain organizational sustainability.

### RECOMMENDATIONS

Based on the findings of this study, the following recommendations were put forward for building strong sustainability manufacturing companies in Rivers State.

- Management should make effective use of the models of facilities layout and facilities location in decision making process.
- They should also develop proper maintenance initiatives to reduce costs and wastage of equipments and materials to attain economic growth in organizations.

### PRACTICAL IMPLICATIONS

Results have shown that good performance of operations management activities improves the economic, environmental and social conditions of the firms and thereby ensure sustainability

in the organizations. Therefore, managers are under obligations and must recognize the importance of operations management activities by focusing on it, as the most important drivers to attain sustainability, economic, environmental and social benefits.

### **CONTRIBUTIONS**

The study makes two key contributions to the existing work on operations management activities and organizational sustainability. First, the study developed an operational framework based on previous research studies. This framework assists greatly in explaining the relationship between the two dimensions of operations management activities and how they affect the three indicators of organizational sustainability. Secondly, the study showed that operations management activities could be applied not only in oil and gas sector but mostly in manufacturing firms where they have high technological operations and critical decision-making on facilities layout and inventory management.

### **LIMITATIONS OF THE STUDY**

It is noteworthy that only two dimensions of operations management activities were discussed in this work which may not be adequate to explain the fullest extent of which operations management activities affect organizational sustainability. Furthermore, the study focus on only eight manufacturing firms from 31 registered manufacturing companies which is not up to 50% of the population of manufacturing firms in Rivers State. Thus, the generalization of the study to cover all manufacturing firms in Rivers State may not be adequate and satisfactory.

### **DIRECTION FOR FUTURE RESEARCH**

The findings from this study may not be generalized for all business environments, therefore, the next future research work will focus on how operations management affects organizational sustainability in health-care organizations (Hospitals) in Rivers state, since they are highly involved in decision-making concerning adequate healthcare facilities and maintenance as well and in need of proper control of inventory of humans and resources.

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**APPENDIX A**  
**QUESTIONNAIRE: SECTION (A).**

Please tick (✓) in the appropriate box against the answer that seems most correct to you.

<b>RESPONDENT'S PERSONAL DATA</b>	
1	<b>Gender:</b> Male <span style="margin-left: 200px;">Female</span>
2	<b>Marital status:</b> Single <span style="margin-left: 100px;">Married</span>
3	<b>Age :</b> 20-30 31-40 41-50 above 50
4	<b>Tenure in the Organization:</b> (a) 1 yr-yrs (b) 5yrs-9yrs (c) 10yrs-14yrs (d) 15yrs-20yrs (e) 21yrs and above
2	<b>Educational Qualifications:</b> (a) NCE/OND (b) BSC/HND (c) MA.MBA/MSC (d) PhD
3	<b>Present Position of Respondents in the Company:</b> (a) Director (b) Marketing Manager: (C) Production Manager:

**QUESTIONNAIRE SECTION (B).**

**Please note:** In filling the below questionnaire, the following expressions will serve as a guide; SA= strongly agree; A = Agree; D = Disagree; SD = strongly disagree.

<b>FACILITIES LAYOUT</b>		<b>SA</b>	<b>A</b>	<b>D</b>	<b>SD</b>
	<i>These items were used to examine the layout pattern of facilities in the oil</i>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>

	<i>and gas companies under review</i>				
1	My company focused on cost reduction in setting the plants machinery and factory structures.				
2	My company makes effective use of process layout design that facilitates the processing of oil and gas products.				
3	My company considers the physical environment and challenges when laying oil and gas Pipes or equipment.				
4	My company make provisions for the health and safety conditions of workers and community welfare in setting up plants, machineries and production sites.				
5	My organization's careful considerations of the health and safety conditions of workers and community welfare have improved my organizational productivity.				
	<b>INVENTORY CONTROL</b> <i>These items are used to examine the control of the organizational resources it terms of oil pipes and other materials</i>	<b>SA</b> <b>4</b>	<b>A</b> <b>3</b>	<b>D</b> <b>2</b>	<b>SD</b> <b>1</b>
1	My company regularly makes visibility into excess and obsolete stock, and is it linked to targeted action plans to sell off or reduce this stock.				
2	My company uses a simple rule of thumb such as "all products made in factory ABC need 2 years of safety stock".				
3	My company applies the above practices to all aspect of inventory (finished goods, raw material, and works in process) in all organizational activities.				
4	My company cross-functional team determines the optimal frequency for producing or ordering products.				
5	My organization does not waste product except for specific purpose				

### QUESTIONNAIRE SECTION (C)

	<b>Economic sustainability</b>	<b>SA</b> <b>4</b>	<b>A</b> <b>3</b>	<b>D</b> <b>2</b>	<b>SD</b> <b>1</b>
1	My organization honour s the taxes, tributes, fees, and other government contributions that enhances economic sustainability				
2	My organization does not practice disloyal competition, trust, monopoly or dumping on economic sustainability issues.				
3	My organization's economic sustainability decisions are taken based on a formal strategic planning that encompasses the organization as a whole, made by professionals.				
4	My organization focused on risk management plans and evaluations, with concern of the company's capacity to honour financial commitment with collaborators and shareholders.				
5	My company has restructuring plans in case of exceptional events (economic market crash, natural phenomena, etc.).				
	<b>Environmental sustainability</b>	<b>SA</b>	<b>A</b>	<b>D</b>	<b>SD</b>
1	My organization has monitoring programmes of environmental performance improvement.				

2	My organization informs its collaborators at all hierarchic levels to contribute to the organization's environmental performance				
3	In my company, the causes for environmental pollution are not intentional.				
4	My organization has a process for adequate disposal of by-products and residues in a manner that does not damage the environment.				
5	My organization has a process for minimizing leaks or spills of substances that are hazardous to the environment.				
	<b>Social sustainability</b>	SA 4	A 3	D 2	SD 1
1	My organization offers safety conditions and occupational health, minimizing rates of lesions, occupational illness, sick days, days off and deaths related to work.				
2	My organization assists people with special needs, immigrants, minorities, etc.				
3	My organization has a concern with the quality of life of its workers and the society.				
4	My organization communicates social policies to the society collaborators and disseminated through all hierarchical levels.				
5	My company offer free training and education to its workers and the society.				
5	My company needs to train its workers or key personnel for effective operations management activities.				