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SENSITIVITY ANALYSIS AND ORGANISATIONAL PRODUCTIVITY OF SELECTED PAINT MANUFACTURING FIRMS IN PORT HARCOURT, RIVERS STATE

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ABSTRACT

This study examines the relationship between sensitivity analysis and organisational productivity of selected paint manufacturing firms in Port Harcourt, Rivers State. Correlational survey research design was adopted for this study as this study seek to determine the relationship between the two variables. The population of this study was eleven (11) paint manufacturing companies in Rivers State which are registered with the Rivers State branch of Paint Manufacturers Association of Nigeria (PMAN). This gave us a total of thrity-three (33) for the study. Structured questionnaire instrument title "sensitivity analysis and organisational productivity of selected paint manufacturing firms in Rivers State". The questionnaire was developed on five-point likert scale. The result of the Cronbach's Alpha reliability test indicates .800 which is above .70 which implies that the items are reliable. Pearson product moment correlation was used to test the hypotheses using SPSS (Statistical Package Social Sciences). The study revealed that there is a significant relationship between cost sensitivity and organisational productivity of paint manufacturing firms in Rivers State. There is a significant relationship between demand sensitivity and organisational productivity of paint manufacturing firms in Rivers State. There is a significant relationship between capacity sensitivity and organisational productivity of paint manufacturing firms in Rivers State. The study concluded that there is a significant positive correlation between sensitivity analysis and organisational productivity in paint manufacturing firms in Rivers State. This finding underscores the strategic importance of digital integration in enhancing operational efficiency, market reach, and overall competitiveness within the industry. The study recommended that management of paint manufacturing firms should continuously evaluate and adapt their business models to align with changing market dynamics, customer needs, and competitive pressures.

INTRODUCTION

Sensitivity analysis has gained prominence as a crucial tool in operational research and strategic planning, enabling organizations to examine how variations in input variables affect outcomes and decisions. In the context of business and industrial operations, sensitivity analysis serves as a diagnostic and predictive mechanism to assess the responsiveness of key performance indicators to fluctuations in economic, operational, or environmental variables (Saltelli et al., 2008). Central to this concept are dimensions such as cost sensitivity, demand sensitivity, and capacity sensitivity. Cost sensitivity evaluates the responsiveness of production and operational costs to changes in resource pricing or financial inputs, which is essential in managing profitability and budgeting accuracy (Pannell, 1997). Demand sensitivity refers to how shifts in customer preferences, market demand, or external conditions influence output levels and revenue forecasts, necessitating agility in production planning and supply chain management (Trietsch & Baker, 2012). Capacity sensitivity, on the other hand, concerns how infrastructural limitations or enhancements impact the organization's ability to scale operations or adapt to varying levels of demand, which directly affects lead time, resource utilization, and service quality (Saltelli et al., 2010).

Organizational productivity, particularly in manufacturing contexts, is a multi-dimensional construct encompassing the ability of firms to efficiently convert inputs into valuable outputs while maintaining

competitiveness and sustainability. Productivity is frequently measured by output quality, innovation levels, and operational efficiency (Sink & Tuttle, 1989). Quality output reflects the degree to which products meet predefined specifications and customer expectations, playing a critical role in brand reputation and customer loyalty (Deming, 1986). Innovation, another dimension, encompasses the capacity of firms to develop new products, processes, or organizational methods that enhance competitiveness and adaptiveness (Damanpour & Evan, 1984). Efficiency, the third dimension, entails minimizing waste, reducing production time, and optimizing resource use, thereby ensuring that organizational goals are met at the lowest possible cost without compromising output standards (Porter, 1996). These performance metrics are particularly vital in sectors such as paint manufacturing, where material cost, product differentiation, and timely delivery are decisive competitive factors.

The relationship between sensitivity analysis and organizational productivity is increasingly recognized, especially in manufacturing industries that operate in volatile markets or resource-constrained environments. In the paint manufacturing sector of Rivers State, firms must contend with fluctuating raw material prices, inconsistent demand cycles, and infrastructural bottlenecks, all of which make sensitivity analysis a valuable strategic asset. By applying sensitivity analysis across cost, demand, and capacity variables, managers can simulate various operational scenarios, anticipate bottlenecks, and make evidence-based adjustments to enhance productivity (Sobol, 2001). For example, understanding cost sensitivity allows firms to negotiate better supply contracts or adopt cost-saving technologies, while insights from demand sensitivity can inform marketing strategies or inventory planning. Similarly, capacity sensitivity assessments can guide investment in plant upgrades or workforce expansion, aligning production capabilities with market needs (Saltelli et al., 2004). Consequently, firms that integrate sensitivity analysis into their decision-making processes are more likely to maintain high productivity through sustained quality, innovation, and efficiency.

Given the fluctuating costs of raw materials, energy instability, and changing consumer behaviors, sensitivity analysis provides a dynamic tool for managing uncertainties and ensuring continuous productivity improvement. Empirical studies have shown that organizations that adopt structured sensitivity analysis frameworks are better positioned to optimize resource allocation, reduce operational risks, and achieve consistent performance across productivity indicators (Campolongo et al., 2000; Saltelli et al., 2010). Therefore, establishing a clear understanding of how each sensitivity dimension correlates with productivity measures such as quality, innovation, and efficiency is essential for building resilience and fostering sustainable growth in the manufacturing sector. Thus, this study seeks to explore the interplay between sensitivity analysis and organizational productivity within the context of paint manufacturing firms in Rivers State.

Statement of the Problem

The problems affecting organisational productivity in paint manufacturing firms in Port Harcourt are multi-faceted, touching on quality output, innovation deficits, and operational inefficiencies. These challenges are often rooted in structural, managerial, and technological limitations that hinder the firms' ability to achieve sustainable competitive advantages. Quality output problems are often a result of inadequate production controls, substandard raw materials, and inconsistent regulatory compliance. Poor product quality can lead to high rates of product rejection, customer dissatisfaction, and a damaged brand image. In an industry where customer loyalty and brand reputation are pivotal, these quality issues can result in significant financial losses and reduced market share (Okafor & Nwankwo, 2020).

Innovation problems further compound the productivity challenge. Paint manufacturing firms in the region are generally slow to adopt new technologies or develop novel products. This is frequently due to a lack of research funding, limited technical know-how, and management's aversion to risk-taking (Adeleke & Salau, 2019). Without innovation, firms are unable to diversify their product offerings, improve production efficiency, or meet evolving customer and environmental demands.

Consequently, they remain vulnerable to market shifts, regulatory pressures, and competitive threats from more agile and technologically advanced firms.

Operational inefficiencies such as high production costs, wastage of raw materials, energy inefficiency, and unreliable logistics are also prevalent. These inefficiencies are largely due to manual processes, outdated equipment, and poor workforce management (Eze & Chukwuma, 2021). Sensitivity analysis becomes highly relevant in this context as it helps managers understand how changes in key variables like cost of raw materials, labor hours, or machine downtime affect overall productivity. By applying sensitivity analysis, firms can identify which factors most significantly impact their output and profitability, thereby guiding more informed decision-making. For instance, if a sensitivity analysis reveals that minor fluctuations in energy costs disproportionately affect total production costs, management can prioritize investments in energy-efficient technologies. Therefore, addressing productivity issues through the lens of sensitivity analysis enables paint firms in Port Harcourt to strategically allocate resources, minimize risks, and improve performance outcomes.

Conceptual Framework

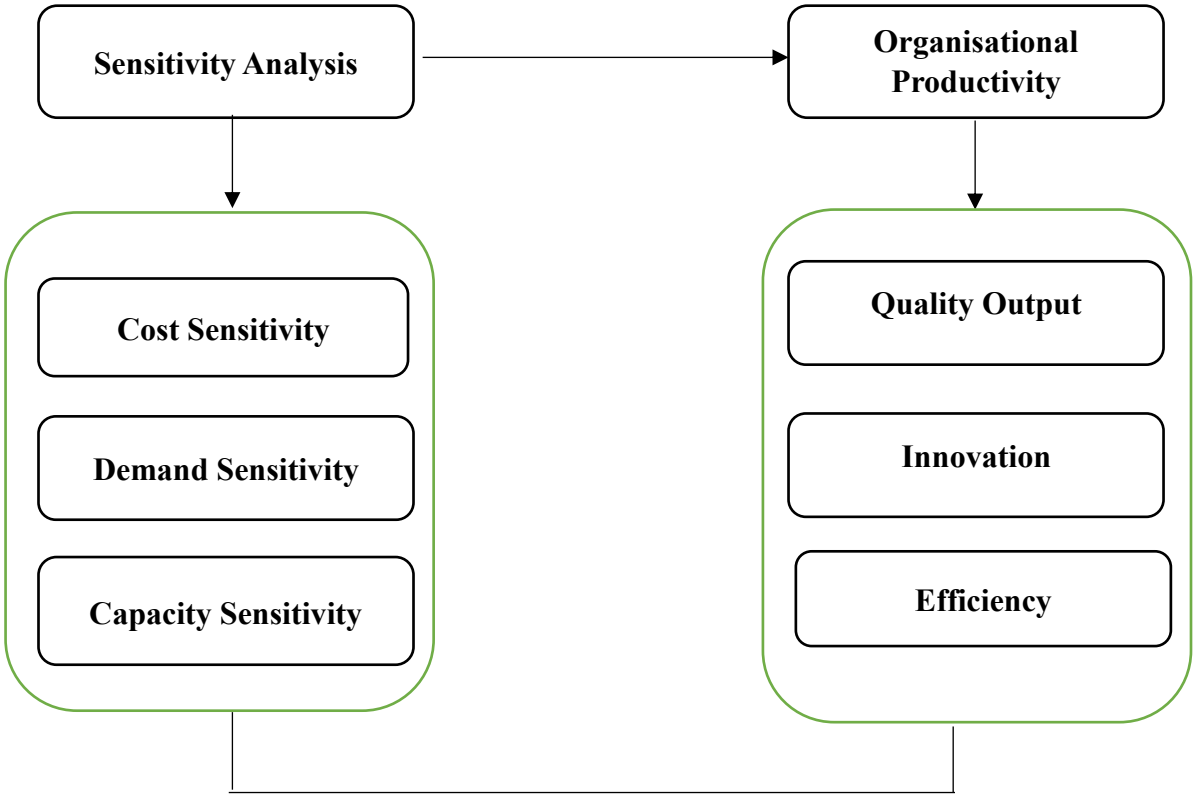

Figure 1: Conceptual framework showing the dimension/measures of Sensitivity Analysis and Organisational Productivity of Selected Paint Manufacturing Firms in Rivers State
Sources: Adopted from Heizer et al., (2020) and Drucker (1954).

Aims & Objectives

The aim of this study is to examine the relationship between sensitivity analysis and organisational productivity of selected paint manufacturing firms in Port Harcourt. The specific objectives are to:

i. Determine the relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State.
ii. Determine the relationship between demand sensitivity and innovation of paint manufacturing firms in Rivers State.

iii. Determine the relationship between capacity sensitivity and efficiency productivity of paint manufacturing firms in Rivers State.

Research Questions

The following research questions were raised to guide the study.

i. What is the relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State?
ii. What is the relationship between demand sensitivity and innovation of paint manufacturing firms in Rivers State?
iii. What is the relationship between capacity sensitivity and efficiency of paint manufacturing firms in Rivers State?

Hypothesis

The following null hypothesis were formulated and was tested at a significant level of 0.01.

Ho_1: There is no significant relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State.

Ho_2: There is no significant relationship between demand sensitivity and innovation productivity of paint manufacturing firms in Rivers State.

Ho_3: There is no significant relationship between capacity sensitivity and efficiency of paint manufacturing firms in Rivers State.

Significance of the Study

The significance of studying sensitivity analysis and organisational productivity extends across various stakeholders, including employees, employers, policymakers, and researchers

Employees: Sensitivity analysis helps employees understand how their actions and performance impact productivity, enabling them to align their efforts with organizational goals and improve efficiency.

Managers: For managers, sensitivity analysis offers a strategic tool to identify critical variables affecting productivity, aiding in better decision-making, resource allocation, and performance optimization.

Paint Manufacturing Firms: In paint manufacturing, where production variables and cost efficiency are crucial, sensitivity analysis enhances operational control, reduces waste, and supports consistent product quality.

Researchers: Researchers benefit from sensitivity analysis by gaining insights into causal relationships within productivity models, enabling more robust, evidence-based studies and advancing organizational theory.

Scope of the Study

The scope of the study will be discussed under content scope, geographical scope, and unit of analysis.

Content Scope: The content scope of the study is limited to sensitivity analysis and organisational productivity. Discussions on sensitivity analysis are restricted to cost sensitivity, demand sensitivity and capacity sensitivity; while organisational productivity as the dependent variable is measured and discussed through quality output, innovation and efficiency.

Geographical Scope: The geographical scope of this study is delimited to paint manufacturing firms operating in Port Harcourt, Rivers State.

Unit of Analysis: This study adopted a macro level analysis; this implies at the organisational level (management) of road construction firms in Port Harcourt, Rivers State.

REVIEW OF RELATED LITERATURE

This section reviews various extant literatures under the headings of conceptual review, theoretical review and empirical review.

Conceptual Review

Concept of Sensitivity Analysis

Sensitivity analysis is a methodological approach used to determine how different values of an independent variable impact a particular dependent variable under a given set of assumptions. The concept originated from operations research and economic modeling, but it has found widespread application in various fields, including engineering, environmental science, finance, and epidemiology. According to Saltelli et al. (2008), sensitivity analysis serves as a critical tool for exploring the robustness of model predictions by systematically varying input parameters and observing their effects on the output. This process is essential for identifying which variables have the most influence on a model's behavior and for assessing the degree of uncertainty in the results. As noted by Hamby (1994), the principal purpose of sensitivity analysis is not only to understand the relationships within a model but also to enhance transparency in decision-making processes, especially in complex systems where outcomes may be driven by multifactorial influences.

Furthermore, sensitivity analysis enables modelers to evaluate the reliability and stability of model outcomes, making it indispensable for risk assessment and policy evaluation. Pannell (1997) emphasized that sensitivity analysis can help in detecting parameter combinations that lead to extreme outcomes, which is particularly valuable in environmental management and economic forecasting. This form of analysis can be categorized into local and global methods. Local sensitivity analysis focuses on small perturbations around a base-case scenario, often assuming linearity in the system's response. In contrast, global sensitivity analysis investigates the entire input space, accounting for nonlinearities and interactions among variables (Saltelli et al., 2004). By employing these techniques, researchers can prioritize research efforts, refine models, and improve predictive accuracy. Morris (1991) further developed an elementary effects method for global sensitivity analysis, which balances computational cost and accuracy, making it practical for high-dimensional problems.

The utility of sensitivity analysis also extends to model validation and calibration. It allows for the identification of parameters that significantly affect model outputs, thereby guiding experimental designs and data collection strategies. As noted by Frey and Patil (2002), sensitivity analysis plays a foundational role in uncertainty analysis, which often accompanies simulation modeling. This integration ensures that stakeholders are not misled by model results that appear deterministic but are in fact highly sensitive to certain inputs. Additionally, the interpretability of models can be significantly enhanced through sensitivity analysis, as it reveals the driving forces behind outcomes and allows model users to gauge confidence in projections. Consequently, sensitivity analysis is not merely a technical tool but a strategic component in the broader landscape of scientific inquiry and policy development (Saltelli et al., 2010).

Dimensions of Sensitivity Analysis

Cost Sensitivity

Cost sensitivity, as a dimension of sensitivity analysis, refers to the degree to which variations in input costs influence the outputs or outcomes of a model or decision-making framework. It is particularly crucial in economic modeling, operational research, and policy evaluation, where uncertainties in cost estimates can significantly alter the conclusions drawn from analysis. Cost sensitivity analysis helps identify which cost components have the greatest impact on the overall system, allowing for more robust decision-making under uncertainty. For instance, in health economics, cost sensitivity analysis is employed to assess how changes in the costs of treatments or interventions affect cost-effectiveness outcomes (Briggs et al., 2006). Similarly, in project management, sensitivity to cost variations informs budgeting and resource allocation decisions, enhancing the strategic management of risks (Clemen & Reilly, 2013). The use of cost sensitivity is also evident in environmental assessments, where it aids in understanding the economic implications of alternative mitigation strategies under uncertain cost conditions (Saltelli et al., 2008).

Demand Sensitivity

The concept of *demand sensitivity* as a dimension of sensitivity analysis pertains to how variations in consumer demand affect outcomes in economic, operational, or policy-based models. It is especially pertinent in sectors where demand is volatile or uncertain, such as energy, healthcare, and transportation. Demand sensitivity measures the extent to which a system's outputs respond to changes in demand inputs, thus enabling decision-makers to evaluate risk, optimize resource allocation, and develop adaptive strategies under uncertainty (Saltelli et al., 2008; Pannell, 1997). This analytical dimension becomes crucial in scenario planning and forecasting, as it helps in identifying critical demand thresholds that significantly influence system performance (Hamby, 1994; Borgonovo & Smith, 2010).

Capacity Sensitivity

Capacity sensitivity, as a dimension of sensitivity analysis, refers to the extent to which the output of a system or model responds to variations in the capacity-related parameters of its components. This concept is particularly relevant in contexts where resource limitations, infrastructural thresholds, or processing constraints play a central role in influencing system behavior. It emphasizes how changes in the upper limits of performance such as maximum production volumes, energy throughput, or service delivery limits can alter model outcomes and decision-making efficacy (Saltelli et al., 2008; Pannell, 1997). Unlike traditional sensitivity analysis that focuses broadly on parameter uncertainty, capacity sensitivity draws attention to the nonlinear and often threshold-dependent effects of capacity constraints within complex systems (Tian, 2004). It thus serves as a critical tool in identifying potential bottlenecks, evaluating scalability, and informing robust policy design in dynamic and resource-bound environments (Campolongo et al., 2007).

Concept of Organisational Productivity

Organisational productivity is a multifaceted concept that has evolved significantly over time, shaped by various theoretical and practical perspectives. At its core, organisational productivity refers to the efficiency with which an organisation transforms inputs such as labor, capital, and raw materials into desirable outputs, including goods, services, and overall value (Drucker, 1999). This efficiency is not merely about increasing output but optimizing the processes to achieve maximum results with minimal resources. According to Sink (1985), productivity in organisations should be seen as a complex interplay of multiple variables, including human behavior, technology, and work processes, each contributing to or detracting from an organisation's capacity to perform effectively. He stresses that productivity is both a measure and a philosophy, where the ultimate aim is continuous improvement and adaptability in dynamic environments. Moreover, Robbins and Coulter (2009) assert that productivity encompasses both efficiency (doing things right) and effectiveness (doing the right things), highlighting that a productive organisation is one that achieves its goals with judicious use of its resources.

From a managerial standpoint, productivity is often associated with employee performance and managerial practices that align individual efforts with organisational goals (Armstrong, 2006). The balanced scorecard approach introduced by Kaplan and Norton (1996) integrates financial and non-financial metrics to evaluate productivity more holistically. This framework demonstrates that productivity is not limited to quantifiable outputs but also includes intangible assets such as employee satisfaction, knowledge management, and innovation. Moreover, Leibenstein (1966) introduced the concept of "X-efficiency," which posits that differences in organisational productivity can arise from inefficiencies within the system due to lack of motivation, poor management, or structural constraints. These insights underscore that productivity must be examined not only through output metrics but also through the systemic and behavioral conditions that shape performance within organisations.

Productivity is no longer viewed as a static or one-dimensional goal but rather as a dynamic capability that must evolve in response to environmental uncertainties and market shifts (Teece,

2007). Organisations that succeed in maintaining high productivity levels are those that foster a culture of continuous improvement, invest in employee development, and embrace technological innovation. As suggested by Porter and Kramer (2011), productivity is intricately linked to shared value creation organisations must generate economic value in ways that also produce value for society by addressing its needs and challenges. This perspective extends the traditional boundaries of productivity to include social and environmental considerations, recognizing that long-term organisational success depends on sustainable practices. Therefore, the modern understanding of organisational productivity is integrative, accounting for internal efficiencies, external value creation, and the strategic foresight necessary for enduring competitiveness.

Measures of Organisational Productivity

Quality Output

The concept of quality output as a measure of organisational productivity emphasizes the value of outcomes rather than mere quantity of work performed. Quality output reflects the effectiveness and efficiency with which resources are transformed into valuable goods or services, aligning with the broader organisational goals of customer satisfaction and competitiveness (Deming, 1986; Juran, 1992). It incorporates dimensions such as reliability, consistency, and conformance to standards, serving as a more holistic performance metric than output volume alone (Oakland, 2003). Scholars argue that productivity assessments based solely on quantitative measures overlook critical qualitative factors that influence long-term sustainability and innovation (Sink & Tuttle, 1989). Therefore, integrating quality as a core component in productivity evaluation provides a more accurate depiction of organisational health and strategic alignment (Garvin, 1987; Kaplan & Norton, 1996).

Innovation

Innovation is increasingly recognized as a critical determinant of organizational productivity, acting as a catalyst for efficiency, competitiveness, and long-term growth. It extends beyond technological advancement to encompass changes in processes, structures, and strategies that collectively enhance value creation within firms (Schumpeter, 1934; Damanpour & Evan, 1984). Organizations that invest in innovation are better equipped to adapt to dynamic market environments, improve operational efficiency, and create new revenue streams (Tidd & Bessant, 2018). Moreover, innovation contributes to productivity not only by reducing input costs but also by fostering product and service differentiation. Empirical studies underscore that innovative firms consistently outperform their non-innovative counterparts in terms of output and profitability, thereby cementing innovation's role as a pivotal measure of organizational productivity (Hall, 2011; Rosenbusch, Brinckmann & Bausch, 2011).

Efficiency

Efficiency refers to the ability of an organisation to maximise outputs while minimising inputs, thereby optimising resource utilisation. It is often used to assess how well an organisation converts its resources such as labour, capital, and time into goods and services (Drucker, 1967). Organisational efficiency directly influences productivity levels, as it determines how effectively a firm can achieve its objectives with minimal waste (Daft, 2016). The concept is closely related to operational performance, where high efficiency signifies streamlined processes, reduced redundancies, and enhanced competitiveness (Jones & George, 2021). Moreover, efficiency is not merely a technical consideration but also a strategic imperative that reflects an organisation’s adaptability and capacity to thrive in dynamic environments (Robbins & Coulter, 2018). By measuring efficiency, managers gain insight into potential areas for improvement and sustainable performance gains (Hill et al., 2017).

EMPIRICAL REVIEW

Adebayo and Ojo (2018), worked on the impact of sensitivity analysis on organizational productivity in Nigerian manufacturing firms. The primary aim was to investigate the relationship between the application of sensitivity analysis techniques and the overall productivity of manufacturing organizations in Nigeria. The methodology employed a survey research design, utilizing questionnaires administered to a sample of managers and decision-makers in selected manufacturing firms across various sectors in Nigeria. Data analysis involved descriptive statistics, correlation, and regression analysis. The findings revealed a significant positive correlation between the application of sensitivity analysis and organizational productivity. Firms that regularly incorporated sensitivity analysis into their planning and decision-making processes reported higher levels of efficiency, reduced operational costs, and improved profitability. The study concluded that sensitivity analysis is a valuable tool for enhancing organizational productivity in the Nigerian manufacturing sector, enabling firms to better understand and mitigate risks associated with various operational variables. Recommendations included promoting awareness and training on sensitivity analysis techniques among Nigerian businesses, integrating it into strategic planning processes, and encouraging its use in evaluating investment projects and operational changes.

Okoro and Eze (2019) carried out study on sensitivity analysis and its role in enhancing productivity in Nigerian Small and Medium-sized Enterprises. The study aimed to understand how sensitivity analysis could be leveraged to improve the operational and financial productivity of SMEs in Nigeria. The methodology involved a mixed-methods approach, combining quantitative data from surveys administered to a sample of SME owners and qualitative data from in-depth interviews. The study focused on SMEs in the retail and service sectors within Lagos State. The findings indicated that while many SMEs were aware of the concept of risk, few formally applied sensitivity analysis. However, those that did reported improved resource allocation, better pricing strategies, and enhanced ability to respond to market fluctuations, all contributing to increased productivity. The study concluded that despite initial challenges in adoption, sensitivity analysis offers significant potential for Nigerian SMEs to optimize their operations and achieve sustainable growth. Recommendations included developing simplified sensitivity analysis tools tailored for SMEs, providing accessible training programs, and fostering a culture of data-driven decision-making within the SME ecosystem.

THEORETICAL REVIEW

Systems Theory

Systems theory, originally propounded by biologist Ludwig von Bertalanffy in the 1940s, offers a holistic framework for understanding complex entities by emphasizing the interdependence of components within a system (Bertalanffy, 1968). It posits that systems whether biological, social, or industrial are composed of interconnected parts that function as a whole. In the context of organizational theory, systems theory has been widely adopted to analyze the dynamics within businesses and industries. It views organizations as open systems that continuously interact with their environment, thereby adapting to changes and maintaining equilibrium through feedback mechanisms (Scott & Davis, 2015).

In the study of sensitivity analysis, particularly within manufacturing systems such as paint production, systems theory proves crucial. Sensitivity analysis involves examining how variations in input variables impact outputs or performance metrics. Systems theory enhances this process by providing a structured lens through which these interdependencies can be visualized and measured (Saltelli et al., 2008). By conceptualizing a paint manufacturing firm as a system comprising procurement, production, quality control, and logistics, sensitivity analysis can help identify critical variables that most significantly affect product quality or cost efficiency. This systems-oriented approach enables decision-makers to prioritize improvements and mitigate risk factors inherent in operational processes.

For paint manufacturing firms in Port Harcourt, Rivers State, systems theory offers a valuable analytical framework to assess organizational effectiveness and adaptability. These firms operate within a dynamic economic and regulatory environment that necessitates constant interaction with suppliers, distributors, and regulatory agencies. Systems theory allows organizational analysis to extend beyond internal structures to include these environmental interfaces (Daft, 2016). Applying this approach enables firms to identify systemic bottlenecks, streamline communication flows, and improve overall coordination. This holistic analysis supports strategic planning and aligns operational subsystems such as human resources, finance, and production toward common organizational goals, thereby enhancing competitiveness in the local and regional markets.

METHODOLOGY

Correlational survey research design was adopted for this study as this study seek to determine the relationship between the two variables. The population of this study was eleven (11) paint manufacturing firms in Rivers State which are registered with the Rivers State branch of Paint Manufacturers Association of Nigeria (PMAN).

1. Intercolor Industries (Nigeria) Ltd
2. Portland Paints & Products Nigeria Plc (Sandtex Paints)
3. DN Meyer Plc (Meyer Paints)
4. Berger Paints Nigeria Plc
5. President Paints Nigeria Ltd
6. Terra Paints (Technotap Nigeria Ltd)
7. Wesly Paints
8. Demcok Paints Ltd
9. Dulux Colour Centre (Franchise – Port Harcourt)
10. Chumaco Paints Nigeria Ltd
11. Global Tile & Paint Ing.

The sample size for this study was the eleven (11) paint manufacturing companies earlier indicated as the population. The study adopted the census techniques. One of the reasons for applying census method is the limited and manageable size of the population. With regard to the respondents of the study given the strategic nature of the study, three key managers (production manager, marketing manager and logistics manager) were chosen as respondents from each using simple random sampling of the eleven firms constitute the study subject. This gave us a total of thirty-three (33) for the study. Structured questionnaire instrument title "Sensitivity analysis and Organisational productivity of selected paint manufacturing firms in Port Harcourt. The questionnaire was developed on five-point likert scale.

Sensitivity analysis and organisational productivity of selected paint manufacturing firms in Port Harcourt. The reliability of empirical measurement is indicated by the internal consistency, one of the most commonly used indicators of internal consistency is Cronbach's alpha coefficient. Questionnaire item statements with Cronbach's alpha reliability coefficient below the 0.70 threshold were eliminated. The test-re-test method was used. 15 copies of the questionnaire instrument were issue and some later same copies were issue through electronic media. The results were used in computation using Cronbach's alpha test of reliability.

Table 1: Reliability Statistics

Cronbach's Alpha	N of Items
.800	6

Source: Researcher Computation via SPSS Version 25

The result of the Cronbach's Alpha reliability test indicates .800 which is above .70 which implies that the items are reliable. Pearson product moment correlation was used to test the hypotheses using SPSS (statistical package social sciences).

DATA ANALYSIS

Ho_1: There is no significant relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State.

Table 2: Correlation on Cost Sensitivity and Quality Output

		Cost sensitivity	Quality output
Cost sensitivity	Pearson Correlation	1	.466
	Sig. (2-tailed)		.000
	N	92	92
Quality output	Pearson Correlation	.466	1
	Sig. (2-tailed)	.000	
	N	92	92

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

Table 2: correlation on cost sensitivity and quality output revealed that there is a significant relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State where (P. .466 = sig. .000) thus leading to acceptance of alternate hypothesis: There is a significant relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State.

Ho_2: There is no significant relationship between demand sensitivity and innovation of paint manufacturing firms in Rivers State.

Table 3: Correlation on Demand Sensitivity and Innovation

		Demand sensitivity	Innovation
Demand sensitivity	Pearson Correlation	1	.555
	Sig. (2-tailed)		.000
	N	92	92
Innovation	Pearson Correlation	.555	1
	Sig. (2-tailed)	.000	
	N	92	92

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

Table 3: correlation on demand sensitivity and innovation revealed that there is a significant relationship between demand sensitivity and innovation of paint manufacturing firms in Rivers State where (P. .555 = sig. .000) thus leading to acceptance of alternate hypothesis: There is a significant relationship between demand sensitivity and innovation of paint manufacturing firms in Rivers State.

Ho_3: There is no significant relationship between capacity sensitivity and efficiency of paint manufacturing firms in Rivers State.

Table 4: Correlation on Capacity Sensitivity and Organisational Productivity

		Capacity sensitivity	Efficiency
Capacity sensitivity	Pearson Correlation	1	.866
	Sig. (2-tailed)		.000
	N	92	92
Efficiency	Pearson Correlation	.866	1
	Sig. (2-tailed)	.000	
	N	92	92

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

Table 4: correlation on capacity sensitivity and efficiency revealed that there is a significant relationship between capacity sensitivity and efficiency of paint manufacturing firms in Rivers State where (P. .866 = sig. .000) thus leading to acceptance of alternate hypothesis: There is a significant relationship between capacity sensitivity and efficiency of paint manufacturing firms in Rivers State.

DISCUSSION OF FINDINGS

Table 2: correlation on cost sensitivity and quality output revealed that there is a significant relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State where (P. .466 = sig. .000) thus leading to acceptance of alternate hypothesis: There is a significant relationship between cost sensitivity and quality output of paint manufacturing firms in Rivers State.
Table 3: correlation on demand sensitivity and innovation revealed that there is a significant relationship between demand sensitivity and innovation of paint manufacturing firms in Rivers State where (P. .555 = sig. .000) thus leading to acceptance of alternate hypothesis: There is a significant relationship between demand sensitivity and innovation of paint manufacturing firms in Rivers State.
Table 4: correlation on capacity sensitivity and efficiency revealed that there is a significant relationship between capacity sensitivity and efficiency of paint manufacturing firms in Rivers State where (P. .866 = sig. .000) thus leading to acceptance of alternate hypothesis: There is a significant relationship between capacity sensitivity and efficiency of paint manufacturing firms in Rivers State.
Similarly, Adebayo and Ojo (2018), worked on the impact of sensitivity analysis on organizational productivity in Nigerian manufacturing firms. The findings revealed a significant positive correlation between the application of sensitivity analysis and organizational productivity. Firms that regularly incorporated sensitivity analysis into their planning and decision-making processes reported higher levels of efficiency, reduced operational costs, and improved profitability. The study concluded that sensitivity analysis is a valuable tool for enhancing organizational productivity in the Nigerian manufacturing sector, enabling firms to better understand and mitigate risks associated with various operational variables. Recommendations included promoting awareness and training on sensitivity analysis techniques among Nigerian businesses, integrating it into strategic planning processes, and encouraging its use in evaluating investment projects and operational changes.

CONCLUSION

The study concluded that there is a significant correlation between sensitivity analysis and organisational productivity in paint manufacturing firms in Rivers State. This suggests that the systematic evaluation of variable uncertainties through sensitivity analysis plays a crucial role in enhancing decision-making processes, ultimately contributing to improved operational efficiency and productivity within the sector.

RECOMMENDATIONS

1. Management of paint manufacturing firms should implement stringent cost control mechanisms, such as regular cost-benefit analyses and waste minimization strategies, to enhance productivity without compromising quality.
2. Management of paint manufacturing firms should invest in market intelligence systems and flexible production planning to swiftly respond to fluctuations in customer demand, thereby sustaining productivity and competitiveness.
3. Management of paint manufacturing firms should regularly assess and align their production capacity with projected market needs through scalable infrastructure and workforce development, ensuring optimal resource utilization and improved productivity.

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