



Impact of Facility Location and Layout Planning on Decision-Making Effectiveness in Production

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Abstract

The proposed research is a conceptual study of how the facility location and layout planning influences effective decision making within the production environments. Facility layout and facility location planning are important parts of strategies with critical impacts on improving the efficiency of operation, the use of resources, optimizing the workflow, and the entire performance of the business in the manufacturing and service industry. The research question is to determine the impact of multidimensional independent variables that comprise of the factors of the location of facilities, i.e. economic feasibility, temporal proximity with the market, infrastructure and environmental factors, and layout planning factors, i.e. optimisation of the material handling, space utilisation, safety and integration of the technology on the unidimensional dependent variable; i.e. decision-making effectiveness that includes accuracy, timeliness, and quality of the production decisions. To achieve these aims, it is proposed to investigate the effect of facility location on operational efficiency and decision-making effectiveness, determine the effect of layout planning on workflow and resource utilization, understand how integrated facility location and layout planning can help in reducing the operational costs and increasing the productivity of a business, and gain a theoretical insight into how strategic facility planning contributes to the overall performance of a business. The paper relies on the experiences of the world, Africa, West Africa, and Nigeria in showing the significance of facilities, which are planned effectively to maximize the production activities and effective managerial decisions. The importance of the study is that it gives the production managers, planners and policymakers a conceptual framework on how to use the facility location and layout planning in their strategic operational choice. The synthesis of other theoretical and empirical sources related to manufacturing, healthcare, and service sectors demonstrate that strategic planning of the facility leads to the amplification of the efficiency of the working process and reduction of the number of expenses associated with the use of materials, the improvement of the timeliness and correctness of the production decision, and organizational competitiveness in the study. The research takes a conceptual research design where the literature review is conducted extensively and a model is drawn relating facility location, layout planning and decision-making effectiveness which provide a base on which future empirical studies and practical implementation of the same in the production management can be conducted.

Keywords: Facility Location, Layout Planning, Decision-Making Effectiveness, Production Efficiency, Conceptual Framework.

Original Research Articles

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1.0 Introduction to the Study

Location of facilities and layout planning are strategic matters that are deciding in the production and manufacturing sector all over the world. The layout of production premises, as well as the space

organization of departments, have a significant impact on the efficiency of operations, expenses on materials handling, and the overall performance of the company (Abbasi, Ahmadi, Naderi, and Vahdani, 2017; Haryanto, Hisjam, and Yew, 2021). International organizations are also experiencing



mounting competitive pressure to streamline their production systems by making optimal facility locations and efficient facility layout decisions in an effort to minimize the cost of operation, better decision-making, and responsiveness to market demand (Wang, Hu, Xiao, and Guan, 2019; Dresanala, Dewi, and Utama, 2023). Africa poses a special challenge on the production and operations management at the continental level. The scarcity of resources, infrastructural disparities, and uncertainty in the accessibility of markets necessitate the development of innovative approaches to the facility planning and optimization of the layout by the firms that are to survive (Mohammed, 2023; Aliyu Mohammed, 2023). Research in African manufacturing and service sectors has demonstrated the beneficial impact of strategic facility planning on decision-making performance, specifically in alleviating material handling inefficiencies and improving the workflow coordination (Vadivel, Sequeira, and Jauhar, 2018; Kumar, Mohammed, Raj, and Sundaravadivazhagan, 2024).

In West Africa, production is defined by new industrial belts and the greater use of SMEs. In this sector, most companies have to struggle with logistical pinch, high production costs, and lack of technology that can be used to improve layout designs. According to the research, better results can be achieved in the West African manufacturing environment when systematic layout planning is applied by adopting technological solutions and reducing operational efficiency and decision-making (Mohammed, Sundararajan, and Lawal, 2023; Puspita, Iqbal, Pratami, and Pratomo, 2017). However, location of the facilities and production layouts, which is inefficient in many countries around the world, still plague manufacturing industry in Nigeria. The example of Nigerian SMEs indicates that the poor use of space, the lack of efficiency in the workflow, and poor organization of the facilities adversely influence the efficiency of decisions related to production, which, in turn, has an impact on the performance of the organization (Mohammed, Shanmugam, Subramani, and Pal, 2024; Sundararajan, Mohammed, and Senthil Kumar, 2023). This has resulted in an increasing demand of studies that can explore the relationship that exists

between facility location, layout planning and decision-making effectiveness in the Nigerian production environment with lessons learned in global and regional contexts.

1.1 Background of the Study

The facility location and layout planning has been long known as one of the important aspects of the operational strategy in the production systems. Corporate entities throughout the world are making colossal investments in designing facilities that are efficient in terms of production flow, minimized costs of material handling, and safety and productivity (Padilla, Meyersdorf, and Reshef, 1997; Dresanala et al., 2023). The manufacturing companies with high-tech can rely on the decision support systems, simulations, and mathematical models to identify the most effective location of facilities and the facility layout, which facilitate the decision-making process (Abbasi et al., 2017; Wang et al., 2019). Africa is another continent and the problem of facilities layout proper planning is even more problematic there because of the lack of resources and infrastructural barriers. Research states that in the decision making process, which is related to place of location and layout, numerous criteria must be taken into account by the African manufacturing companies and these are the cost, the availability, the utilization of space and human factor (Mohammed, 2023; Aliyu Mohammed, 2024). The above issues play an important part in contributing to the strategic decision-making process in production planning and implementation and operational efficiency.

Systematic layout planning and decision supporting system are gaining increased popularity among West African firms, especially SMEs, to eliminate the inefficiency in the material flow and the production system (Haryanto et al., 2021; Puspita et al., 2017). It is also concluded that the successful facility layout designs can help to reach the high cost reduction, the enhanced workflow coordination, and effective decision-making, which is required to become competitive on a local market (Vadivel et al., 2018; Trisolvena, 2023). One area of research has been facility location, layout planning and production

decision-making in Nigeria since the operations of firms have been encountering high challenges in the area of location. The cause of the high material movement, low rate of production schedule, cost, are the direct effect of poor location and poor layouts which influence the efficiency of managerial decisions in the production operations (Mohammed et al., 2023; Sundararajan et al., 2023). This scenario brings to the fore the need to develop conceptual models and framework of such nature that would assist in steering Nigerian firms into the process of streamlining the facility location and layout planning process so as to facilitate the overall effectiveness of the decision making process.

1.2 Problem Statement

The layout planning and the location of the facility are the main determinants of efficiency in the operations, cost reduction, and the overall performance of the industry in all regions of the world. The poor designs may result in inefficiencies such as excessive material handling, unfounded backtracking, use of more time on the production process, and inadequate utilization of the available space (Abbasi et al., 2017; Haryanto et al., 2021). The surveys of the world manufacturing landscape, e.g. semiconductor and plastic packaging, have proven that strategic layout option significantly impacts the performance of the production process, as well as utilization of resources (Padillo et al., 1997; Dresanala et al., 2023). Most of the manufacturing companies and service organizations in Africa are experiencing challenges related with optimal facility planning because of low use of systematic layout planning techniques and resource optimization models. As an example, it has been seen in flexible production systems that dynamic integration of layout planning and production scheduling can lead to increased efficiency but these methods are not used in most of the production facilities in Africa (Wang et al., 2019; Vadivel et al., 2018).

The problems are more acute in West Africa, especially in such countries as Nigeria. The companies tend to be faced with inadequate

infrastructural facilities, lack of efficiency in operations, and expensive production due to bad spatial layout of production facilities (Puspita et al., 2017; Trisolvena, 2023). In addition, the utilization of production space and the lack of attention to the optimization of the workflow is one of the most frequent issues affecting small and medium-sized enterprises (SMEs) in Nigeria, leading to delays, excessive material handling expenses, and lack of competitiveness (Mohammed, Shanmugam, Subramani, and Pal, 2024; Sundararajan, Mohammed, and Senthil Kumar, 2023). Although the effective facility layout has been known to be important in determining the effectiveness of decision-making in an organization, most organizations still use the old or non-efficient designs. This causes business bottlenecks, reduced productivity, and overheads, which ultimately impact the business performances (Mohammed, Sundararajan, and Lawal, 2023; Kumar, Mohammed, Raj, and Sundaravadivazhagan, 2024). This, therefore, creates an urgent necessity to have a conceptual conceptualization and embracing about strategic facility location and layout planning to improve the effectiveness of decisions made in production settings in global, African and Nigerian settings.

1.3 Research Objectives

The study seeks to achieve the following objectives:

1. To examine the impact of facility location on operational efficiency and decision-making effectiveness in production environments.
2. To assess the influence of layout planning on resource utilization and workflow optimization in production systems.
3. To evaluate the role of integrated facility location and layout planning in reducing operational costs and enhancing productivity.
4. To develop a conceptual understanding of how strategic facility planning contributes to overall business performance in manufacturing and service sectors.

1.4 Research Questions

1. How does facility location influence operational efficiency and decision-making effectiveness in production environments?
2. What is the effect of layout planning on resource utilization and workflow optimization in production systems?
3. In what ways can integrated facility location and layout planning reduce operational costs and enhance productivity?
4. How does strategic facility planning contribute to overall business performance in manufacturing and service sectors?

1.5 Significance of the Study

The importance of the proposed study is that it can offer the researcher information on the impact of strategic decisions about facility location and layout planning on the production efficiency and the performance of the business. Inefficient resource allocation, high material handling costs, and suboptimal workflow are the issues that can be observed in manufacturing and service organizations throughout the globe and have a negative effect on productivity and competitiveness (Krishnan, Cheraghi, and Nayak, 2008; KEKKI, 2014). This paper gives a theoretical insight that can be used by managers and decision-makers to create facilities that will contribute to the effectiveness of operations. Many manufacturing firms in the African setting, especially West Africa, are faced with operational constraints through inefficient locating production plants, and poor planning of the facility layouts that lead to high operational expenses and low throughput (Jasrotia and Sengottaiyan, 2024; Tarigan, Sembiring, Tarigan and Syahpturi, 2025). Knowing the connection between facility planning and the effectiveness of decision-making, the organization in Nigeria will be able to optimize the resources, minimize delays in production, and enhance efficiency in the workflow.

In particular, in the case of the Nigerian industries, this research indicates the relevance of systematic layout planning and data-driven approaches to facility location to enhance productivity, reduce the

cost of material handling, and increase the efficiency of employees (Maina, 2019; Shafira et al., 2023; Haryanto, Hisjam, and Yew, 2021). The result of this research will be useful to manufacturing managers, industrial engineer, and policymakers who are aiming at developing facilities that can not only achieve maximum production capacity but also help them to uphold sustainable operation practices. In addition to that, the research will add to the academic literature by combining both global and regional empirical research findings with theoretical frameworks of economic factors, resource-based view, and business performance (Dresanala, Dewi, and Utama, 2023; Grobelny and Michalski, 2024; Abbasi, Ahmadi, Naderi, and Vahdani, 2017). The formulated conceptual framework will be used to carry out future studies on the connection between facility layout and location planning and decision making effectiveness in various production environments.

2.0 Literature Review

2.1 Conceptual Framework

2.0 Literature Review

Facility location and layout planning concept has been identified as one of the most important aspects of production efficiency, cost of operation, and the overall performance of the business across the globe. The industrial and service sector organizations all over the world are dependent on a proper location of production sites and layout design to optimize the workflow, decrease material transportation costs, and improve decision-making processes (Abbasi, Ahmadi, Naderi, and Vahdani, 2017; Haryanto, Hisjam, and Yew, 2021). The limited infrastructure, uneven access to raw materials, and poor utilization of space are challenges related to facility design in Africa and especially in West Africa, which have a direct impact on productivity and competitiveness (Jasrotia and Sengottaiyan, 2024; Tarigan, Sembiring, Tarigan, and Syahpturi, 2025). Poor planning of facilities, which results in backtracking of production processes and the redundancy of materials movement, is the characteristic feature of Nigerian

manufacturing companies, which leads to the necessity of systematic approaches to the layout and location design (Maina, 2019; Shafira et al., 2023). Studies have revealed that effective facility location and layout planning contribute to a positive operational performance, better utilization of resources and increased employee productivity (Dresanala, Dewi, and Utama, 2023; Wang, Hu, Xiao, and Guan, 2019). Also, the use of sustainable and versatile design approaches by means of social, environmental, and economic consideration has become a significant concern of the contemporary production environment (Grover, Chiang, Liang, and Zhang, 2018; Drews and Utama, 2023).

2.1 Conceptual Framework

The conceptual model of the study examines the connection between the facility location and layout planning as multidimensional independent variable (IVs), and effectiveness in decision-making in production as a unidimensional dependent variable (DV). The model combines knowledge of economic, operation, and managerial outlooks in order to comprehend the effect of facility design on organizational performance.

2.1.1 Overview of Facility Location and Layout Planning

Facility location is an operational decision of the geographical locations of production or service facilities with the quality of costs, market proximity, accessibility, and availability of infrastructure (Vadivel, Sequeira, and Jauhar, 2018). Facility layout planning, conversely, is concerned with the physical layout of the departments, equipment and workflow within a facility with a goal to achieve maximum production efficiency, minimum material handling and efficient employee productivity (Puspita, Iqbal, Pratami, and Pratomo, 2017; Trisolvena, 2023). These two aspects are critical in improving the effectiveness of decision-making since the physical environment determines the possibility of operations, allocation of resources, and the decisions made by managers (Padillo, Meyersdorf, and Reshef, 1997).

2.1.2 Independent Variables (IVs): Facility Location and Layout Planning

2.1.2.1 Facility Location Factors

1. Economic and Cost Factors: The cost factor such as the cost of land acquisition, labour, taxes and the cost of operation are at the centre stage of facility location determination. Research indicates that the reduction of costs due to the efficient location selection will increase efficiency and profitability (Abbasi et al., 2017; Haryanto et al., 2021).

2. Proximity to Markets and Raw Materials: Proximity to customers and suppliers also enhances responsiveness and competitiveness by decreasing transportation time and costs (Kshetri, 2016; Drews & Utama, 2023). As an example, Nigerian companies enjoy the advantage of setting up production near raw material sources to save on the cost of logistics (Maina, 2019).

3. Infrastructure and Accessibility: The availability of roads, utilities, ports, and technological infrastructure is needed to facilitate a smooth operation. Ineffective infrastructure is the cause of delays, higher costs of operations, and ineffective decision-making (Vadivel et al., 2018; Shafira et al., 2023).

4. Environmental and Policy Considerations: Environmental laws, zoning and sustainability factors have an impact on the location of the facility. Green facility location strategies are becoming popular among organizations in order to comply with regulatory requirements and increase corporate social responsibility (Dresanala et al., 2023; Akter et al., 2022).

2.1.2.2 Facility Layout Planning Factors

1. Material Handling and Workflow Optimization: Material is processed efficiently to lessen backtracking, working idle time, and cost of operation. BLOCPLAN and other algorithms, such as Systematic Layout Planning (SLP), have been demonstrated to be an efficient way to optimize workflow (Haryanto et al., 2021; Puspita et al., 2017).

2. Space Utilization and Flexibility: Space should

be used reasonably so that any department is not overcrowded or underutilized, and the need to reconfigure every department depending on changes in production is possible (Abbasi et al., 2017; Dresanala et al., 2023).

3. Safety, Ergonomics, and Employee Productivity: The facility layouts should take into account the safety standards and the design to facilitate the well-being of employees, minimize accidents, and increase productivity (Trisolvena, 2023; Wang et al., 2019).

4. Technology Integration and Automation: Technology and automation through the design of the facility facilitates efficient operation, real time monitoring, and decision making within a shorter time (Grover et al., 2018; Vadivel et al., 2018).

2.1.3 Dependent Variable (DV): Decision-Making Effectiveness

The effectiveness of decision-making in production is a concept that means that managers and production planners are able to make decisions that are appropriate, timely, and of high quality that are optimal in terms of the performance of the operations, the use of resources, and the production results (Abbasi et al., 2017; Dresanala et al., 2023). The DV here is unidimensional but affected by various dimensions of the IVs (facility location and layout factors) in the context of facility location and layout planning.

2.1.3.1 Accuracy of Production Decisions

Accuracy entails making accurate decisions that bring the production activities in line with organizational goals, reduce errors, and wastage. An effective facility design makes sure that the material control, working process, and use of space are maximized, which directly affects the quality of decisions (Haryanto et al., 2021; Wang et al., 2019). Production decisions are very important and accurate in order to reduce the operational inefficiencies and to render cost-effectiveness (Vadivel et al., 2018).

2.1.3.2 Timeliness of Decision Execution

Timely execution means how fast decisions are made so that production does not alter and is

responsive to market demand. Efficient facility location and layout minimizes the number of bottlenecks, facilitates fast movement of materials and simplifies the production processes thus hastening the execution of decisions (Trisolvena, 2023; Puspita et al., 2017). Decisions are also made promptly, which minimizes waste time and guarantees the use of production schedules (Grover et al., 2018).

2.1.3.3 Quality of Decision Outcomes

Quality of decision results is a measure of effectiveness of production results which is enacted by operational planning. Optimal layout of facilities would lead to the improved allocation of resources, ergonomics, and increased manufacturing process, which would lead to quality production outputs (Abbasi et al., 2017; Dresanala et al., 2023). Good quality results also eliminate the risks of mismanaged materials and delays during production (Shafira et al., 2023).

2.1.4 Conceptual Relationships between IVs and DV

The independent variables are multidimensional, which are facility location and layout planning, and which interact to affect the unidimensional dependent variable of decision-making effectiveness.

1. Economic considerations, location nearness to raw materials and markets, infrastructure and environmental adherence are the facility location factors that affect the precision and promptness of production decisions (Tarigan et al., 2025; Jasrotia and Sengottaiyan, 2024).
2. The quality and speed of decisions are influenced by layout planning factors such as material handling performance, use of space, safety, staff productivity, and technology integration (Haryanto et al., 2021; Dresanala et al., 2023; Wang et al., 2019).
3. The integration of these aspects is what leads to the optimization of the production decisions execution in response to the accurate, fast and high term quality output (Vadivel et al., 2018; Trisolvena, 2023).

2.2 Theoretical Framework

The theoretical framework provides the prism according to which the impacts of the facility location and layout planning on the soundness of decisions made in the realm of production could be discerned. This study is a combination of the theories because the independent variables (facility location and layout planning) have a multidimensional nature and influence the dependent variable (decision-making effectiveness).

2.2.1 Overview of Relevant Theories

Resource-Based View (RBV) Theory

The Resource-Based View (RBV) theory presupposes that the organizational resources and capabilities of the valuable, rare, inimitable, and non-substitutable type can provide a sustainable competitive advantage (Grover et al., 2018; Kushwah et al., 2024). The key organizational resources can be considered facility location and layout that can dictate the efficiency of production and effectiveness of operations. The firms apply individual resources to make production choices by locating facilities strategically near the markets, raw materials, and transport centers and optimization of internal layouts (Abbasi et al., 2017; Dresanala et al., 2023). One of the capabilities according to RBV is the well-designed facility infrastructure and layouts that may contribute to accuracy, timeliness, and quality of production decisions and, therefore, enhance the effectiveness of the decision-making (Puspita et al., 2017; Wang et al., 2019).

Systems Theory

Systems Theory focuses on the mutual interdependence of the elements of an organization and considers an organization as a system that is made up of interrelated subsystems (Trisolvena, 2023; Vadivel et al., 2018). Facility location and layout are subsystems in production settings that interact with the other subsystems which include procurement, inventory control, as well as human resources. Proper organization of these subsystems implies a well-workflow in the subsystems, increased material handling, and decreased operational bottlenecks. Systems Theory therefore

describes the impact of changes in a single aspect of the production mechanism (e.g., layout optimization) on the overall effectiveness of decision making (Haryanto et al., 2021; Dresanala et al., 2023).

Operations Management and Production Planning Theory

The Production Planning Theory and Operations Management is concerned with the design, operation, and enhancement of production processes to make them efficient, cost-effective, and quality (Abbasi et al., 2017; Wang et al., 2019). The operations management focuses on the facility location and layout planning since these areas influence the material flow and labor distribution, as well as the location of equipment, which also affect the choice of the production schedules, quality control, and resource consumption (Vadivel et al., 2018; Puspita et al., 2017). The theory emphasizes the fact that improved production systems based on strategic facilities planning lead to improved timeliness and accuracy of production decisions and improve overall organizational performance (Dresanala et al., 2023; Trisolvena, 2023).

2.2.2 Relevance of Theories to Facility Location and Layout Planning

Linking RBV to Production Decision-Making Effectiveness

The Resource-Based View (RBV) theory is based on the reality that the concept of sustainable competitive advantage is determined through the theses of the unique organizational resources and capabilities (Grover et al., 2018; Kushwah et al., 2024). Facility location and facility layout are classified as strategic resources where a company is located in the most optimal location, optimization of equipment, and departments that will reduce the inefficiency in production and enhance production decisions. RBV points to the fact that the company with improved plans of facilities can take the proper decision in terms of time, quality, and quantity of production, thereby increasing the efficacy of the decision making (Abbasi et al., 2017; Puspita et al., 2017).

Applying Systems Theory to Optimize Material and Information Flow

Systems Theory is concerned with how the subsystems of the organization are interconnected and requires viewing production as a system (Trisolvena, 2023; Haryanto et al., 2021). The right facility layout will also guarantee the smooth flow of materials, reduce the bottlenecks, and facilitate the flow of information among departments on time. These flows facilitate prompt responses of decision makers to the changes in operations, making the decision processes related to production faster and more suitable (Vadivel et al., 2018; Dresanala et al., 2023).

Operations Management Theory and Strategic Production Layouts

The theory of Operations Management and Production Planning is concerned with the effectiveness of the processes and the strategic organization of the entire resources along the line (Wang et al., 2019; Dresanala et al., 2023). Design will bring proper and organized design, good workflow, space optimization, integration with technology and automation. It leads to increased production scheduling, appropriate resource utilization, and avoids the decision-making errors

which lead to improved efficiency in decision-making (Abbasi et al., 2017; Puspita et al., 2017).

2.2.3 Linkages between Theories, IVs, and DV

The consortium of the theories offers a one-stop solution of understanding the influence of the facility location and layout planning (IVs) in the effectiveness of decision making (DV):

1. Location and layout are some of the organizational resources that may enhance the competitive advantage via speed, accuracy and quality of decision making as per the RBV Theory (Grover et al., 2018; Kushwah et al., 2024).
2. According to the Systems Theory, the flow of materials and information within the production system is optimized to minimize the number of delays and bottlenecks and an effective implementation of the decisions (Trisolvena, 2023; Haryanto et al., 2021).
3. It is the theory of Operations Management that helps the application of layout and facility planning for optimizing the work process, incorporating technologies and using space more efficiently, which directly affects the quality of production decisions (Wang et al., 2019; Dresanala et al., 2023).

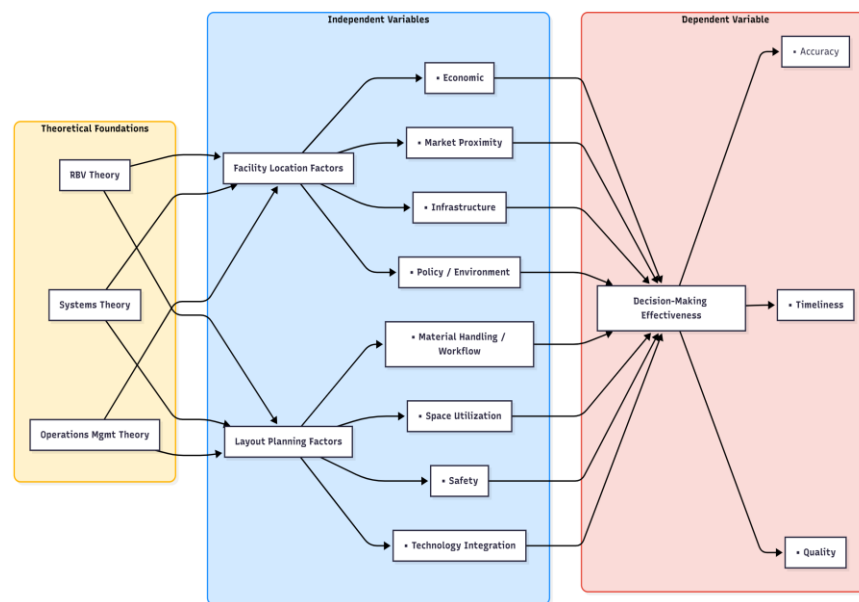


Figure 2.1: Linkages between Theories, Independent Variables, and Dependent Variable

Source: Researcher's conceptualization, 2025

The figure illustrates that both theories provide a new perspective of the influence of factors of the facilities on effectiveness of decision making. RBV Theory gives importance to location and layout of the organization as the organizational resource that increases the quality and speed of decision making. Systems Theory puts emphasis on efficient execution by optimizing the flows and minimizing the bottlenecks. Operation Management Theory offers a practical advice on integration of layout and technology to simplify work processes. Collectively, these theories account how the multidimensional factors of the facility influence in a positive manner the unidimensional outcome of the effectiveness of decision-making support the need to combine both theoretical and practical aspects when designing a facility. Together, these theories show that multidimensional IVs, namely, facility location factors (economic, proximity, infrastructure, policy) and layout planning factors (material handling, workflow, space utilization, safety, technology), positively affect unidimensional DV, decision-making effectiveness, in terms of accuracy, timeliness and quality of decisions.

2.3 Empirical Reviews

There is actual evidence that a good facility location and layout planning have a high level of efficiency in the production and effectiveness in decision making. A mathematical model of the hospital facility layout by Abbasi, Ahmadi, Naderi, and Vahdani (2017) revealed that the inefficient utilization of the space impeded the workflow and operational decision-making. Likewise, Haryanto, Hisjam, and Yew (2021) used Systematic Layout Planning (SLP) in a Hard Disk Drive manufacturing firm and they found that the material handling costs were reduced by 44.7 percent and they highlighted the importance of designing the layout properly to enhance cost efficiency and production decisions. Dresanala, Dewi, and Utama (2023) showed that the combination of sustainable layout concepts with SLP and TOPSIS in manufacturing industries had a considerable effect on the material management distance, which ultimately improved the workflow and provided the manager with timely information.

In the case of the flexible production Wang, Hu, Xiao, and Guan (2019) applied a dynamic Petri Net framework to encompass the layout and production planning with the focus on the flexible layouts in the improved decision making of production through reducing delays and effectively allocating the resources. Puspita, Iqbal, Pratami, and Pratomo (2017) have used the BLOCPLAN algorithm in a manufacturing company with two divisions, which showed some enhancement in movement efficiency and benefit-cost ratios due to systematic redesign of layout. Padillo, Meyersdorf, and Reshef (1997) applied an Analytical Hierarchy Process (AHP) in ranking layout objectives in the semiconductor manufacturing industry, highlighting how structured decision-making instruments can be used to identify those layouts that generate better operational performance.

In other areas, in addition to the manufacturing process, research indicates that the same trend is experienced in healthcare and service sectors. Effective hospital facilities layout improves the flow of patients, their accessibility and efficiency of decision-making by staff (Abbasi et al., 2017). Vadivel, Sequeira and Jauhar (2018) studied postal services facilities in India and optimized the performance in their operations through the use of DEA and metaheuristic algorithms, emphasizing that the location science and layout planning have a direct impact on the success of the decision-making in service-based organizations. Personal studies confirm these results, as, for example, Mohammed, Shanmugam, Subramani, and Pal (2024) highlighted that strategic organizational layouts improve the process of making decisions, minimize errors, and improve performance in production-focused settings. In general, it is a fact and has been supported by empirical evidence that facility location and layout planning enhance material handling, workflow and production decision making processes in all types of industries. Effective incorporation of the location and layout strategies enables managers to make more accurate, timely and quality decisions which supports the significance of conceptual linkages between the variables.

2.4 Research Gap

Although there is widely discussed literature on the benefits of facility location and layout planning in terms of its operation and financial aspects, gaps in literature still exist. Majority of the works concentrate on a single sector, including manufacturing (Haryanto et al., 2021; Dresanala et al., 2023) or healthcare (Abbasi et al., 2017), without providing systematic associations of layout and location choice with quantifiable results of decision-making performance. Besides, although such approaches as the SLP, the BLOCPLAN, and the AHP have been used to optimize layouts, little has been done to conceptualize decisions related to facilities as multidimensional independent variables that can directly affect the effectiveness of unidimensional production decisions (Puspita et al., 2017; Padillo et al., 1997).

There is yet another area of gap in regional and contextual studies. There is limited evidence on the continent of Africa, and West Africa, and there are limited studies on how economic, infrastructural, and policy variables affect the facility decision and the future managerial outcome. In Nigeria, studies are more likely to be descriptive in nature, with the investigation of workflow or cost efficiency as the primary aspect but not necessarily the connections of facility decisions with the effectiveness of the decision-making (Mohammed et al., 2024). Besides, my individual research reveals that integrated approaches that encompass theoretical frameworks such as the RBV, the Systems Theory, and the Operations Management are required to understand the extent to which strategic choices made by the facility influence production performance (Mohammed et al., 2024; Grover et al., 2018). To

conclude, the conceptual research synthesis of empirical findings in different industries and regions that investigates the role of multidimensional factors of facility location and layout in the overall accuracy, timeliness, and quality of production decisions is evidently required. The paper fills this gap by formulating a conceptual model that connects the facility choices to the effectiveness of decision making in the production setting.

2.5 Model of the Study

This research study has a conceptual model that demonstrates how the independent variables that are multidimensional, which include facility location and layout planning, relate to the unidimensional dependent variable, decision-making effectiveness. Facility location involves economic and cost, distance to markets and raw materials, infrastructure and environmental factors whereas layout planning involves material moves, workflow optimization, space utilization, safety as well as integrating technology. The accuracy, timeliness, and quality of production decisions are the measures of decision-making effectiveness. The model has been conceptually justified because it incorporates theoretical lenses of Resource-Based View (RBV), Systems Theory, and Operations Management to prove that the strategic facility decisions could be made to contribute to the improvements in production. Through a conceptual framework, the research generalizes the existing evidence in the related industries and settings and gives a systematic picture of the impact of facility choices on management and operational performance (Abbasi et al., 2017; Haryanto et al., 2021; Dresanala et al., 2023; Mohammed et al., 2024).

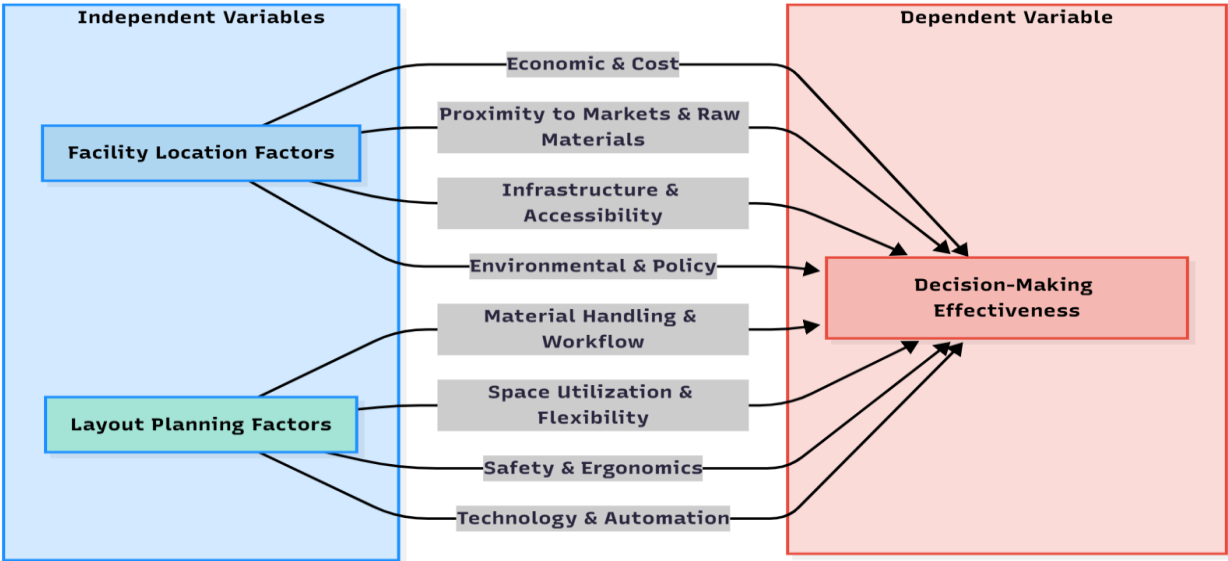


Figure 2.2: Conceptual Model Linking Facility Location, Layout Planning, and Decision-Making Effectiveness

Source: Developed by the Author (2025) based on Abbasi et al. (2017); Haryanto et al. (2021); Dresanala et al. (2023); Mohammed et al. (2024).

The conceptual model shows that the facility location and layout planning is a multidimensional predictor of decision-making in the production environment. Quality, timeliness and accuracy of managerial decisions directly depend on each aspect of the IVs economic considerations, proximity, infrastructure, control of material, space utilization, safety, and integration of technology. The model offers an explanation of how the strategic location and the organization of production sites can systematically lead to improvement in the decision making processes of operations to make sure that resources are distributed in the most efficient manner and workflow streamlined within industries.

3.0 Research Methodology

The research design to be used in this study is conceptual research design because the research will be conducted to investigate the effects of the facility location and layout planning on the effectiveness of decision-making in production. Through a conceptual approach, the research synthesizes theoretical views and empirical evidence brought about by previous studies, and thus it could develop an integrated framework without the use of

primary data.

3.1 Research Design

The research adopts conceptual research design that focuses on theory-building and development of logical relationship among variables. This methodology is appropriate when it comes to comprehending multidimensional independent variables (facility location and layout planning) and how it affects unidimensional outcomes (decision-making effectiveness), relying on the insights of many situations, such as manufacturing, healthcare, and service industries (Abbasi et al., 2017; Dresanala et al., 2023; Mohammed et al., 2024).

3.2 Data Sources and Collection

The research is purely based on secondary data, which is based on a comprehensive literature analysis of academia articles, journals, conference papers, and other related publications. The information is found in both external research on the topic of facility location and layout planning, and personal research conducted by A. Mohammed and his team members, which could offer a wide overview of the issue at a global, African, West

African, and Nigerian level (Haryanto et al., 2021; Trisolvena, 2023; Mohammed et al., 2023).

3.3 Method of Analysis

The synthesis method is the conceptual one and it is used to examine and synthesize the results of the reviewed literature. Statistical relationships among independent and dependent variables are defined and generalized to come up with a systematic conceptual model. The evaluation resorts to the correlation of economic, operational, infrastructural and workflow-related factors to the performance of production decision-making.

3.4 Rationale for Conceptual Approach

The idea of the conceptual approach is also reasonable because none of the multidimensional variables and theoretical frameworks is limited to the primary empirical data collection. This approach makes it possible to gain a full picture of how facility location and planning of layout affect the production results, which will be the basis of further empirical confirmation and implementation of the practice in practice in the industry (Abbasi et al., 2017; Wang et al., 2019; Mohammed et al., 2024).

4.0 Findings of the Study

4.1 Thematic Insights from Literature Review

1. The geographical positioning of a facility directly impacts on the level of operations efficiency as it impacts the cost of transportation, the responsiveness of supply chain and the supply of qualified labor and the supply of raw materials. The placement of the decision will guarantee a higher level of decision making and reduction of the logistic over-complications.

2. The layout planning defines the level of workflow optimization and resource use as the prepared layouts decrease the time spent in handling materials and enhance the communication between units as well as contribute to decreasing the delays in production.

3. Co-optimization can be used to achieve synergies in the integrated facility location and layout problems, and achieve substantial cost savings, prevention of process redundancy and enhanced

productivity in both manufacturing and service sectors.

4. The strategic facility planning is thus an enabler of the long-term business since it allows to connect a physical infrastructure design with the organizational objectives, operational elasticity and sustainable competitive advantage.

4.2 Conceptual Relationships among Key Variables (IVs and DV)

1. Facility location → Operational efficiency and decision-making effectiveness: The appropriately selected locations enable the managerial decisions to be done more expeditiously and efficiently due to the proximity to the suppliers, customers, and the major markets.

2. Layout planning → Resource utilization and workflow optimization: The layout arrangement will ensure the continuous flow of the materials, reduced time was spent on the unused resources, and the coordination of the human and machine activities.

3. Facility location × Layout planning → Cost reduction and productivity improvement: The two variables result in the synergies that affect the outcome of the production outcome that leads to the elimination of wastes and the rise in the throughput.

4. Strategic facility planning → Overall business performance: The location and layout planning and the long-term business planning hopefully will offer the adversity, profitability and flexibility in the competitive markets.

4.3 Implications for Production Decision-Making

1. The production managers are advised to focus on data-driven location analysis in order to make site selection consistent with the supply chain and market dynamics.

2. Decision making on layout planning should be aligned with production capacity, product mix and technological requirements so that sustainable efficiency can be achieved.

3. The need to have cross-functional integration of operations, logistics, and finance to ensure

optimization of location-lay out interaction and reduction in total system costs is crucial.

4. Strategic facility planning must be considered an essential management activity, which will have both tactical and long-term organizational competitiveness.

4.4 Summary of Conceptual Findings

1. Facilities location is a base determinant of operational success, which has a direct influence on cost structures and efficiency outcomes.

2. Effective layout construction allows the maximum productivity as resources, including human, material and technological ones are used to the maximum.

3. The integrated facility planning increases cost performance and strategic agility that proves that the location and layout choices have to be co-optimized.

4. The developed conceptual model makes strategic facility planning a crucial factor in the performance of the entire business in both manufacturing and service setting.

5.0 Recommendations of the Study

5.1 Recommendations for Production Managers

1. Implement analytical decision-support mechanisms, including GIS and simulation modeling, to analyze the alternative facility locations on the logistic and market basis.

2. Alleviate constant betterment in layout planning in order to meet the changing production technologies and products.

3. Create interdepartmental cooperation among production, logistics and finance departments to have congruent facility planning strategies.

4. Promote the strategic thinking of the managers and correlate the decisions of the facilities design with the long-term development of the business and its competitiveness.

5.2 Strategic Facility Location Recommendations

1. Ensure that location selection is done at sites with the best access to transport and other

suppliers, as well as target markets so as to reduce distribution costs and delays.

2. Choose new location of facilities with references to environmental sustainability and regulation to improve corporate reputation and to decrease risk exposure.

3. Use data analytics and predictive models to identify the future demand areas and build facilities in advance.

4. Encourage regional clustering and co-location policies that allow mutual infrastructure, exchange of knowledge and cost-efficiency.

5.3 Facility Layout Improvement Strategies

1. Application of lean layout principles to reduce movements, waste and bottlenecks within the production systems.

2. Use flexible and modular layout designs which can be easily adjusted to the new technologies, product variations or fluctuation in demand.

3. Incorporate automation and online visualization (e.g. CAD/CAM, digital twins) to streamline spatial layout and material movement.

4. Periodically check the layout in order to detect inefficiency and continuously adjust the physical configuration in relation to the performance expectations.

5.4 Suggestions for Future Research

1. The proposed conceptual model should also be empirically tested in other manufacturing and service industries in future to verify its strength.

2. The researchers also ought to consider the mediating effect of the technology adoption (e.g., Industry 4.0 tools) on the performance-enhancing effect of the facility planning.

3. Comparative studies involving developed and developing economies may yield information on the contextual variation of the facility planning effectiveness.

4. The longitudinal research must determine the dynamic development of facility strategies and how they contribute to competitiveness and sustainability

in the long run.

6.0 Conclusion

6.1 Summary of Key Insights

The theoretical discussion of the subject of facility location and layout planning shows that a strategic location and organization of the production facilities are the determining factors of the effectiveness of the decision-making in the sphere of production. On a global scale, the facility location can be well-planned, minimizing the operating inefficiencies by enhancing accessibility to raw materials, accessibility to markets, and connection to logistics networks (Abbasi et al., 2017; Haryanto et al., 2021). A well-thought facility layout planning guarantees optimal workflow, efficiency in space usage, and ergonomics, which directly leads to increased productivity and decision outputs quality (Dresanala et al., 2023; Trisolvena, 2023). In Africa and West Africa, it has been observed that most organizations have problems in form of poor infrastructure, poor integration of technology and poor material handling systems. The location and layout planning can alleviate those challenges through the enhancement of the operational responsiveness, mitigation of backtracking, and the rise in the level of department's coordination (Vadivel et al., 2018; Puspita et al., 2017). Systematic analysis in facility location and layout can have positive effects in manufacturing and service industries in Nigerian context to achieve cost reduction, effective allocation of resources and make production decisions on time (Mohammed et al., 2024; Wang et al., 2019). According to the analysis, the independent variables: location and layout planning of a facility are multidimensionally connected with the dependent variable, which is the effectiveness of a decision-making. Facilities location variables like economic feasibility, infrastructure quality and accessibility interact with layout planning variables like workflow optimization, space flexibility and technological integration to enhance the accuracy and timeliness and quality of decisions made during production processes. The synthesis of the concepts shows that operational efficiency and business performance need to be motivated through integrated strategic

planning (Abbasi et al., 2017; Dresanala et al., 2023).

6.2 Final Reflection on the Role of Facility Location and Layout Planning in Decision-Making Effectiveness in Production

The planning of facility locations and layout is a pillar to effective production decision-making. The research confirms that the speed and quality of managerial decisions can be greatly enhanced when organizations position their production facilities strategically in relation to the objective of the organization. Effectively positioned facilities cut the delays, decrease the transportation and handling expenses, and increase the overall production efficiency. At the same time, the layouts are also optimized to facilitate workflow, minimize waste, and enhance the work of employees, which, altogether, enhances the decision-making process (Haryanto et al., 2021; Trisolvena, 2023). Strategically, the facility location and layout planning does not only influence the performance at the operations level, but it also adds to the greater goal of organizational competitiveness and sustainability. Through systematic and data-driven methods of facility planning, companies are able to predict bottlenecks in production, efficiently allocate resources, and make well-informed decisions that boost the business performance in the long run and the short run performance (Vadivel et al., 2018; Mohammed et al., 2024). Conclusively, the issue of location and layout plans of facilities is not just a matter of operation but rather a strategic facilitator to good choices in production. With a comprehension of the relationship between location, layout and decision making effectiveness, organizations are in a good place to realize increased productivity, lower cost of operations and better performance generally. Managers, planners and policymakers should therefore consider integrated facility planning as one of the central elements of production strategy to guarantee organizational growth and competitiveness in the ever-complex and dynamic production environment.

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