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Production Planning Strategies and Operational Cost Management of Selected Food and Beverage Enterprises in Akwa Ibom State, Nigeria

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Abstract

This research work examined the effect of production planning strategies on operational cost management of selected food and beverage enterprises in Akwa Ibom State. One main objective and five specific objectives were developed for the study and were accompanied by five research questions and five research hypotheses respectively. Related literature was reviewed and descriptive survey design was employed in the study. The population of this study was 353 workers from seven (7) food and beverage enterprises operating in Akwa Ibom State and consisted of members of management and other senior staff whose job description have direct link with production and cost management. The sample size was 187 workers (respondents) selected using convenient and purposive sampling methods. Questionnaire was the instrument for data collection and was researcher-structured and also subjected to validation and reliability tests. Research hypotheses were tested at 0.05 level of significance. The researcher employed linear regression analysis technique via SPSS V21. From the hypotheses tested, findings showed that four production planning strategies namely assemble-to-order strategy, level production strategy, chase production strategy and just-in-time strategy all have significant effect on operational cost management of food and beverage enterprises in Akwa Ibom State. On the other hand, make-to-stock (a production planning strategy) has no significant effect on operational cost management based on the findings. In conclusion, production planning strategies boost food and beverage production vis-à-vis operational cost management in Akwa Ibom State. Five recommendations were made and most importantly, food and beverage enterprises should review their production planning strategies to accommodate assemble-to-order, level production, chase production and just-in-time.

1. Introduction

1.1 Background to the Study

Production Planning (PP) is the center of operation of any productive and profit seeking firm. It encompasses sorting out the sustaining and satisfying factors of both the firm's management system, managing suppliers, and the customers (Afolalu1 *et al.,* 2021). Its strategies (production planning strategies) incorporate all the various approaches employed by manufacturing firms to manage and control manufacturing processes efficiently, with the view of ensuring adequate utilization and possibly minimization of costs, optimization of production schedule, and ensuring the timely availability of materials and products (Welp, 2020). These strategies include different methods used by companies to plan the future production of goods and materials at manufacturing plants. Implementing various and suitable production planning strategies creates a foundation that can help determine how much of each product to produce, at a given time period (Stevenson, 2018).

A firm with a dynamic business model will tend to unprofitably consume cost in terms of time and monetary value on redundant activities when its production process is based on guess operation rather than operating on a carefully analyzed planned market and customers' demand. Inadequate forecast on the production line during planning may tend to increase cost and jeopardized the production output and profit of a firm as a corporate entity (Ovunda *et al.*, 2019). The capacity to determine exactly what to produce, how to produce, when to produce, and where to produce, is what will make a firm to adequately stand out and compete favourably in the production market (Akeem, 2017). This thus makes production planning a vital instrument in the manufacturing system. Thus, it demands firms, irrespective of their size, to seize the opportunity to

embark on strategic planning during production process (Mamidu & Akinola, 2019).

Production process demands adequate planning strategies to transform inputs resource (such as manpower, raw materials, capital, information, energy, etc) into a demanded output (such as finished products and services in appreciable quality and quantity), hence attaining organizational objectives of an enterprise which will increase the market value of the goods and the firm. Production planning shows a sequential ladder in the production process of a manufacturing setting designed to ensure that input resources (raw materials, men, money, and machine) are made available within a stipulated timeframe, in the appropriate amount to produce the demanded output of goods and services based on the schedule specified (Biswas & Baral, 2021). Production planning is a managerial activity of an organization that is saddled with the responsibility to decide production facilities requirement considering space availability and the market demands of goods and services to produce (Asaolu, 2021). While production is the transformation and creation of goods/services to satisfy human needs, production is thus considered as the act of transforming/processing inputs resources into finished goods and services via physical resources (Obisi, Samuel, & Ilesanmi, 2020). It also involves the transformation of raw materials or purchased components or semi-finished products into finished products for sale. Production is generally considered as the conversion process of raw materials into finished products such as goods and services. Manufacturing system is made of large number of components that demands effective management to obtain the right outputs of appropriate quantities, qualities, minimal production cost and at the right desired time frame (Oyedokun, & Adelodun, 2023).

According to Umo (2014), production planning is the strategic process by which manufacturing firms determine what to produce, how much to produce, and when to produce to meet market demands efficiently. Nugroho *et al*, (2020) added, the adoption of effective production planning strategies ensures that resources are allocated optimally, reducing waste and ensuring timely delivery to customers.

Operational cost management is a fundamental aspect of any manufacturing firm's operations. Controlling and optimizing the various expenses incurred during production is not only essential for profitability but also for the long-term sustainability of the business (Nyekpunwo *et al.,* 2019). These operational costs encompass a wide range of elements, from labour and raw materials to energy consumption and maintenance. In the competitive landscape of the manufacturing industry, efficient operational cost management is a key factor that can significantly impact a firm's ability to remain viable and competitive (Karl, 2022). The intricate relationship between operational cost management and production planning cannot be overstated. Effective production planning can lead to cost savings by optimizing resource allocation and minimizing wastage (Wadhwa & Sachan, 2019). On the other hand, efficient operational cost management can enhance the viability and flexibility of production planning strategies (Umo, 2015).

Operational cost management is at the core of enterprise performance management, as it represents the bottom line for every company. In today's context, there are multiple reasons why cost management is of particular relevance, especially today. In most organizations, the indirect costs as part of overall costs are growing and customer self-service business models rule, so that organizations even bear the risk of losing grip on their direct cost in their business processes. Economic pressures complete the picture. In short, to preserve margins and ensure profitability, organizations need to keep their eye on the ball and monitor their business processes continuously. Most organizations go through a maturity lifecycle for profitability. This profitability maturity lifecycle is largely understood as organizations go through an evolution without realizing they are moving from one stage to another. According to Robinson and Umo (2023), cost Management drives business performance by discovering drivers of cost and profitability, empowering users with visibility and flexibility, and improving resource position.

The food and beverage industry has been found to blossom if operational constraints are effectively managed by enhancing formulation of strategies that adds more value. To remain competitive, food and beverage industry players must deliver products with higher nutritional value, create more formula agility, consistently reduce production cost, and minimize environmental impact. Many companies experience variable demand for their products. This is probably most noticeable in products that have seasonal demand patterns, such as umbrellas or fruit suppliers, but demand for other products may vary appreciably throughout the year. In such cases, companies face several different options meeting demand. Generally, these options fall into production planning strategies (Ganiyu, 2019). The main strategies used in production planning are assemble-to-order strategies, level production strategies, chase strategies, make-to-stock strategies and engineer-to-order strategies (Karl, 2022; Robinson & Umo, 2023).

Assemble-to-order is a strategy for which standard parts, components, and subassemblies are acquired or manufactured according to forecasts, while schedules for remaining components, subassemblies, and final assembly are not executed until detailed product specifications have been derived from booked customer orders (Ikon Nwankwo, 2024). Assemble to order is the process of having the components and subassemblies of your product ready, so when a sales order is generated, the finished product can be quickly built and dispatched to the customer. Assemble-to-order, or (ATO), is a manufacturing strategy in which products are assembled from previously completed sub-assemblies once an order comes in. The (ATO) workflow is used for goods that still have some customizability but the sub-assemblies are made to stock before orders come in (Karl, 2022).

Level production is a strategy that produces the same number of units equally. This is common in industries where demand is cyclical and production capabilities are limited or capped (Habib, 2024). It is an approach to aggregate planning that aims to regulate production at a constant level, regardless of fluctuation in demand. It involves storing the product in times of low demand and is not therefore an option available to the providers of services. The benefits include maintaining a stable workforce and the optimum use of capacity. The disadvantages include the costs of storage and the difficulty of responding to major changes in demand (Oxford, 2022).

Chase demand strategy is an uncertain demand strategy where the changes made to the output level will depend on the change in the demand. In case of chase strategy, the

main concern of the management is to respond to the changes in the demand. In this strategy, the output changes are carried out following the demand changes in order to save the inventories and maximize the profits. There is a possibility for the production managers to over produce during the low demand periods. Also, there is a possibility that the production manager might under produce during the high demand periods. However, chase strategy remains an uncertain demand strategy as it involves the element of uncertainty in the changes in the output level (Asaolu, 2021).

Another production planning method adopted by food and beverage enterprises is the make-to-stock (MTS). This is a production strategy that requires the manufacturers to match the inventory with anticipated consumer demand. Using the efficiency of constant production that lowers costs and keeps inventory at a minimum, buyers can access products readily and do not need to wait, keeping demand consistent. While make-to-stock may increase inventory cost, it is still beneficial to those that specialize in certain areas, such as retail, cars, phones, etc. Products are made and put in inventory so that potential consumers can view what is available. Thus, products are made for the market with anticipated sales. The benefit is that it drives down production costs.

According to Robinson and Umo (2023), Just in Time (JIT) is a production strategy aimed at improving efficiency by producing goods only as they are needed, thereby minimizing inventory levels and reducing waste. Originating from the Toyota Production System in Japan during the 1970s, JIT focuses on streamlining operations and reducing excess. It is driven by customer demand rather than forecasting. Products are made only when there is an order or a clear demand signal, which helps avoid overproduction and excess inventory (Green & Davis, 2022). The intricate need to establish the relationship between production planning strategies and operational cost management has become more significant. Effective production planning can save costs by optimizing resource allocation and minimising wastage. On the other hand, efficient operational cost management can enhance the viability and flexibility of production planning strategies.

From the above background, this study was carried out to study the effect of production planning strategies on operational cost management in food and beverage enterprises using firms in Akwa Ibom State of Nigeria as the organizations of study.

1.2 Objectives of the Study
The main objective of the study was to examine the effect of production planning strategies on operational cost management using selected food and beverage enterprises in Akwa Ibom State as the organizations of study.
Specifically, the study sought:
1. To examine the effect of assemble-to-order strategy on operational cost management of food and beverage enterprises in Akwa Ibom State.
2. To find out the manner of effect of level production strategy on operational cost management of food and beverage enterprises in Akwa Ibom State.
3. To determine the degree of effect of chase demand production strategy on operational cost management of food and beverage enterprises in Akwa Ibom State.

4. To assess the extent of effect of make-to-stock (MTS) production strategy on operational cost management of food and beverage enterprises in Akwa Ibom State.
5. To find out if Just-in-time (JIT) production strategy has any significant effect on operational cost management of food and beverage enterprises in Akwa Ibom State.

2. Review of Related Literature
This chapter presents the review of related literature. It is discussed under the following sub-headings: conceptual framework, theoretical framework, empirical review and summary of related literature and gap.

2.1 Conceptual Framework
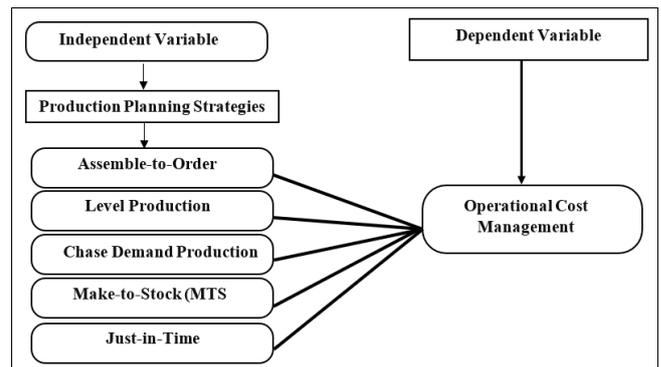
Source: Researcher's conceptualization. (2025)

Fig 2.1: Conceptual framework of the relationship of independent and dependent variables

2.1.1 Production planning strategy
A production planning strategy according to Leonard (2019) is a planned decision made on the basis of earlier study of the costs and revenue impacts of various alternatives that give consideration to factors such as quality, technology and production and service delivery effectiveness. Production planning strategy involves coming up with ways and means of achieving the set objectives of a production firm. In his accounting literature, Umo (1999) stressed, production planning involves the sequence of activities performed before the production process takes place. These include a production schedule, economic batch quantities, dispatch of priorities, and operation sequence. On the other hand, production control ensures the implementation of all production plans" (Ovunda, Isaac & Vurasi, 2019). Production planning is a management strategy that manufacturing organizations use to ensure that resources are allocated and coordinated in a manner that results in operational efficiency. In an environment where consumer demand is fluid and production resources are scarce, management must oversee all production elements (Biswas & Baral, 2021).

The purpose of planning and controlling all the activities involved in making a product is to improve productivity. According to Biswas and Baral (2021) production planning establishes efficient use of materials, money, machine, and manpower to enhance the organization's Profitability. The impact of Production Planning is improved organization for regular and timely delivery, better suppliers' communication for raw materials procurement, reduced investment in inventory, reduced production cost by increasing efficiency, smooth flow of all production processes, reduced waste of

resources and production cost savings that improve the bottom line. According to Asaolu (2021) the critical decisions in Production Planning are what to produce, how to produce, where to produce when to produce, who will produce, and how much to produce. All these decisions are spread across different functions in an organization. Production planning forms the central nervous system of a manufacturing organization that interconnects all other functions (Umo, 2015).

Production planning according to Mukherjee (2021) is a guideline for manufacturers in carrying out the production process. It deals with basic concepts of what to produce when to produce, how much to produce, and so on. Production planning is long-term and aims to ensure high-quality resources are always available during the process. A production plan is a tool that companies can use to develop a strategy for meeting forecasted demands while minimizing costs. An effective production plan also enables companies to reduce the amount of stored inventory they hold and make the best use of their manufacturing plant space and equipment (Ikechukwu *et al*, 2023).

Kanya (2022) and Umo (2014) stressed that effective scheduling and planning can save costs, streamline processes, optimize equipment utilization, and ensure timeliness in meeting consumer needs. Thus, it is important for manufacturers to optimize their production planning. A production planning strategy is a planned decision made on the basis of earlier study of the costs and revenue impacts of various alternatives that give consideration to factors such as quality, technology and production and service delivery effectiveness. Production planning according to Mckay and Wiers (2019) involves making prior decisions on how to carry out a certain strategy in a business which involves the material to produce, the period of production, and the exact location to carry out the production process. A well designed plan with good understanding of the future outcomes helps to avoid failure due to uncertainties. Production planning aims at looking ahead and estimating the type of resources required in an organization and then coming up with the proper arrangements which enables attainment of the set production targets in the proposed plan (Umo, 1999).

2.1.1.1 Assemble-to-order production strategy
Assemble-to-order is a manufacturing strategy under which the manufacturer stocks up on sub-assembly parts and inventories and assembles the parts into the final product when a customer places an order. This strategy relies on the ability of the company to assemble and deliver goods quickly.

ATO manufacturing is a strategy for which standard parts, components, and subassemblies are acquired or manufactured according to forecasts, while schedules for remaining components, subassemblies, and final assembly are not executed until detailed product specifications have been derived from booked customer orders (Essien *et al.,* 2023). Assemble to order is the process of having the components and subassemblies of your product ready, so when a sales order is generated, the finished product can be quickly built and dispatched to the customer. Assemble-to-order, or (ATO), is a manufacturing strategy in which products are assembled from previously completed sub-assemblies once an order comes in. The ATO workflow is used for goods that still have some customizability but the sub-assemblies are made to stock before orders come in

(Eneje, 2019). Assemble-to-order (ATO) is a business production strategy where products that are ordered by customers are produced quickly and are customizable to a certain extent. It typically requires that the basic parts of the product are already manufactured but not yet assembled. Once an order is received, the parts are assembled quickly and the final product is sent to the customer (Biswas & Baral, 2021).

Since production is triggered with an incoming customer order, (ATO) usually have longer lead times than make-to-stock operations. To counter this, (Millicent, 2024) averred that manufacturers employing these production strategies usually have much closer coordination with suppliers. Since manufacturing volumes are smaller, they also keep less components and raw materials in stock. This makes diligent supply chain management a must as procurements and production scheduling need to be thoroughly planned. Whereas companies employing (MTS) can rely on an existing stock of finished goods to satisfy demand quickly, (ATO) producers usually do not keep finished goods inventory at all. A modest safety stock might be kept only in select cases. Jiang and Fu (2018) in their study reported that industries that apply ATO strategy experienced a 15-30% reduction in inventory holding cost, due to better demand matching and less reliance on speculative inventory, thereby reducing operational cost.

The main purpose of this production strategy is to produce the parts that might benefit the customers (Robinson & Umo, 2023). In this strategy, the manufacturer aims to produce goods that the customers might order, assemble the parts, and then sell as many products as possible. The strategy is mainly applicable to the goods that are sold in bulk or high-volume products. The opposite of assemble to order is the make-to-order strategy, in which the items are produced as soon as the production unit gets the order for the same. Basically, the production team starts assembling and manufacturing goods once they get the confirmation for the order. This strategy is for the low-volume and special products that have low demand, and are expensive. The major benefit of the assemble-to-order production strategy is that the product could be customized on some level. Only the parts of the products are manufactured at this stage. It is possible for the production unit to change the product depending on the customer's demand. This is especially useful for the units that require minimal efforts, time and cost from the customer's end. Advances in technology and the latest inventory management functions have played a pivotal role in increasing the demand for assemble-to-order products (Okah *et al,* 2019). ATO allows users to combine a limited number of subassemblies into many possible finished items. This strategy allows a wide variety of customization options, shorter lead times, and low inventory risk.

2.1.1.2 Level Production Strategy
Level production is a strategy that produces the same number of units equally. This is common in industries where demand is cyclical and production capabilities are limited or capped. (Ofila & Ramat, 2021). It is an approach to aggregate planning that aims to regulate production at a constant level, regardless of fluctuation in demand. It involves storing the product in times of low demand and is not therefore an option available to the providers of services. The benefits include maintaining a stable workforce and the optimum use of capacity. The disadvantages include the

costs of storage and the difficulty of responding to major changes in demand (Oxford, 2022). The use of a level strategy means that a company will produce at a constant rate regardless of the demand level. In companies that produce to stock, this means that finished goods inventory levels will grow during low demand periods and decrease during high demand periods. When a company produces items to meet the demands of consumers, it means that the company must ensure that the right quantity of each item is available for sale at any time. The process that is used to determine the right quantity of each type of item is known as the Work-availability process for each product and is a major component of the concept known as materials requirements planning (MRP). If a company produces to meet demand, this process will be followed automatically. If the company employs a level production strategy, it means that the work availability process is followed, but only for each individual item (product). This means that if an item is in high demand, the company will manufacture a large quantity of it. In contrast, if an item is not in high demand, it will only produce a small quantity.

2.1.1.3 Chase Demand Production Strategy
Chase demand strategy can be defined as a strategy where the changes are made to the output according to the demand (Afolalul *et al.,* 2021). Here, the changes are in terms of increasing or decreasing the output in line with the rising or falling demand. It involves matching the demand by hiring or firing the workers or by controlling the level of production and using inventories to control the changes in the demand level. Chase demand is an approach to aggregate planning that attempts to match supply and output with fluctuating demand. Depending on the product or service involved, the approach can incur costs by the ineffective use of capacity at periods of low demand, by the need to recruit or lay off staff, by learning-curve effects, and by a possible loss of quality. The advantages include low storage costs and greater ability to respond to the needs of the customer (Oxford, 2022). In the view of Leonard (2019), this is a lean production strategy, saving on costs until the demand order is placed. Inventory costs are low, and the cost of goods for products sold is kept to a minimum and for a shorter length of time. The chase strategy is common in industries where perishables are an issue or with a company that doesn't have a lot of extra cash on hand and doesn't want the added risks of loss, theft or unsold products. The production schedule is based on orders and immediate demand.

Chase demand strategy is an uncertain demand strategy where the changes made to the output level will depend on the change in the demand. In case of chase strategy, the main concern of the management is to respond to the changes in the demand. In this strategy, the output changes are carried out following the demand changes in order to save the inventories and maximize the profits. There is a possibility for the production managers to over produce during the low demand periods. Also, there is a possibility that the production manager might under produce during the high demand periods. However, chase strategy remains an uncertain demand strategy as it involves the element of uncertainty in the changes in the output level (Akeem, 2017).

Study by Mukherjee (2021) reported that while firms using chase strategies improved responsiveness to customer demand, they also incurred higher costs associated with

maintaining flexible production lines and cross-training employees, adding that these firms experienced increased operational costs due to the challenges of managing labour efficiently during demand peaks and troughs. Similarly, Carlsson and fuller (2022) acknowledged that firms employing chase demand strategies could quickly adapt to market fluctuations but faced increased long-term cost, related to frequent changes in production schedules and workforce adjustments.

2.1.1.4 Make-to-Stock Production Strategy
Make to stock is a conventional production technique wherein producers produce commodities on a large scale in accordance with anticipated consumer demand. Instead of setting a production level and then attempting to sell goods, a company using (MTS) would estimate how many orders its products could generate, and then supply enough stock to meet those orders (Cookey, 2020). According to the corporate finance institute (2020), (MTS) production technique offers a quick response time because customers can purchase and receive delivery of commodities at the same time. (MTS) is a "push supply chain" strategy. In a push supply chain strategy, decisions on when to produce and how much to produce depend on anticipated customer demand. In explaining further, (Siemens, 2021) remarked that make-to-stock (MTS) is a manufacturing strategy in which production planning and production scheduling are based on forecasted product demand. Products made during one production period are used to fulfill orders made in the next production period. This means that in make-to-stock production planning, production is triggered prior to and independent of specific customer orders.

Make-to-stock is considered a push-type operation, which means supplier-raw materials and supplier-provided components - are "pushed" through the production process, and planning starts with supplies and works forward to the finished product. In today's manufacturing marketplace, a high inventory of finished goods is usually an unacceptable cost burden, imposing the expenses of inventory management, warehousing, spoilage and more. Likewise, inventory shortages are costly because of expediting premiums, overtime, and missed delivery times. Therefore, the ideal of make-to-stock production planning is to match the quantity of finished goods at any given time with customer demand during the next period of time. To approach this ideal, planners must successfully forecast demand and appropriately balance supplies and production capacity to meet that demand (Siemens, 2021).

Siemens (2021) identified two keys to efficient make-to-stock planning are; accurate demand forecasting and tools that enable rapid adjustments to changing forecasts. Demand forecasting has become more challenging in nearly every market because of the growing variety of products for which a manufacturer must forecast demand, as well as inherently unpredictable factors affecting demand – natural disasters, health crises, and certain seasonal variations (geopolitical or weather-related shortages of raw materials), to name a few. In addition to demand forecasting, effective make-to-stock planning must incorporate a complex web of considerations, including manufacturing capacity planning, labour and utilization, raw material inventory and replenishment plans, and on-hand and future inventory of finished goods.

Make-to-stock planning on a software system developed by Siemens begins with generation of an accurate and achievable master production schedule (MPS) based on:

rough cut capacity, pack-forward figures, target days of stock cover, manufacturing preferences, minimum and maximum reorder quantities, reorder multiples, product shelf life. To be as efficient as possible, make-to-stock planning must also take account of intermediate stock levels – points in the manufacturing process where work-in-progress (WIP) accumulates prior to the next operation. A make-to-stock approach often results in relatively high intermediate stock levels, so optimizing these levels is an important consideration in the planning process (Siemens, 2021).

2.1.1.5 Just-in-Time Production Strategy
Just-in-time production refers to a production method which aims to improve overall productivity through the elimination of waste and which leads to improved quality (Abdallah & Matsui, 2022). In the manufacturing/assembly process JIT provides the cost-effective production and delivery of only the necessary quality parts, in the right quantity, at the right time and place, while using a minimum of facilities, equipment, materials and human resources. Just-in-time is dependent on the balance between the stability of the user's scheduled requirements and the supplier's manufacturing flexibility. It is accompanied through the application of specific techniques which require total employee involvement and team work. Green and Davis (2022) defines JIT as a technology to reduce costs that do not add value and long-term costs, and the ongoing commitment to achieving excellence by designing and manufacturing products in the quantities and quality required and at the exact time specified.

Just-in-time production is a manufacturing strategy in which products are produced to meet demand, in spite of produce in surplus or prior to need (Ekpudu *et al,* 2022). According to Bivin (2020), in JIT production, manufacturing companies attempt to reduce their level of storage to zero or at least close to zero. That means the three major popular inventories of manufacturing firms; raw materials, work in process and finished goods inventories are tried to be diminished. Companies produce only the required quantity of products at the necessary time. Regarding the core purpose of JIT production in manufacturing companies, Lai and Cheng (2021) argue that the elimination of waste is likely to be the major drive to implement this strategy. Additionally, it can be emphasised that the major motive behind the entire scene is to reduce costs of production, whilst ensuring quality, in manufacturing companies. Similarly, Brown and Smith (2021) described JIT as the production of the minimum number of different units, in the smallest possible quantities, at the latest possible time, thereby eliminating the need for inventory.

The notion of JIT production was described by Taiichi Ohno, the godfather of Toyota production system, as "All we are doing at the time line from the moment the customer gives us an order to the point when we collect the cash, and we are reducing that time line by removing the non-value-added wastes" (Jayswal & Raj, 2021). One motivating reason for developing JIT and other better production techniques was that after World War II, Japanese people had a very strong incentive to develop good manufacturing techniques to help them rebuild the economy (Bivin, 2020). According to Al-Zweeni and Musawi (2019) JIT performance can be measured by inventory turnover, cycle time, lead time, delivery performance, and other measures. Agrawal (2021) suggested some variables to measure JIT

performance such as: the extent of reduction of inventory due to JIT; the extent of reduction of rejects of finished goods due to JIT; the extent of improvement in on-time receipts from suppliers due to JIT; the extent of lead time reduction due to JIT, and the extent of improvement of relationship with suppliers due to JIT.

2.1.2 Operational Cost Management
Operational cost management is a fundamental aspect of any manufacturing firm's operations. Controlling and optimizing the various expenses incurred during production is not only essential for profitability but also for the long-term sustainability of the business (Lee & Chang, 2019). These operational costs encompass a wide range of elements, from labor and raw materials to energy consumption and maintenance. In the competitive landscape of the manufacturing industry, efficient operational cost management is a key factor that can significantly impact a firm's ability to remain viable and competitive (Robinson & Umo, 2023).

Operational costs are a monetary representation of what it takes to run a business. They are the expenses businesses face daily. They cover everything a company needs to function, from employee salaries to rent. Wages, daily expenses, and various other costs are a part of it. These costs impact profitability, pricing, and a company's growth strategy. These costs are pivotal in helping organizations make informed decisions to thrive. From a higher level view, it's somewhat the backbone of an effective financial strategy (Mykhalska, 2021). Iurieva, Sinianskaia, and Sinianskaia (2020) described operational costs as the silent players in the backdrop, influencing profitability and sustainability. Every time a company pays for utilities, rents a space, or processes paychecks, it's tapping into its operating costs. These aren't one-off purchases; they recur month after month. By managing these costs, a business can succeed.

Therefore, operational cost management according to Mamidu and Akinola (2019) is a set of techniques and methods for planning, measuring, and reporting, intended to improve a company's products and processes. Its ultimate purpose is to provide information that companies need to provide the value that customers demand at a minimal cost. Operational Cost management is at the core of enterprise performance management, as it represents the bottom line for every company. Cost Management drives business performance by discovering drivers of cost and profitability, empowering users with visibility and flexibility, and improving resource position. In today's business environment, companies focus increasingly on cost management. Modern cost management assumes knowledge of cost accounting and managerial accounting, although the purposes and methods of cost management differ in important ways from those of cost accounting and managerial accounting. The primary purpose of cost accounting has always been to calculate inventory and cost of goods sold for financial statement purposes. In other words, the focus of cost accounting is on external financial reporting. The primary concern of cost management, by contrast, refers to internal decision-making (Yuriy *et al*., 2018).

According to Tarigan *et al*. (2021) the most important managerial tools are operational cost management strategies which are considered as critical factors to increase revenue for the success of manufacturing companies. Cost

management strategy supports decision making and improves competitive advantage that results in a better resource allocation. In addition, Sysoiev (2019) stressed that operational cost management may be an integral feature of overall businesses' management effectiveness which facilitate to determine accurately estimated cost before process starting and can help to forecast cost occurrence and reduction in the future. Operational cost management strategy effectiveness helps to finish the task with the spending of limited allocated resources and makes valuable to firms such as reduction in working capital invested, lowering cost per unit, leading to better quality of the process and product (Sysoiev, 2019). Firms with operational cost management strategy implementation are able to know the amount of cost they will incur in the future if they have current and future cost information. Thus, managers can make better decision which will positively improve the financial performance of manufacturing companies (Tarigan *et al.,* 2021).

Operational cost management as described by Mykhalska (2021) is a process of quality planning and cost reduction that manages the costs before their occurrence. According to Iurieva *et al.* (2020), a well-planned cost management system will provide improvements in quality, cost/price, and functionality of a product. Manufacturing companies use modern cost management techniques in their daily operations which has a great impact on their financial performance that generate costs of non-added values. Frederica and Augustine (2020) viewed operational cost management as cost reduction strategy which refers to an attempt to attain lower current fixed costs and variable costs associated with an essential activity, adding that, operational costs management provides a clearer picture of a business's financial standing in order to Know which costs can be trimmed during lean times and which remain constant, useful in budgeting and forecasting.

The intricate relationship between operational cost management and production planning cannot be overstated. Effective production planning can lead to cost savings by optimizing resource allocation and minimizing wastage. On the other hand, efficient operational cost management can enhance the viability and flexibility of production planning strategies (Wadhwa & Sachan, 2019). According to Ofoegbu (2021) operational cost management is a pivotal function for manufacturing firms in Nigeria, as it directly impacts profitability and sustainability. This process involves the systematic control, reduction, and optimization of various expenses incurred during the manufacturing process (Robinson & Umo, 2023) Given the unique challenges in Nigeria, effective operational cost management is paramount.

2.1.3 Components of Operational Cost Management

Labour productivity: Labour productivity is a critical component in the operational efficiency and cost management of production firms in Nigeria as it relates to the efficient utilization of human resources to maximize output while minimizing operational costs. Nigeria's labour market exhibits diversity in terms of skills and availability, making labour productivity a complex factor to manage. The training and skill development of the workforce are pivotal (Frederica & Augustine, 2020). By investing in employee training and skill enhancement programs, manufacturing firms can optimize the productivity of their workforce. Well-trained employees are more efficient, produce higher-

quality outputs, and can adapt to changing market demands. Efficient Labour Allocation is fundamental for cost management. Ensuring that workers are deployed effectively to perform tasks that match their skills and competencies minimizes wastage and rework (Mykhalska, 2021). Labour allocation systems can be optimized to match labour availability with production schedules, reducing idle time and overtime costs.

Regular performance evaluations, feedback, and incentives can motivate employees to improve productivity and maintain consistent output. Incentives for productivity improvement can further enhance labor efficiency. Providing monetary and non-monetary incentives for meeting or exceeding production targets can encourage employees to maximize their efforts. Incentives can help reduce the occurrence of idle time and absenteeism (Wadhwa & Sachan, 2019). Employee welfare and work environment should not be overlooked. A safe and comfortable working environment promotes productivity. Investing in workplace safety measures and employee well-being can reduce absenteeism due to work-related injuries or health issues and enhance overall labor productivity.

Regulatory compliance: Regulatory compliance is a fundamental aspect of operational cost management and risk mitigation for manufacturing firms. Given the evolving regulatory landscape in the region, understanding and adhering to legal and industry-specific requirements are critical. Nigeria has a complex regulatory environment with local, state, and federal regulations affecting various aspects of manufacturing operations. Compliance is essential to avoid legal issues, fines, or disruptions in operations. Manufacturers must stay informed about changes in regulations and ensure that their practices align with these evolving requirements (Wadhwa & Sachan, 2019).

Quality standards and certification: Many industries have specific quality standards and certifications that manufacturing firms must adhere to. Ensuring compliance with these standards is essential for maintaining product quality and meeting customer expectations (Monday & Wosowei, 2025). Non-compliance can result in the production of subpar products and increased operational costs due to rework and customer complaints. Regulatory compliance in Nigeria encompasses a range of legal, quality, environmental, health and safety, tax, and ethical considerations. Compliance is essential for minimizing legal risks, operational disruptions, and financial penalties. Manufacturing firms must be proactive in understanding and adhering to the evolving regulatory landscape to ensure cost-effectiveness and long-term sustainability.

Equipment maintenance: Equipment Maintenance is vital in operational cost management. Regular maintenance schedules help extend the lifespan of machinery and equipment, reducing downtime and costly repairs. In a region with logistical challenges, minimizing equipment downtime is a cost-saving strategy.

Raw material costs: Raw Material Costs, which are affected by supply chain logistics and market volatility, represent a substantial portion of operational costs. Collaborating with local suppliers, implementing just-in-time inventory systems, and closely monitoring raw material prices are strategies to mitigate these costs (Shim & Siegel, 2019).

High energy costs and inconsistent power supply: High energy costs and inconsistent power supply pose significant challenges to operational cost management. Manufacturing

firms often rely heavily on energy-intensive processes, and the elevated energy costs can significantly impact overall expenses. Implementing energy-efficient technologies and practices, along with exploring alternative energy sources, becomes a crucial strategy to control these costs (Ofoegbu, 2021).

Production planning strategies significantly impact operational cost management by influencing inventory levels, labor utilization, production efficiency, and responsiveness to market demand (Oyedokun & Adelodun, 2023). In the case of Assemble-to-Order (ATO), Products are assembled only after a customer order is received. Components and sub-assemblies are stocked, but the final product is not. By not holding finished products, companies save on warehousing, insurance, obsolescence, and capital tied up in inventory. As products are assembled upon order, the risk of having outdated or unsellable finished goods is minimized. According to Prasanta and Walid (2022), ATO allows for a degree of customization without the high costs of make-to-order, potentially increasing sales and customer satisfaction. While finished goods inventory is reduced, a wider variety of components might need to be stocked, potentially increasing component inventory management complexity and costs. Managing the assembly process, supplier relationships for components, and ensuring timely assembly can add administrative and coordination costs.

On the other hand, for level production, production occurs at a constant rate regardless of demand fluctuations. During periods of low demand, inventory builds up, and during high demand, it's drawn down. This stabilizes labour cost as there is no need for frequent hiring, layoffs, or excessive overtime, leading to lower training costs, better employee morale, and potentially higher quality due to a consistent workforce. Equipment runs at a steady pace, maximizing capacity utilization and potentially reducing wear and tear associated with fluctuating workloads. Radzua (2022) noted that consistent, high-volume production can lead to lower per-unit manufacturing costs due to bulk purchasing of materials and optimized production runs. For chase demand, Production rates are adjusted to closely match demand fluctuations. This means increasing production when demand is high and decreasing it when demand is low. By producing only what is needed, companies minimize finished goods inventory, reducing storage, insurance, and obsolescence costs. This strategy allows for quick adaptation to changes in customer demand, minimizing stockouts and maximizing sales opportunities.

Additionally, in the case of Make-to-Stock (MTS), products are manufactured in anticipation of customer demand and held in inventory. This strategy relies heavily on accurate sales forecasting. Products are readily available, allowing for immediate fulfillment of customer orders, which can lead to higher customer satisfaction and increased sales which thus enhances operational cost efficiency. Large production runs based on forecasts allow for bulk purchasing of raw materials and efficient use of production facilities, leading to lower per-unit manufacturing costs (Oyedokun & Adelodun, 2023). Just-in-Time (JIT) is a strategy that that aims to minimize inventory and increase efficiency by receiving goods, components, and producing products only as they are needed, precisely when they are needed. This strategy minimizes inventory holding cost by drastically reducing costs associated with storage, obsolescence, damage, and capital tied up in inventory. JIT

identifies and eliminates waste in all forms (overproduction, waiting, unnecessary transport, over-processing, excess inventory, defects, unnecessary motion).

The choice of production planning strategy is a critical decision that directly impacts a company's operational cost structure. Each strategy involves trade-offs. The optimal strategy depends on various factors such as product type, demand variability, lead times, supply chain reliability, and the company's financial capacity and strategic objectives. Emanuel and **Worlu** (2025) found that a positive significant relationship exists between production planning and operational efficiency; Umoh *et al*. (2024) found that production planning significantly affects operational effectiveness, increased equity capital, and the expansion of the Nigerian manufacturing sector; Millicent (2024) established that enterprise resource planning, manufacturing resource planning, Just-in-time systems, and Chase demand strategy significantly influence operational performance and Uche and Peterson (2024) observed that indicate that assemble-to-order strategy and operational cost level production strategy have significant effect on operational cost management of selected MSEs in Ethiopia.

2.2 Theoretical Review
Three theories were used to support this study, they include: Economic order quantity model, resource-based view and theory of constraints.

2.2.1 Economic Order Quantity Model by Harris (1913)
The Economic Order Quantity (EOQ) is one of the most common deterministic inventory models. The (EOQ) is a mathematical model formulated within the scope of operations management to determine the optimal inventory level. The model was developed by Ford W. Harris in 1913 and is also known as Wilson (EOQ) model, who critically analyzed the model. The (EOQ) model requires that for every item stocked in the stores, there is need to determine the point of order and that of the most cost effective quantity to order. This also affects the production planning strategy adopted by the firm. The model assumes that all other variables are constant even though uncertainties are common and regular in all business. For instance, uncertainties may include change in demand, damage during transportation and delay in delivery. Uncertainty in demand, will therefore force (EOQ) to be adjusted to buffer against uncertain business atmosphere. (Blackburn 2010) is among researchers who agree that (EOQ) is one of the models widely used to manage inventory in many industries. Economic order quantity approaches have proven to be effective in production planning and inventory management technique when the demand and lead time are relatively stable, as well as when significant variability and uncertainty exist. (Coleman, 2017) adopted (EOQ) and applauded the model as one that order quantities which minimize the balance of cost between inventories holding costs and re-order costs.

The Economic Order Quantity (EOQ) model directly relates to operational cost management by providing a method to minimize the total cost of inventory management. By calculating the EOQ, a company can determine the order quantity that results in the lowest total cost, balancing ordering and holding cost effectively. More so, managing operational cost involve levels. Hence, the EOQ helps in determining the precise amount of stock to order, thereby reducing excess inventory (which increases holding cost)

and avoiding stock outs, which can lead to lost sales and increased ordering costs. In summary, EOQ is a critical tool within operational cost management for balancing and minimizing the cost associated with inventory. Effective management of these costs can enhance the operational efficiency and profitability of businesses.

2.2.2 Resource-Based View Theory by Barney (1991)

The *resource-based view* **(RBV)** theory was developed by Barney Jay in 1991. The Resource-Based View (RBV) theory is a prominent framework in the field of strategic management that posits that firms can attain and sustain a competitive advantage by leveraging their unique and valuable resources. The theory emphasizes the firm's resources as the fundamental determinants of competitive advantage and performance. It adopts two assumptions in analyzing sources of competitive advantage (Peteraf & Barney, 2018). First, this model assumes that firms within an industry (or within a strategic group) may be heterogeneous with respect to the bundle of resources that they control. Second, it assumes that resource heterogeneity may persist over time because the resources used to implement firms' strategies are not perfectly mobile across firms (i.e., some of the resources cannot be traded in factor markets and are difficult to accumulate and imitate). The theory recognizes that heterogeneity of resources in a firm is a driver of competitive differences within an industry; those companies that foster resources in support of sustainability reporting are likely to gain competitive advantages and hence achieve higher share prices as most investors are becoming more environmentally conscious and tend to be more interested in firms that rate well in their sustainability performance.

Resource based view theory proposed that there are two major sources of competitive advantage within the internal environment of an organization that are important to the preparation of firm strategy and the efficient and effective application of these resources can enable organization to achieve sustainable competitive advantage (Uche & Peterson, 2023). These resources are tangible and intangible resources. Resource based view theory holds two major assumptions which state that resources must be heterogeneous in nature. The heterogeneous nature of resources assumes that firms achieve competitive advantage when organization makes use of resources that are significantly different from that of competitors. The second assumption of resource based view theory is that firm's resources are non-movable and non-transferable that is, resources attributed to a particular company do not move from one company to another at least in a short run (Welp, 2020).

The resource-based view (RBV) is a managerial framework used to determine the strategic resources a firm can exploit to achieve sustainable competitive advantage. The RBV focuses managerial attention on the firm's internal resources in an effort to identify those assets, capabilities and competencies with the potential to deliver superior competitive advantages.

The *resource-based view* **(RbV)** is a model that sees resources as key to superior firm performance. If a resource exhibits Value, rarity, imitability and organization attributes, the resource enables the firm to gain and sustain competitive advantage.

In the context of resource-based view, a food and beverage company might lose its competitive advantage if important production planning and management skills are scarce or getting lost as they are not easily duplicated or substituted. The supporters of this RBV theory argue that organizations should look inside the company to find the sources of competitive advantage instead of looking at competitive environment for it. Production strategies are valuable as they help providing supply strategies for future needs and developing supply management strategies to support company strategies. Resource-based view (RBV) approach is useful by employing various strategies in controlling inventories in the organization through optimal utilization and allocation to be more competitive and improve on performance. RBV also uses techniques such as value analysis to study the function of material, components or systems to identify areas of unnecessary costs as it forms a key component of an inventory control strategy that minimizes costs to the bottom-line.

2.2.3 Theory of Constraints by Goldratt (1987)

The theory of constraints was developed by Eli Goldratt in the mid-1980s. The theory of constraints evolved from the optimized production timetables (Opt) system and was later known under the commercial name optimized production technology (Opt). By 1987, the overall concept became known as the theory of constraints (TOC) which Goldratt viewed as "an overall theory for running an organisation". This refinement recognised that the main constraint in most organisations may not be physical but managerial-policy related. To address the policy constraints and effectively implement the process of on-going improvement, Goldratt developed a generic approach called the "thinking process" (TP), which is the current paradigm of theory of constraints (Rahman, 2020). The (TOC) philosophy assumes that any organisation or system has a small number of constraints which dominates the entire system. The analytic approach with Toc comes from the contention that any manageable system is limited in achieving more of its goals by a very small number of constraints, and that there is always at least one constraint. The theory adopts an idiom that, "A chain is no stronger than its weakest link" as a new management paradigm, which means that processes or organisations are vulnerable because the weakest person or part can always damage, break or adversely distress the outcome (Tulasi & Rao, 2012).

The theory further defines a constraint as anything that limits an organisation's high performance in terms of its goal. The theory of constraint views all operations systems as consisting of a set of interdependent processes where the output of one process is an input to another process or processes. The number and type of interdependencies that exist in a given plant will be a function of product varieties, production processes and a number of other factors. Constraints may be physical such as machine capacity, or management policies such as pricing. Organisational constraints can be addressed in five step process which are; identify the system's constraint, decide how to exploit the system's constraint, subordinate the rest of the system to the decisions made above, elevate the constraint and the final step, you go back to step 1 for improvement if the previous steps result in new constraints (Gupta & Boyd, 2008).

2.3 Empirical Review

Emanuel and Worlu (2025) empirically tested the relationship between production planning in terms of manpower planning and material planning and operational

efficiency of food and beverage industry in Rivers State, Nigeria. It attempts to provide answer to the relationship between production planning and operational efficiency. Fifteen (15) firms were purposively selected from the food and beverage industry in Port Harcourt. Using the Spearman Rank Order Correlation Coefficient, they analyzed the data collected from the human resource manager, production manager and financial manager of the 15 selected food and beverage firms in Port Harcourt. The study found that a positive significant relationship exists between production planning and operational efficiency and that organizational age moderate the relationship between the independent and dependent variables. Based on the findings, we recommended that all food and beverage firm should with seriousness embark on proper planning of production activities irrespective of the age of the organization among others.

Monday and Wosowei (2025) evaluated the effectiveness of production planning strategies and cost minimization approaches in food and beverage enterprises across South-South Nigeria. Using a descriptive survey design, the research examined 45 companies selected through stratified random sampling from the six states in the region. Data collection utilized a structured questionnaire with 40 items across four research objectives. Findings revealed high effectiveness in current production planning strategies and strong correlation between planning approaches and cost minimization. Advanced planning software usage emerged as the most effective best practice, while technology upgrade requirements were identified as the highest priority for improvement. The study recommended implementing integrated production planning systems, establishing comprehensive preventive maintenance programs, and developing robust energy management systems to enhance operational efficiency and reduce costs.

Umemezilem et al. (2024) examined the effect of strategic cost management practices on organizational performance of Nigerian manufacturing firms. The study was guided by two research questions and two hypotheses. The survey design was used in the study. The population of study was 70 staff or respondents drawn from Guinness Nigeria Plc, Cocoa-cola Nigeria Plc, Nigerian Breweries Plc and Delta Glass Plc with a sample size of 60 using the Taro Yamena's formula Data analysis and stated hypothesis were tested using Kruskal Wallis one-way analysis of variance by rank. The findings revealed that strategic cost management practices positively cost impact on the organizational performance of the manufacturing firms under study. In light of this result of study, it is recommended that manufacturing firms still using the traditional costing methods should consider implementing the strategic cost management techniques to enhance their performance and competitiveness.

Umoh et al. (2024) investigated the relationship between Production Planning and Corporate Productivity Performance in the Nigerian manufacturing industry. The study evaluated corporate productivity performance in terms of growth, improved equity capital, and cost reduction. Eighty respondents in the eighty sampled manufacturing firms out of the hundred in the industry that are publicly traded received the questionnaire, which was provided with three hypotheses. The questionnaire was retrieved in 62 copies. For the analysis, these and the companies' five-year financial statements were used. From the findings of the study, production planning significantly affects operational effectiveness, increased equity capital, and the expansion of the Nigerian manufacturing sector. The conclusion suggests that production planning has a considerable impact on organizations' corporate productivity performance. Based on the findings, the study suggested, among other things, that the Nigerian manufacturing sector evaluate the concepts and practices of production planning in order to reestablish the sector as the cornerstone of all progress.

Ikon and Nwankwo (2024) examined the effect of production planning strategies on profitability of selected manufacturing firms in Nigeria, the study used Flour Mill of Nigeria Plc, Dangote Flour Mill Plc, and Honeywell Flour Mill Plc as case studies. According to the report, production planning is crucial for giving clients better, more affordable goods at a lower cost. The study identifies the issue as an inventory shortage brought on by stockouts and unexpectedly high demand; a supply challenge brought on by insufficient machine capacity and installation; inferior technology; poor capacity utilization; an inability to meet budgetary targets due to changes in demand and supply variables; and poor demand forecasting. The data collected for the study were based on Secondary information. The data obtained were analyzed using the Ordinary Least Squares (OLS) technique using time series. The findings of the study show that the estimated coefficient of the constant term is statistically significant at better than 0.1 percent for Dangote Flour Mill Plc and Honeywell Flour Mill Plc and statistically significant at 0.6 percent for Flour Mill of Nigeria Plc. This implies that an increase in turnover (sales) leads to a subsequent increase in inventory, which in turn increases the level of production. The increase in turnover subsequently increases profitability at Dangote Flour Mill Plc and Honeywell Flour Mill Plc.

Millicent (2024) studied the effect of manufacturing planning/control on operational performance within the context of the pharmaceutical industry of Nairobi. The study was based on a descriptive research design and the data were collected from respondents via questionnaire. The study's findings established that enterprise resource planning, manufacturing resource planning, Just-in-time systems, and Chase demand strategy significantly influence operational performance. Therefore, it is highly required for pharmaceutical companies to deploy the necessary strategies to deal with the challenges of the application/implementation of manufacturing planning and control systems.

Habib (2024) examined the effect of production planning strategy on operating performance of pharmaceutical companies in Egypt. The researchers adopted an ex-post facto research design and collected panel data covering ten years (2013-2023) from thirteen pharmaceutical companies in Cairo, Egypt. The researcher analyzed the data using descriptive statistics and panel multiple regression analysis with the E-views 10.0 statistical package. The study found that the degree of the MRP positive implementation of pharmaceutical manufacturer's production and operations' performance, ensures the availability of materials, components, and products. This led to Enhanced production and operations planning and controlling, improved on-time delivery to customers, maintenance of optimal inventory level and plans manufacturing activities, and accomplishment of purchasing schedules. MRP creates synergy and attains better production and operations

performance which resulted in wide acceptance in the Egyptian pharmaceutical manufacturing field. Using correlation and regression analysis.

Uche and Peterson (2024) examined the impact of production planning strategies and operational cost management. Data for the study were collected from 188 micro and small enterprises (MSEs) operating in the manufacturing sub-sector in Ethiopia and the relationships and hypothesis proposed in the conceptual framework were tested using structural equation modeling (SEM). Production planning strategies was measured by assemble-to-order strategy and operational cost and operational cost management was measured by level of output and cost efficiency. The results indicate that assemble-to-order strategy and operational cost level production strategy have significant effect on operational cost management of selected MSEs in Ethiopia.

Bassey and Wilson (2024) investigated the effect of various production planning strategies on firm's operational cost efficiency of listed companies in Pakistan. These factors included level production strategy, chase demand production strategy and make-to-stock (MTS) production strategy on operational cost management. Data was collected by questionnaire from 250 individuals from different departmental stores in Karachi in Pakistan. The research design adopted for the study was survey design and primary data were used. The primary data were derived from the researcher constructed 5 point Likert questionnaire Data was analyzed using structural equation modelling. The results showed make-to-stock (MTS) production strategy has positive correlation with operational cost management while on relationship was found between level productions strategies, chase demand production strategy and operational cost management.

Oluwagbemiga et al. (2024) investigated the relationship that exists between Lean production and supply chain innovation in baked foods supplier to improve performance using data from 40 manufacturing companies listed on the Nigerian stock exchange during the period from 2013 to 2022. The study relied on secondary data extracted from the audited financial statements of the selected companies. Inventory management, budgetary control and cash management, production overhead cost, and administrative overhead cost were taken as independent cost management variables, while profitability (operating profit) was taken as a dependent variable representing the firm's performance. The result indicates that a positive, significant relationship exists between cost management practices and the firm's performance in the manufacturing organization.

Aluko et al. (2024) examined the relationship between production planning strategies and operational cost management of manufacturing companies in Nigeria. The study made use of both primary and secondary data. Primary data for the study was collected through the use of a questionnaire which was administered on employees of sampled companies (Nigerian Breweries, PZ Industries and Innoson Nigeria Limited) with a response rate of 270 out of 285. Secondary data was obtained from annual reports of the sampled companies. They employed descriptive statistics, Pearson's correlation and regression techniques for the analysis of data. The result revealed that assemble-to-order strategy and level production strategy have significant effect on operating efficiency of manufacturing companies in Nigeria. The results also provided evidence that chase

demand production strategy and make-to-stock (MTS) production strategy and insignificantly affected the productivity of manufacturing firms.

Udoh and Martinez (2023) carried out a study to ascertain the relationship between production planning strategies financial performance selected SMEs in Kenya. Survey research design was adopted and primary data used were gotten from the responses from 350 respondents. The instrument for data collection was researcher's constructed questionnaire. Ordinary least squares (OLS) regression method and Pearson Correlation were used for the study. The independent variable was represented by Just-in-time (JIT), chase demand production strategy and make-to-stock (MTS) production strategy while the dependent variable was represented by Return on Assets. The findings showed that Just-in-time (JIT) and chase demand production strategy showed significant positive impact on Return on Assets (ROA). However, make-to-stock (MTS) production strategy showed a negative impact on Return on Assets. Also, the control variables adopted in this study (size, growth, leverage and current ratio) have significant impact on financial performance of firms selected for the study.

Johnson et al. (2023) studied the relationship between production planning strategies and operational cost management of selected Kenyian firms. They studied 52 businesses for a period of 25 years between 2012 to 2021. The ex post facto research design was and secondary data were the data source for the study. The study used multiple regressions to determine the correlation between production planning strategies and operational cost management. The study measured production planning strategies using level production strategy, chase demand production strategy and make-to-stock (MTS) production strategy. The results revealed a positive correlation between level production strategy and chase demand production strategy the study was done in another country while the current study is carried out in Nigeria.

Ikechukwu et al. (2023) focused on the effect of production planning on firm operational performance at Dangote Cement Plc. The study specifically investigates the impact of inventory control and forecasting on operational performance. The study was anchored on the theory of Resource-Based View (RBV). A descriptive survey research design was employed. The total population of the study comprises the staff of the selected departments in Dangote Cement Plc Benue Plant, which is one hundred and five (105) staff. This population was chosen because of their knowledge about the study. The sample size was determined at 83 using Taro Yamane's statistical formula. The reliability of the instrument was ascertained using Cronbach's coefficient statistics at 85%. The tested hypotheses revealed that inventory control and forecasting have a significant influence on the operational performance of Dangote Cement Plc Benue Plant. The study concluded that production planning determines the kind of activity to be carried out and the amount of time needed to perform this activity. This will improve and foster productivity through high organisational structure. The study therefore recommended that the management timely place an order for basic raw materials, as that will minimize the incidence of stock outs, which may affect the production process and customer satisfaction.

Oyedokun and Adelodun (2023) examined the effect of production planning on the Profitability of listed FMCG

companies in Nigeria. The study adopts an ex- post facto research design. The data were collected from the audited reports published by the Nigerian Stock Exchange from 2011 to 2020. The population comprises twenty-one (21) consumer goods firms listed on the Nigerian Stock Exchange floor as of 31st December 2020. The study selected eight (8) FMCGs in Nigeria based on two filter criteria. The descriptive and inferential analysis, multiple regression techniques, and the STATA13 package were used for the analysis. The findings revealed that inventory turnover enhances the profitability of listed FMCGs in Nigeria and that workforce productivity positively affects productivity (The F-Stat chi-square = 320.99, P-value =0.000). The R^2 reveals a value of 34.39%, indicating that the production planning variables and the control variable inflation can explain the variations in the Profitability of the selected FMCGs firms in Nigeria to a percentage of 34.39%, while the remaining percentage is explained by other factors not captured in the model. The study concluded that inventory management, as indicated by inventory turnover, improves the Profitability of listed FMCGs in Nigeria and that improved workforce productivity enhances the Profitability of listed FMCGs in Nigeria, and that capital structure with higher total debt to total equity will negatively influence the Profitability of listed FMCGs in Nigeria. The study, therefore, recommended that FMCG companies' management in Nigeria should focus on strategic inventory management to improve operations efficiency and turnover, and also government and policymakers create an enabling environment and sovereign fund accessible by manufacturing companies at single-digit interest rates to improve their working capital and enable their growth.

Nnamdi and Wilson (2023) carried out a study to determine the relationship between production planning strategy and operational cost efficiency selected Nigerian manufacturing firms. The survey research design was adopted and six companies were purposively selected. The primary data used were obtained from structured 5 point Likert questionnaire and tested by means of fixed and random effects ordinary least square estimation tool. Findings indicated that assemble-to-order strategy, level production strategy had a significant positive relationship with return on investments, while inventory turnover period had a significant negative relationship with operational cost efficiency. Also, make-to-stock (MTS) production strategy and Just-in-time (JIT) production strategy had a significant negative relationship with operational cost efficiency.

Adeniran and Smith (2023) examined automation impact on production planning accuracy. A census of all the procurement employees in the retail supermarkets was undertaken. The study utilized descriptive design. Data was collected using structured questionnaires and analyzed using both descriptive (measures of central tendencies) and inferential statistical techniques (Pearson correlation). Analysis was done using Statistical Package for Social Sciences (SPSS) version 24. The study established that automated planning systems reduced production errors by 35%. Similarly, Oladipo *et al*. (2023) demonstrated that integrated planning software improved resource allocation by 42%. Furthermore, Mohammed and Andrews (2023) showed that digital planning tools enhanced production scheduling accuracy by 28%.

Ofoegbu (2023) investigated the critical interplay between production planning and operational cost management within the manufacturing firms of Rivers State, Nigeria. The study delves into the complex relationships between these two essential facets of business operations, shedding light on how they impact the competitiveness and sustainability of manufacturing enterprises in this region. Employing a quantitative research design, data were collected from three prominent manufacturing firms, namely Demcok Paints, Glaxo Paint Nigeria Limited and Terra Paint through a convenient sampling method. The analysis revealed intriguing insights into the connections between market demand analysis, quality control, labor productivity, regulatory compliance, and their impact on operational costs and production efficiency. The findings of this study have the potential to guide manufacturing firms in Rivers State toward more effective strategies for optimizing production planning and cost management, thereby enhancing their competitiveness and longterm viability.

Prasanta and walid (2022) developed and deployed an analytical framework for measuring the environmental performance of manufacturing supply chains in Malaysia. This work's theoretical bases combine and reconcile three major areas: supply chain management, environmental management and performance measurement. Researchers have suggested many empirical criteria for green supply chain (gsc) performance measurement and proposed both qualitative and quantitative frameworks. however, these are mainly operational in nature and specific to the focal company. this research develops an innovative gsc performance measurement framework by integrating supply chain processes (supplier relationship management, internal supply chain management and customer relationship management) with organisational decision levels (both strategic and operational). Theoretically it contributes holistic constructs for designing a gsc and managing it for sustainability; and practically it helps industry practitioners to measure and improve the environmental performance of their supply chain.

Kritchanchai and Meesamut (2022) examined inventory management in hospitals, and it was observed that hospital management uses a single inventory policy for all drugs. The research design adopted for this study was survey research design. The instrument for data collection was the researcher's self-constructed questionnaire. The data analysis technique employed was ordinary least square regression analysis. This has led to increasing costs on storage, obsolesce, and attendant budget increase. Based on historical records, the research focused on studying high consumption values and classified them by drug characteristics, demand value, and clinical importance. It was discovered that a single inventory policy is inadequate for all medicine based on their category and demand characteristics.

Ekpulu *et al*. (2022) examined the effect of production planning and control on organisational performance in the Nigerian cement manufacturing industry. Production planning and control were proxied by material requirement planning, quality control, just-intime production, and inventory management; while organisational performance was measured by productivity, quality delivery, profitability, and cost minimisation. The study's population includes 768 employees in the production, quality, procurement, and sales/marketing departments of Dangote Cement Plc and Lafarge Cement Nigeria Plc, in which two hundred and sixty-three (263) employees were selected as sample using

judgmental sampling technique. A structured questionnaire was administered on the respondents. A pool confirmatory factor analysis was employed to assess the validity and reliability of the research instrument. The study employed descriptive (mean, frequency distribution, and percentage) and inferential statistical techniques to analyse and test the data collected. On the other hand, structural equation modeling technique was used to test the hypotheses formulated for the study. The outcome of the path analysis revealed a positive coefficient value of the causal effect of production planning and control constructs (material requirement planning, quality control, just-in-time production, and inventory management) on organisational performance. The study recommended that manufacturing firms should embrace effective material requirement planning to ensure manufacturing effectiveness in their operations.

Radzuan (2022) did a study on inventory management practices and its effects on vendor managed inventory performance. This study tried to shed the lights on the effects of inventory management practices, which include visibility of demand, replenishment decision, inventory ownership, inventory location, and inventory control limits on VMI performance. Quantitative methodology was chosen as the method to gather the data where those manufacturing companies being selected according to the list from the Federation of Malaysian Manufacturer (FMM). The data were gathered from 101 manufacturing companies whose manufacturing based located in Malaysia. Data analysis was conducted by employing descriptive analysis, factor analysis, reliability analysis, and a simple multiple regression. The findings showed that visibility of demand and inventory control limits were the main predictor of service performance. Meanwhile, only inventory location contributed to cost performance of VMI.

Nahid *et al*. (2022) examined how the development of working capital management influences on profitability and liquidity as two important factors of financial performance of companies in Kenya. This paper was an analytical - descriptive research that reviews the existing literature in this field and classifies them into two groups including the impact of working capital strategies on the performance and the other one was the impact of working capital indicators on the performance. This survey investigated the relationship between working capital strategies and working capital indicators with the performance of organization. The survey result showed that the impact of working capital strategies and indicators on profitability and liquidity considered simultaneously in development of working capital management.

Lehoux and Ronnqvist (2022) conducted a study through a review of 118 articles on coordination, cooperation and collaboration in the production and inventory systems. The research design adopted for the study was ex post facto and secondary data were used. These secondary data were obtained from the 118 articles reviewed. The research spanned from 2012 to 2021. FGLS ordinary least square regression model was used to examine the relationship between the variables studied. The result showed that 'production planning and control decisions are not separate and that supply chain members can significantly reduce costs through effective planning and coordination of production and inventory decisions in organisation'.

Karanja *et al*. (2022) also conducted a study on adoption of modern management accounting techniques in small and medium (SMEs) in developing countries: A case study of SMEs in Kenya. Their study shows that modern costing techniques such as assemble-to-order strategy, level production strategy, chase demand production strategy and Just in Time method (JIT) as well as other non-conventional methods were adopted as an attempt to enhance enterprise efficiency and innovation for better planning and improved product/service pricing. The findings showed that SMEs in Kenya have intuitively adopted varying management accounting techniques. From the sample, the majority of SMEs are faced with constraints on capital management.

Adenuga and Price (2022) identified the considerations for adapting production planning strategies in a product development environment and provide a "best practice" approach for production processes in Ghana. The findings from a literature review and interviews were tested during a case study at Renault Trucks. According to this study, identifying key specific objectives, choosing the suitable scope and project, and noticing the information and output uncertainties are the main subjects that should be considered during the application of production planning strategies in the product development area. Based on the findings, a step-by-step procedure is provided that helps organizations apply assemble-to-order strategy, level production strategy, chase demand production strategy, make-to-stock (MTS) production strategy, Just-in-time (JIT) production strategy, material planning requirement and vendor managed inventory in their product development environment.

Ibrahim and Okonkwo (2021) examined production planning practices and financial performance of listed consumer food products manufacturing companies in Nigeria. The specific objectives evaluated the relationship between just-in-time costing and return on equity; chase demand strategy on return on assets and assemble to order strategy on return on assets of listed consumer food products manufacturing companies in Nigeria, also examined the relationship between value stream mapping and return on equity of listed consumer food products manufacturing companies in Nigeria, and determined the moderating influence of firm size in the relationship between production planning practices and financial performance of listed consumer food products manufacturing companies in Nigeria. The study adopted triangulation and correlational research design. The unit of respondent of the study were three hundred and thirty-six (336) knowledgeable and competent staff within the production, marketing and finance departments of the nine (9) listed consumer goods manufacturing companies. The sample size was therefore determined by using the Taro-Yame sampling techniques to be 183. The instrument of the study is triangulation (primary data and secondary data). The formulated research questions were analyzed with descriptive statistics. The hypotheses were tested using the multiple regression analysis with the aid of E-view (10). The findings of the study were that: there is significant relationship between just-in-time costing (JITC) and assemble to order and return on equity (ROE); there is an insignificant relationship between chase demand strategy and return on equity (ROE) of listed consumer food products manufacturing companies in Nigeria. And There is significant influence of the firm size on the relationship between lean accounting practices and financial

performance of listed consumer food products manufacturing companies in Nigeria.

Ejiofor *et al*. (2021) aimed to test the relationship between production planning strategy and the profitability of Algerian small and medium enterprises in the province (wilaya) of Sétif. Production planning strategy were proxied by chase demand production strategy, make-to-stock (MTS) production strategy and Just-in-time (JIT) production strategy while profitability was proxied by return on assets. The research design adopted for the study was ex post facto. The Ordinary Least Square method was used to test the formulated hypotheses. Statistically significant results were reached between the variables, as there is a direct relationship between production planning strategies and the rate of return on assets (ROA).

Asaolu (2021) explored the influence of operation management on the performance of the Oil & Gas, and Manufacturing sectors in the United States and the disparities in their dynamics. The study used secondary data from the New York Stock Exchange (NYSE)/NASDAQ for ten years, from 2010 to 2019. The inquiry used the panel least square estimation approach and sectoral analysis of the data acquired to evaluate the specified hypotheses. The findings demonstrated that inventory structure enhanced business performance, a significant rise in such leverage tends to lower firm performance for all of the firms studied. However, this study focused on a developed market, which cannot be generalized for emerging economies. A study on Nigeria's FMCGs firms may yield a different outcome.

Adopting linear regression analysis, Yazan (2021) in his work on JIT and firm performance revealed that the JIT system positively and significantly influences operational excellence of firms. Using correlation and descriptive research design, the study population comprised 13 industrial goods firms listed on the Nigerian Exchange Group, with a sample of 11 firms. Primary data from the structured questionnaires sent to respondents from these firms were extracted for analysis, utilizing general regression and correlation techniques. Above studies inferred that it is necessary for firms' managers to pay adequate attention to JIT systems such as Setup time reduction, supplier quality, pull production, and equipment layout to build and sustain competitive advantage and operational excellence.

Also, Ofila and Rahmat (2021) assessed how effective the implementation of a quality control circle (QCS) is in influencing a firm's performance in the construction industry in Kenya. The research design adopted for the study was ex post facto and secondary data were used. These secondary data were obtained from the studied firm's annual report and the stock exchange fact books. The study deployed a regression analysis to test the collaborative influence of QCS on the performance of firm. The results revealed that quality control circle is a robust and powerful tool adopted by firms to proffer possible solutions to quality problems as well as optimize performance of firms.

Essien and Ekpo (2021) studied the effect of operations management practices on performance of manufacturing firms using one of the FMCG companies in Nigeria as a case study. The study focused on the techniques used in managing and controlling inventories and the effect on the Profitability of manufacturing firms in Nigeria, with a special focus on Champion Breweries Plc. Uyo, Akwa Ibom State. Nigeria. The study used a mixed method. The primary

data was collected through a questionnaire, and secondary data was extracted from the financial performance report for 4 years. The result showed that the stock valuation method used and inventory cost management of the company has a direct impact on Profitability. However, the company studied was not using the Just in Time method of inventory control. The use of a computerized inventory control method would improve the company's Profitability.

Istan *et al*. (2021) analyzed the effects of production and operational costs, capital structure and company growth on profitability. The method used in this research is quantitative method, data collection is performed by distributing questionnaires among employees of packaging April 25 2021 industry. The population in this study are industrial employees in Jabodetabek whose numbers have not been identified with certainty. The questionnaire is distributed electronically using a simple random sampling technique. The results of the questionnaire returned are 180 respondents. Based on the results of data analysis, it is concluded that Capital structure has a significant effect on Production cost profitability. An increase in the capital structure variable will be followed by an increase in Operational cost profitability and a decrease in variable capital structure will be followed by a decrease in profitability. Capital structure Company growth has no significant effect on profitability. An increase in the company growth variable will not be followed by an increase in profitability and a decrease in variable company Profitability growth will not be followed by a decrease in profitability. Operational cost has a significant effect on profitability. An increase in the operational cost variable will be followed by an increase in profitability and a decrease in variable operational cost will be followed by a decrease in profitability. Production cost has no significant effect on profitability. An increase in the production cost variable will not be followed by an increase in profitability and a decrease in variable production cost will not be followed by a decrease in profitability.

Aryee *et al*. (2021) studied production scheduling analysis: a perspective of the Ghanaian Food and Beverage Manufacturing Industry. The food and beverage industry has systematically developed into a major propeller of global competitiveness of nations. Notwithstanding the vast agricultural resources in most developing countries, the inefficient and sub-optimal production scheduling and workforce planning practices of local food and beverage firms have rendered them non-competitive. Powered by a multi-case study research strategy and data from secondary sources, a multi-objective and multi-product mixed integer linear programming (MILP) model was formulated as genetic algorithms in Microsoft Excel evolver solver to find optimal production schedules. It is recommended that firms in Ghana's food and beverage manufacturing industry should apply multi-functional mixed inter linear programming algorithms to optimize their production system, and as well consider an enterprise wide approach to production planning. While at all this, the theory of queuing must be strongly applied to reduce manufacturing cycle time and hence consumer waiting time. Subjecting the data collected to multi integer linear optimization test in Excel Evolver solver indicates optimal solution for the maximum profit and minimum cost. This resulted in an optimized manufacturing cycle time, minimize overall total cost, meet

customer demand, exceed customer expectation, and maximize total revenue.

Agorzie *et al*. (2020) carried out a study on material management practices effect on operational performance of selected quoted food, beverages and breweries firms in south western Nigeria. The research design adopted for this study was survey design. The sampling technique used was purposive sampling. The type of data used was primary data taken by the method of documentation and researcher structured questionnaire. The data analysis techniques used were descriptive statistics and multiple linear regression analysis which were processed with the help of the SPSS Ver. program 25. The finding of the analsysis shows that material management practices have significant effect on operational performance of firms in the sector.

Xian (2020) analysed the database of 9051 observations to assess the effect of JIT application on firms' innovation. A double-fixed panel-data regression model was deployed in the study of the patents were divided into three forms to ascertain how JIT impacts the various types of innovation. The research design adopted for this study was the ex post facto research and secondary data were employed. The population of this study was 13 listed manufacturing companies in Malaysia and purposive sampling technique was employed to select 11 manufacturing companies. The method of data analysis employed was the panel least squares regression analysis and the statistical package employed was E views version 10. The study revealed that the adoption of JIT enhances innovation, output and investment in corporate innovation. It further showed that the adoption of JIT optimised innovation performance of firms.

Tekalign (2020) carried out a study in Hawassa City to find out how effective the practices of inventory management were in manufacturing companies. A descriptive research design was adopted and a self-administered questionnaire was used for data collection. It was indicated that a lot of procedures of inventory management were experienced by the studied firms in an attempt to maintain a reasonable level of stock and prevent stockout to satisfy both current and future customers' demand. The results of the study also revealed that a robust practice of IM was in place in the studied firms. Nevertheless, the study's result showed that severe long lead time challenges were encountered by some of the firms as a result of bureaucratic processes involved in receiving materials or parts ordered which led to cancellation of purchase orders and results in loss of customers.

Opoku *et al*. (2020) examined the impact of various practices of inventory management on operational performance in the Ghanaian manufacturing companies. A descriptive survey was employed and one hundred and fifty-two participants were sampled from the study firms. A primary tool (questionnaire) was used to generate the primary data. Regression analysis (ordinary least square) was deployed and results revealed that 'strategic supplier partnership, vendor-managed inventory, activity-based costing, material resource planning, economic order quantity, and just-in-time had significant impact on operational performance'. Based on the outcomes, the study concluded that the practices of IM, particularly strategic supplier partnerships, play significant roles in optimizing the level of operational performance of manufacturing companies.

Nugroho *et al*. (2020) investigated the association among supply chain management (SCM), just in time and quality management and also their impact on organizational performance. 650 questionnaires have been received from the 2780 questionnaires sent to the different corporations in Indonesia. Corporations lie in the range of 100 to 2000 workforces and the median is 100 personnel. Further to check reliability analysis was conducted by making use of Cronbach's Alpha in order to make sure that components used to operationalize just-in-time, total quality management, supply chain management and performance were evaluated to check that the components are from statistical errors. Recognizing SC collaborations is not just an emphasis on quality but also a primary factor of FP. Either through cooperation and assimilation of operations across the SC or by the acknowledgement of the skills of direct manufacturers, recognizing the aspects of the SC has a positive effect on FP. Moreover, policymakers should focus on the encouragement of the firms to introduce efficient manufacturing through JIT and TQM to improve performance from all aspects.

Ahmad and Zabri (2020) studied mediating effect of knowledge of inventory management and performance, and a strong correlation was observed between inventory management knowledge and the performance of micro-enterprises. The size of an enterprise was also a significant factor in adopting inventory management practices. It was observed that a gap in the knowledge of inventory practices in micro-enterprises limits the growth and performance of such an enterprise. The research was limited to micro-enterprises in Malaysia. It is, however, worthwhile to explore inventory management practices in FMCG companies in Nigeria. The knowledge of inventory management practices is essential for performance. This will guide management in setting the right policy for managing inventory based on the company's production characteristics and strategic plan.

Araujo and Costa (2020) examined the effect of operations strategy and cost management on financial performance of world class companies in Brazil. In this article, three dependence levels are presented: operational, decision support and strategic control. The result of the research shows the importance of alignment between the cost management model and the competitive strategy for corporate success, and confirms the adequacy of the activity-based costing model as a supporting tool for decision taking in a global strategy.

Althaqafi (2020) conducted a study on the effect of inventory management on financial performance with evidence from a Saudi manufacturing company. The study shows a relationship between inventory management and financial performance. The study made a distinction between inventory control and inventory management. Inventory control is seen from the actual stock tracking, recording, and reconciliation, while inventory management focuses more on management and reporting. However, the study identified inconsistencies in inventory records and management that impact negatively on the Profitability of the company. These inconsistencies were identified in scheduled cycle count activity, inadequate staff monitoring and supervision, misplaced or stolen stocks, and inefficient communication approach in inventory management. The study recommended a structural approach to managing inventory. Detailed responsibilities and procedures should

be developed for managing inventory and the process of stock counting to be cross-functional for accurate record updates.

Wen-Hsien and Yin-Hwa (2020) conducted a study in the tire manufacturing industry and proposed a production planning/control framework in a carbon tax Industry in Cairo. The study adopted a mathematical programming model (Activity Based Costing) and theory of constraints for production planning for achieving optimal solution under various production/sale constraints to obtain the optimal product mix that maximises profit. The application of the model was demonstrated using an illustrative example. It was revealed based on the sensitivity analyses and optimal solution that by increasing carbon taxes and the prices of raw materials, profitability was affected.

Olga and Cezary (2020) studied the characteristics of make-to-stock and make-to-availability production strategy using simulation modelling in Congo. The paper characterizes and compares the (MTS) and (MTA) strategies. The comparative analysis based, among others, on computational experiments carried out in a computer program developed in Microsoft visual studio 2017 environment was presented. The study formulated five (5) research hypotheses, and questionnaire distributed to (170) respondent in visual studio. 120 copies of the questionnaire were retrieved. The models have been prepared for both strategies with the same assumptions: external conditions (market demand) and internal conditions structure of the production process). The findings of the study show that make-to-stock (MTS) strategies respond to various scenarios of demand intensity was done. The simulation models were prepared and validated for the case of the production line in one of the industrial automation company. The research shows that the use of the (MTS) strategy in the majority of cases gives much better results than the use of the MTA strategy due to the minimization of storage costs and the costs of non-fulfillment of the customers' demand. The directions for further research were also presented.

Eretan and Babajide (2020) examined production optimization and corporate productivity in the Nigerian manufacturing industry. The objectives of the paper were to determine the impact of production optimization (PO) on corporate performances (CP) and also to ascertain the relationship between production optimization practices (POP) and product quality (PQ). The population for this study comprised of all manufacturing companies in Lagos state. Data were sourced from primary sources using questionnaire as the instrument of data collection. 250 structured questionnaires were administered in the manufacturing companies used as case study 210 were retrieved (Cadbury Nigeria Plc, Guinness Nigeria Plc, Honeywell Flour Mill Plc and Vitafoam Nigeria Plc). Data collected were analyzed using non parametric statistical tool of Chi Square on Statistical Package for Social Scientists (SPSS 20.0). The result of the finding shows that production optimization (PO) has significant impact on organizational performances (OP) and that production optimization practices has help management to achieve organization goals and responding to threats and opportunities in the industry. Therefore, it was recommended that proper production planning and control that rely on empirical research should be performed from time to time in other to improve and enhance the competitive edge.

Tumiso *et al*. (2019) looked into the impact of production

planning practices and techniques as a fundamental role of product management in a manufacturing organization's operational costs of selected companies in South Africa. The study takes a closer look at the production process in manufacturing organizations in Johannesburg. The following objectives were listed: to determine the outcomes of the organization's production planning practices and techniques, and to evaluate the techniques of production planning execution on organizational efficiency, and lastly to investigate the impact of production planning on the organization's productivity. The research followed a quantitative approach from a case study. Data was gathered using questionnaires that were administered to operational staff, supervisors, and middle management employees in the Company understudy. The study population included all production planning employees and their supervisors and managers in one of the South African manufacturing industries. The study's findings revealed that the practices and approaches were applied and significantly impacted the overall outcome. Although the results indicated that the production department was efficient, not every department area was efficient.

Nyekpunwo *et al*. (2019) ascertained the degree of application and implementation of production planning and control by the beverage industries in Nigeria, and how relevant it is to operational cost minimization and expenses of the companies. Although, only three beverage production companies were studied; this research will be relevant to the rest of the beverage production companies and other similar industries. A total number of samples collected from the three organizations were 97. The descriptive and inferential statistics were applied in the analysis. The analysis carried out showed that the companies used production planning and control in taken decisions. This was evident by strong response to questions on the utilization of plans for material requirement, manufacturing resource and just in time. Thus, an overall mean of 4.077 and standard deviation of 0.0417 showed that application and implementation of production planning and control by the companies were high. Also, the results obtained on the relevance of production planning and control to operational cost and expenses revealed the usefulness of production planning and control to cost minimization. However, the mean responses obtained indicated that inventory control, budgeting and planning, timely delivery of material order, management decision, product quality and the right utilization of raw material and equipment, minimizes operational cost of material and equipment cost, which as a result, reduced the operational cost of the beverage manufacturing companies. Thus, overall mean of 3.964 and standard deviation of 0.040, affirmed that production planning and control minimizes operational cost and expenses. Furthermore, to actually account how much of the cost reduced, a cost model was proposed, which establishes a relationship between cost reduction and production planning components. The result analysis revealed that operational cost was reduced by 0.078unit, but when all the production components were fully utilized, operational cost increased to 0.1198 representing 4.18% increase in cost reduction. This implied that, there was not just a relationship between production planning and operational cost.

Adopting a survey research, Osuolale *et al*. (2019) assessed the relationship of quality control with the performance of SMEs in Nigeria. The research design adopted for this study

was survey design and the data used were primary. The primary data for the study were generated via a structured questionnaire copies administered on two hundred respondents in manufacturing and service SMEs. The method of data anlaysis employed was ordinary least square regression. The regression analysis deployed revealed that quality control has a significant influence on SMEs' performance in Nigeria. Hence, firms must be committed to total quality planning and control and ensure that it is backed by action and laws.

Ovunda *et al*. (2019) ascertained the degree to which production planning/control has been applied and implemented in the beverage industry of Nigeria as well as how PPC application has enabled the studied firms to reduce cost of operations as well as other operating expenses. The research design adopted for this study was survey design and the data used were primary. The instrument for data collection was 5 point likert questionnaire and the data were analysed using ordinary least square regression analysis. Three firms were studied within the industry and a sample of 97 participants were selected from the studied firms. The findings showed that PPC is used by the firms for decision making and there was an effective application of PPC in the studied firms. Furthermore, it was revealed that PPC is significantly instrumental in minimising cost of operations.

Within the context of the South African environment, Sambil *et al*. (2019) conducted a study in selected South Africans' organisations to ascertain the influence of JIT on SMEs' performance and assess if the philosophy of JIT can be applied in South African SMEs. The study was based on an explanatory research design and deployed the correlation technique of data analysis. It was revealed that firms in South Africa (SA) are test running the JIT application and eventually exhibiting a high level of improvements in monetary terms, employee morale, and customer loyalty. Indeed, the level of productivity in SA SMEs has been greatly influenced positively by JIT production system. Hence, JIT is a robust and applicable principle to adopt by firms in that there are a lot of benefits to derive from it.

Using a survey research design, Okah *et al*. (2019) evaluated production planning effect on firms' effectiveness in the Nigerian food and beverage industry. The firms' effectiveness was proxied by Sales volume, inventory cost minimisation, and customer satisfaction. Primary data were collected with the aid of self-administered questionnaire's copies. The study adopted Chisquare for data analysis and production planning was revealed to have had a positive and significant influence on sales volume, inventory cost reduction, customer satisfaction. It implies that a firm's effectiveness is greatly affected by production planning. Therefore, demand forecasting and material requirements planning must be carried out by manufacturing firms in a bid to identify and meet the needs of customers.

Ikon and Nwankwo (2019) assessed the production planning and Profitability of selected manufacturing enterprises in Nigeria. The research used "flour Mill of Nigeria Plc, Dangote Flour Mill Plc, and Honeywell Flour Mill Plc" as case studies. According to the report, Production Planning is critical for supplying clients with better and more cost-effective goods for a smaller expenditure. The data was analyzed using the Ordinary Least Square (OLS) technique with time series. The study's findings suggest that the estimated coefficient of the constant term for the firms is significant. They concluded that turnover (sales) leads to an increase in inventory, which raises production. Although this study used FMCGs firms, a sample of three firms is too small to generalize to all FMCGs in Nigeria. For generalization, a higher sample size is needed.

Eneje *et al*. (2019) investigated the effects of raw materials inventory management on the profitability of brewery firms in Nigeria using a cross-sectional data from 1989 to 2008 which was gathered for the analysis from the annual reports of the sampled brewery firms. Measures of profitability were examined and related to proxies for raw materials inventory management by brewers. The OLS stated in the form of a multiple regression model was applied in the analysis. The study revealed that raw materials inventory management designed to capture the effect of efficient management of raw materials inventory by a company on its profitability is significantly strong and positive and influences the profitability of the brewery firms in Nigeria. The study concluded that efficient management of raw material inventory is a major factor to be contained with by Nigerian brewers in enhancing or boosting their profitability.

Golas and Bieniasz (2019) determined the relationships between the results of inventory management and the financial performance of enterprises. Listed in Poland between 2007 and 2018. The research was based on the econometric analysis of the influence of the length of inventory cycles on financial performance of branches measured with return on sales, assets and equity, although the effectiveness of inventory management was measured with the length of inventory cycles. Regression analysis was applied to determine the strength and direction of the influence of the results of inventory management, measured with the length of cycles. Concluding from this research that the inventory management was directly correlated with financial effectiveness of enterprises and it should be subject to optimization.

Villalobos and Martinez (2018) studied aggregate planning to minimize cost of production in manufacturing company. The presence of economies of scale allows industries and companies to have better profits. In the present study, the Trans log cost function of a manufacturing company in Mexico is estimated during the period January 2013 to September 2016 to know the type of returns to scale that the company has. The results indicate that elasticity of production with respect to cost is one, where increases in production lead to increases in the same proportion in costs. The theory indicates that there are 3 possible ways in which a company could operate with economies of scale and minimize cost: the first is to analyze if the number of workers is optimal and we conclude that the number of employees is optimal. The second reason consists of the ability to manage the costs of the company. Actually, this company uses a standard cost system which is proposed to analyze whether the management of the company is more effective to consider a new form of cost, so an analysis is done through activity-based costing (ABC).

Akinlabi *et al*. (2018) researched on the effect of inventory management practices on operational performance of flour milling companies in Nigeria. This study examined effect of inventory management practices on the operational performance of flour milling companies in Nigeria. Cross sectional survey research design was used. The target population comprised staff of selected flour milling companies. A stratified random sampling technique was

used to select the sample size of 776. A structured questionnaire was used to collect data. Hypotheses were tested using inferential statistics with the aid of SPSS. The findings revealed that inventory shrinkage had a significant negative effect on customers' satisfaction. There was a significant relationship between inventory control and cost effectiveness of selected flour milling companies. The study concluded that inventory management practices significantly affect operational performance of flour milling companies in Nigeria. The recommendation focused on ensuring that stocks are sufficient to meet production requirements and customer demands at all times.

Sviunda *et al*. (2018) assessed the impact of production planning and operational cost control in the beverage industries. This research was carried out to ascertain the degree of application and implementation of production planning and control by the beverage industries in Nigeria, a total number of samples collected from the three organizations were 97. The descriptive and inferential statistics were applied in the analysis. The findings revealed that companies that used production planning have operational efficiencies. This was evident by strong response to questions on the utilization of plans for material requirement, manufacturing resource and just in time.

Vincent *et al* (2018) investigated the effect of production planning on organizational effectiveness of the beverage industry in South East Nigeria. In this respect organizational effectiveness is measured in the areas of inventory cost minimization, customers' satisfaction, and sales volume. The study formulated four research hypotheses, and questionnaires distributed to 212 respondents in the two sampled manufacturing firms. One hundred fifty (150) copies of the questionnaires were retrieved. From its findings based on the application inferential statistical method of Chi-square, the study revealed that production planning has a significant effect on inventory cost minimization, customer's satisfaction, and sales volume of the Nigerian beverage industry. This finding implies that production planning significantly affects the organizational effectiveness of firms. Based on these, the study recommends among others, that for an organization to be committed to meeting customers' satisfaction, such an organization must be ready to implement material requirement planning (MRP) and demand forecasting. Such implementation will enable them in knowing what their customers' want, how they want it, and when they want it.

Bagshaw (2015) investigated assessing the capacity strategic options on capacity utilisation of manufacturing firms in Rivers State, Nigeria. This study examined capacity strategies that enhance capacity utilization with sample size of 33 manufacturing firms in Rivers State, Nigeria. The data was collected through the use of 23-item Icam questionnaire and was analyzed with the aid of Spss, version 17. It was found that, constant product output and constant direct labour has a strong positive relationship with capacity utilization with correlation co-efficient (r) =0.64, and (r) =0.813 respectively; that positive relationship exist between backorder and capacity utilization with correlation coefficient (r) = 0.781. It was therefore concluded that, capacity strategy has influence on firm's capacity utilization rate. The capacity level selected also, has a critical influence on the firm's response rate in meeting demand, cost structure, inventory policies, and management/ staff support requirements. The study recommends that, manufacturing

firms should employ level capacity management strategies to ensure that they meet customers' demand, while the firms should focus on inventory levels of finished products, capacity utilization, maximizing employee productivity and create value for customers.

Stephen and David (2014) investigated generic strategies employed by food and beverage firms in Kenya and their effects on sustainable competitive advantage. The focus of this study was on competitive strategies that firms adopt in the Kenya beverage industry in order to create above average performance. The fundamental basis of above industry performance is sustainable competitive advantage which is either created by low cost or differentiation strategy. The study aimed at establishing the generic strategies food and beverage firms in Kenya employ for sustainable competitive advantage. This research entailed a descriptive study design. Descriptive design uses a set of scientific methods to collect raw data and create data structures that are used to describe the existing characteristics of a defined target population. This study sought to do that among the F & B firms in Kenya. The study population consisted of 138 food and beverage manufacturing firms in Kenya registered with the Kenya Association of Manufacturers (KAM). The data was tested for central tendency and dispersion after confirmation of normal distribution by appropriate tests of normality. Since the sample size was 32 (over the minimum 30 required for statistical analysis), regression analysis was carried out and interpretation of results of tests of hypothesis done. The research showed that 56.2 percent of the firms embrace duo strategies of cost leadership and differentiation simultaneously while 25 percent were exclusively on cost leadership and 18.8 percent were exclusively using differentiation. The use of dual strategies is a company survival tactic in terms of diversification of risks especially in very competitive environments like that of the Kenyan F&B industry. Results from Pearson's rank correlation coefficient between the dependent variable Y and the independent variables X^1 and X^2 gave coefficients of 0.653 and 0.279 respectively which was an indication of positive correlation.

Pius *et al* (2013) studied product cost management via the kaizen costing system: perception of accountants. Managing cost of production is at the heart of survival of present day corporations, as increased competition, uncertainty and risk present in the operating environment pose challenges for 21st century managers. This empirical paper examines product cost management strategies by adopting and implementing the Kaizen costing system. The sample size of the study was 60 respondents comprising accountants distributed across product and service sector organizations in Anambra State, south-eastern Nigeria. Three hypotheses were formulated and tested in the study. In addition to descriptive statistics, Mann-Whitney, Kolmogorov-Smirnoff and Multivariate Analysis of Variance (MANOVA) were used in analyzing the primary data. The results of the data analysis showed that implementing a Kaizen costing system would provide managers with strategies for reducing material procurement and usage costs, and also reduce labour utilization cost.

Umoh and Wokocha (2013) carried out a research on production improvement function and corporate operational efficiency in the Nigerian manufacturing industry. They investigated the extent to which Production Improvement

Function, had affected the corporate operational efficiency of the Nigerian manufacturing industry. The population consists of those manufacturing companies quoted in the Nigeria stock exchange of (NSE) fact book 2009. A total of (100) manufacturing companies. Sample size of (80) was drawn from the study using stratified random sampling method. Three (3) research hypotheses and were formulated and questionnaire was used for data collection, frequencies and descriptive statistics was used for data analysis. This finding implies that production improvement function significantly affects the operational efficiency of firms. Based on these, the study recommends among others, that the Nigerian manufacturing industry should efficiently and effectively operationalize the all-embracing production improvement function, especially in the area of production scheduling, in order to restore the industry as the base of all development.

3. Research Methodology
In this chapter, the research method and the various procedures that were adopted in carrying out the study are discussed. It consists of research design of the study, population of the study, sample and sampling technique, instrument, validity and reliability of instrument, administration of the instrument and method of data analysis.

3.1 Research Design
The research design employed in this study was the descriptive survey research design, which attempts to establish the effect of production planning strategies on operational cost management. This study was treated as survey research since it relied on the opinions of production managers of food and beverage enterprises.

3.2 Population of the Study
The population of this study consisted of managers of different levels of operations and senior staff of seven selected food and beverage enterprises operating in Akwa Ibom State. The population size was 353 and they serve in production, finance, operations and management departments of the selected organizations.

Table 3.1: Selected food and beverage enterprises operating in Akwa Ibom State

S. No	Name of enterprise	Number of workers
1	Rich Group	38
2	Silver lounge	35
3	Food Affairs Limited	42
4	De Choice Fast food	45
5	Fofana Nigeria Limited	31
6	Jemissi Food Limited	39
7	Champions Breweries PLC	123
	Total	**353**

Source: Register of enterprises operating in Akwa Ibom State obtained from Ministry of Transport and Industry, Idongesit Nkanga Secretariat, Uyo (2025)

3.3 Sample Size and Sample Size Determination
The sample size for this study was 187 respondents. This was arrived at using the Taro Yamane's formula.
Taro Yamane's formula for determining sample size:

$$n = \frac{N}{1+N(e)^2}$$

Where:
n = Sample size
N = Population size
1 = Constant
e = Error = 0.05
Procedure for determining the sample size:

$$n = \frac{353}{1+353(0.05)^2}$$

$$n = \frac{353}{1+353(0.0025)}$$

$$n = \frac{353}{0.8825}$$

$$n = 187$$

This sample size represents the number of respondents used for the study.

3.4 Sampling Technique
Double stage sampling technique was adopted for the study. At stage one (first stage), seven (7) enterprises were selected from the fourteen (14) food and beverage enterprises in Akwa Ibom State using convenient sampling techniques. At stage two, purposive sampling technique was employed to select 187 respondents from the selected enterprises shown in table 3.1 above.

3.5 Sources of Data
The study made use of primary data. Primary data sources refer to original data collected at firsthand by the researcher specifically for the research purpose, suitable for the research objectives. Responses from questionnaires administered constitute the major source of data collection.

3.6 Method of Data Collection
Questionairing was the method of data collection used. It contains questions aimed at finding the effect of production planning strategies on operational cost management of food and beverage enterprises in Akwa Ibom State. Table 3.2 below shows the administration of questionnaires.

Table 3.2: Distribution of questionnaires

S. No	Name of Enterprise	Questionnaires distributed		Questionnaires returned and usable	
		Number issued	Percentage	Number	Percentage
1	Rich Group	20	10.70	20	10.70
2	Silver lounge	20	10.70	20	10.70
3	Food Affairs Limited	20	10.70	20	10.70
4	De Choice Fast food	20	10.70	20	10.70
5	Fofana Nigeria Limited	20	10.70	20	10.70
6	Jemissi Food Limited	20	10.70	20	10.70
7	Champions Breweries PLC	67	35.80	60	32.05
	Total	**187**	**100**	**180**	**96.25**

Source: Researchers compilation (2025)

3.7 Instrumentation

A researcher-developed structured questionnaire titled "Production Planning Strategies and Operational Cost Management of Food and Beverage Enterprises in Akwa Ibom State" was used as instrument for the study. It is divided into two sections as shown in Appendix I.

3.7.1 Validation of the instrument

Face validity was carried out on the instrument. The instrument was presented to three experts. Two from the Department of Accounting, Faculty of Management Sciences, Akwa Ibom State University, one from Measurement and Evaluation, University of Uyo for assessment. The experts checked to ensure that the instrument measured what it intended to measure and it is exhaustive. Their inputs were used to make the final version of the instrument.

3.7.2 Reliability of the instrument

The reliability of the instrument was ascertained through test-retest reliability method. Here, the instrument was administered to 30 respondents in the population but not part of the sample. Thereafter, Cronbach alpha was used to test the data gotten from the field and was used to compute the reliability coefficient. The reliability coefficient gave an index of 0.83. According to Cookey (2020) an instrument with a reliability index of 0.60 and above is considered reliable and valid for a study. Hence, the instrument met the above criteria and was considered valid for this study.

3.8 Model Specification

To test the hypotheses, a linear regression analysis was applied to examine the effect of production planning strategies on operational cost management and the following model was used in the study:

$$OCMi = \beta0 + \beta1CPS + \beta2LPS + \beta_3MTSPS + \beta_4ATOPS + \beta_5JITPS + \alpha$$

Where:

OCMi = operational cost management
$\beta0$ = Constant (intercept)
CPS = chase production strategy
LPS= level production strategy
MTSPS= make-to-stock production strategy
ATOPS= assemble to order production strategy
JITPS= Just-in-time production strategies.
α = the difference between the predicted and observed value of OCM (the error)

3.9 Operationalization of Variables

Table 3.9: Operationalization definition/measurement of variables and Apriori expectation

Dependent variable	Description/measurement	Apriori expectation
Operational Cost management	Responses from respondents on operational cost Mgt.	
Independent variable		
Demand production strategy	Respondent Reponses on use of chase demand strategy	+-
Level	Responses from respondent on the use of level production strategy	+-
Make-to-stock	Responses from respondent to use of production	+-
Assemble-to-order	Respondent responses on the use of Assemble-to-order production strategy	+-
Just-in-time	Responses from respondent to the use of just-in-time production strategy	+-

Source: Researcher's compilation (2025)

3.10 Data Analyses Technique

The data generated for the study was analysed using descriptive and inferential statistics. The descriptive statistics include simple percentages, and frequency count. Simple percentages and frequency were used to analyse the demographic variables we. Simple linear regression was used to answer the research questions and test the null hypotheses. All hypotheses were tested at 0.05 level of significance. The analysis was done using SPSSv.21.

3.11 Decision Rule

For research questions, the following interpretations was used, thus:
When R–value < 0.5 means there is no relationship
When R–value =/> 0.5 = means there is relationship
For hypotheses testing,
When P–value < 0.05 = Reject H_0
When P–value =/> 0.05 = fail to reject H_0 / Retain H_0

4. Data Presentation, Analysis and Discussion of Findings

This chapter presents the data collected, gives elaborate analysis of the data and discuss the findings.

4.1 Data Presentation

4.1.1 Demographic Variables: The data for the study were obtained from (7) food and beverage

Table 4.1: Percentage Analysis of Demographic Characteristics of respondents

Variables	Frequency	Percentage (%)
Gender		
Male	98	54.4
Female	82	45.6
Educational level		
HND/B.Sc.	94	52.2
MBA/M.Sc.	58	32.2
PhD	28	15.6
Length of Service		
1-5 years	72	40
6-10 years	102	56.7
11-15 years	6	3.3
16years and above	-	-
Marital Status		
Married	110	61.1
Single	65	36.1
Separated	5	2.8
Age		
25-35 years	64	35.6
36-45 years	98	54.4
46 and above	18	10

Source: Researcher's compilation (2025)

4.2 Data Analysis

4.2.1 Research question one: What is the relationship between assemble-to-order (ATO) production strategy and operational cost management of food and beverage enterprises in Nigeria?

Table 4.2: Summary of regression analysis of the relationship between ATO production strategy and operational cost management of food and beverage enterprises(N=180)

Variable	R	R-square	Adjusted R-Squared	Std. error of the estimated
Assemble-to-order strategy	0.720	0.518	0.609	1.40382

Source: Field data, (2025)

Result in Table 4.2 shows the relationship between assemble-to-order (ATO) production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State. The table shows the R-value of 0.720 which indicates a high degree of positive correlation between assemble-to-order (ATO) production strategy and operational cost management. The adjusted R-squared value of 60.9 implies that, for every one-unit increase in assemble-to-order production strategy, the company's operational cost management increases by 60.9 per cent. This reveals that assemble-to-order production strategy have linear association with operational cost management in food and beverage enterprises in Akwa Ibom state.

4.2.2 Research question two: What is the relationship between level production strategy and operational cost management of food and beverage enterprises in Nigeria?

Table 4.3: Summary of regression analysis of the relationship between Level production strategy and operational cost management of food and beverage enterprises(N=180)

Variable	R	R-square	Adjusted R-Squared	Std. error of the estimated
Level Production Strategy	0.791	0.626	0.523	1.35443

Source: Field data, (2025)

Result in Table 4.3 shows the relationship between level production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State. The table shows the R-value of 0.791 which indicates a high degree of positive correlation between level production strategy and operational cost management. The adjusted R-squared value of 0.523 implies that, for every one-unit increase in level production strategy, the company's operational cost management increases by 52.3 per cent. This reveals that level production strategy has linear association with operational cost management in food and beverage enterprises in Akwa Ibom state.

4.2.3 Research question three: What is the relationship between chase production strategy and operational cost management of food and beverage enterprises in Nigeria?

Table 4.4: Summary of regression analysis of the relationship between Chase demand production strategy and operational cost management of food and beverage enterprises(N=180)

Variable	R	R-square	Adjusted R-Squared	Std. error of the estimated
Chase demand Production Strategy	0.702	0.493	0.580	4.28259

Source: Field data, (2025)

Result in Table 4.3 shows the relationship between chase production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State. The table shows the R-value of 0.702 which indicates a high

degree of positive correlation between chase demand production strategy and operational cost management. The adjusted R-squared value of 0.580 implies that, for every one-unit increase in chase production strategy, the company's operational cost management increases by 58.0 per cent. This reveals that chase production strategy have linear association with operational cost management in food and beverage enterprises in Akwa Ibom state.

4.2.4 Research question four: What is the relationship between make-to-stock production strategy and operational cost management of food and beverage enterprises in Nigeria?

Table 4.5: Summary of regression analysis of the relationship between make-to-stock production strategy and operational cost management of food and beverage enterprises(N=180)

Variable	R	R-square	Adjusted R-Squared	Std. error of the estimated
Make-to-stock Production strategy	-0.165	0.027	-0.024	0.60880

Source: Field data, (2025)

Result in Table 4.5 shows the relationship between make-to-stock production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State. The result shows that make-to-stock production strategy have linear negative association with operational cost management. The R-value of -0.165 indicates a low degree of negative correlation between make-to-stock production strategy and operational cost management with R-square value of 0.027. The adjusted R-squared value of -0.024 implies that, for every one-unit increase in make-to-stock production strategy, the operational cost management decrease by 2.4 per cent, indicating that make-to-stock production strategy has no positive relationship with operational cost management of food and beverage enterprises in Akwa Ibom State.

4.2.5 Research question five: What is the relationship between Just-in-time production strategy and operational cost management of food and beverage enterprises in Nigeria?

Table 4.6: Summary of regression analysis of the relationship between Just-in-time production strategy and operational cost management of food and beverage enterprises(N=180)

Variable	R	R-square	Adjusted R-Squared	Std. error of the estimated
Just-in-time Production strategy	0.885	0.783	0.724	2.35517

Source: Field data, (2025)

Result in Table 4.6 shows the relationship between just-in-time production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State. The table shows the R-value of 0.885 which indicates a high degree of positive correlation between just-in-time production strategy and operational cost management. The adjusted R-squared value of 0.724 implies that, for every one-unit increase in just-in-time production strategy, the company's operational cost management increases by 72.4 per cent. This reveals that just-in-time production strategy have linear association with operational cost management in food and beverage enterprises in Akwa Ibom state.

4.3 Hypotheses testing
4.3.1 Hypothesis one
Ho_1: There is no significant relationship between assemble-to-order production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

H_{11}: There is a significant relationship between assemble-to-order production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

Table 4.7: Summary of regression analysis of the relationship between assemble-to-order production strategy and operational cost management of food and beverage companies

Model	Sum of Squares	df	Mean Square	F	Sig	Dec
Regression	2.808	1	2.808	1.532		
1 Residual H_0	538.976	178	1.833		0.022	Reject
Total	541.784	179				

Source: Field data (2025); *significant @ p<.05

Result in Table 4.7 shows the F-cal of 1.532 at degree of freedom of 179. Since the p-value of 0.022 is less than 0.05, it implies that assemble-to-order production strategy has a significant relationship with operational cost management. Therefore, the null hypothesis which states that there is no significant relationship between assemble-to-order production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State is rejected, while the alternate hypothesis is upheld.

4.3.2 Hypothesis two
Ho_2: There is no significant relationship between level production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

H_{12}: There is a significant relationship between level production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

Table 4.8: Summary of regression analysis of the relationship between level production strategy and operational cost management of food and beverage companies

Model	Sum of squares	df	Mean square	F-cal	Sig	Dec
I Regression	15.362	1	15.024	10.265	0.001	Ho Rejected
Residual	131.678	178	0.446			
Total	147.041	179				

Source: Field data (2025); *significant @ p<.05

Result in Table 4.8 shows the F-cal of 10.265 at degree of freedom of 179. Since the p-value of 0.001 is less than 0.05, it implies that level production strategy has a significant relationship with operational cost management. Therefore, the null hypothesis which states that there is no significant relationship between level production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State is rejected, while the alternate hypothesis is upheld.

4.3.3 Hypothesis three
Ho_3: There is no significant relationship between chase demand production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

H_{13}: There is a significant relationship between chase demand production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

Table 4.9: Summary of regression analysis of the relationship between chase demand production strategy and operational cost management of food and beverage companies

Model	Sum of Squares	df	Mean Square	F	Sig	Dec
Regression	2.449	1	2.449	6.335		
1 Residual H_0	539.335	178	1.834		0.000	Reject
Total	541.784	179				

Source: Field data (2025); *significant @ p<.05

Result in Table 4.9 shows the F-cal of 6.335 at degree of freedom of 179. Since the p-value of 0.000 is less than 0.05, it implies that chase demand production strategy has a significant relationship with operational cost management. Therefore, the null hypothesis which states that there is no significant relationship between chase demand production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State is rejected, while the alternate hypothesis is upheld.

4.3.4 Hypothesis four
Ho_4: There is no significant relationship between make-to-stock production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

H_{14}: There is a significant relationship between make-to-stock production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

Table 4.10: Summary of regression analysis of the relationship between make-to-stock production strategy and operational cost management of food and beverage companies

Model	Sum of squares	df	Mean square	F-cal	Sig	Dec
Regression	3.051	1	3.051	8.231	0.274	H_0 Re-tained
I residual	109.340	178	0.371			
Total	112.391	179				

Source: Field data (2025); *significant @ p<.05

Result in Table 4.10 shows the F-cal of 8.231 at degree of freedom of 179. Since the p-value of 0.274 is greater than 0.05, it implies that make-to-stock production strategy has no significant relationship with operational cost management. Therefore, the null hypothesis which states that there is no significant relationship between make-to-stock production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State is retained, while the alternate hypothesis is upheld.

4.3.5 Hypothesis five
Ho_5: There is no significant relationship between Just-in-time production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

H_{15}: There is a significant relationship between Just-in-time production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

Table 4.11: Summary of regression analysis of the relationship between Just-in-time production strategy and operational cost management of food and beverage companies

Model	Sum of Squares	df	Mean Square	F	Sig	Dec
Regression	1.856	1	1.855	15.011		
1 Residual H₀	539.927	178	1.836		0 .000	Reject
Total	541.784	179				

Source: Field data (2025); *significant @ p<.05

Result in Table 4.11 shows the F-cal of 15.011 at degree of freedom of 179. Since the p-value of 0.000 is less than 0.05, it implies that just-in-time production strategy has a significant relationship with operational cost management. Therefore, the null hypothesis which states that there is no significant relationship between just-in-time production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State is rejected, while the alternate hypothesis is upheld.

4.4 Discussion of Findings
4.4.1 Assemble-to-order production strategy and operational cost management
Findings on the relationship between assemble-to–order production strategy and operational cost management, revealed a significant relationship between assemble-to–order production strategy and operational cost management in food and beverage enterprises which adopts the strategy. This was evidenced from the regression analysis where the R-value of 0.720 indicates a high degree of positive correlation between assemble-to-order (ATO) production strategy and operational cost management. This was also confirmed from the hypothesis testing, which showed the F-cal value of 1.532 at degree of freedom of 179. Since the p-value of 0.022 is less than 0.05, it implies that assemble-to-order production strategy has a significant relationship with operational cost management. This led to the rejection of the null hypothesis which states that there is no significant relationship between assemble-to-order production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

This finding was associated with the fact that some food and beverage enterprises prepare most of their product half-way and store them in a freezer, waiting for customers' request or order for final processing which will be ready for consumption. The finding of this study supports the fact that industries that apply ATO strategy experienced a 15-30% reduction in inventory holding cost, due to better demand matching and less reliance on speculative inventory, thereby reducing operational cost.

4.4.2 Level production strategy and operational cost management
Findings on the relationship between level production strategy and operational cost management, revealed a significant relationship between level production strategy and operational cost management in food and beverage enterprises which adopts the strategy. This was evidenced from the regression analysis where the R-value of 0.791 indicates a high degree of positive correlation between level production strategy and operational cost management. This was also confirmed from the hypothesis testing, which showed the F-cal value of 10.265 at degree of freedom of 179. Since the p-value of 0.001 is less than 0.05, it implies that level production strategy has a significant relationship

with operational cost management. This led to the rejection of the null hypothesis which states that there is no significant relationship between level production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

This finding was not far from the fact that most food and beverage enterprises produce goods in large quantities when they notice that the demand for such product is high. This however, helps them to avoid rush-hour and hasty production which might lead to incurring more operational costs. As such, they may avoid buying raw materials at a costly price because they already have product to satisfy the customers demand, and may also make more profit in situations where the raw materials become expensive than before. The findings of this study agree with a previous study by Liker and Choi (2020) who in their study found that firms employing level production strategies were able to eliminate 'bullwhip effects' caused by demand fluctuations and reduced the need for costly adjustment to capacity and overtime, resulting to more stable operational costs.

4.4.3 Chase demand production strategy and operational cost management
Findings on the relationship between level production strategy and operational cost management, revealed from the regression analysis a correlation coefficient (R-value) of 0.702 which indicates a high degree of positive linear association of 70.2 per cent chase production strategy and operational cost management. The adjusted R-squared value of 0.580 indicates that, for every one-unit increase in chase production, the operational cost management will increase by 58.0 per cent. This was also confirmed from the hypothesis testing, which showed the F-cal value of 6.335 at degree of freedom of 179. Since the p-value of 0.000 is less than 0.05, it implies that chase demand production strategy has a significant relationship with operational cost management. This led to the rejection of the null hypothesis which states that there is no significant relationship between chase demand production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

This finding is in contrast with the findings by Mukherjee (2021) whose study reported that while firms using chase strategies improved responsiveness to customer demand, they also incurred higher costs associated with maintaining flexible production lines and cross-training employees, adding that these firms experienced increased operational costs due to the challenges of managing labour efficiently during demand peaks and troughs. Similarly, the finding of this study also disagrees with the findings by Carlsson and fuller (2022) who in their study revealed that firms employing chase demand strategies could quickly adapt to market fluctuations but faced increased long-term cost, related to frequent changes in production schedules and workforce adjustments.

4.4.4 Make-to-stock production strategy and operational cost management
Findings on the relationship between the make-to-stock production strategy and operational cost management revealed from the regression analysis a correlation coefficient (R-value) of -0.165 which indicates a low degree of negative correlation between make-to-stock production strategy and operational cost management. The R-square value of 0.027 and the adjusted R-squared value of 0.24 show that for every one-unit increase in make-to-stock

strategy, the operational cost management would decrease by 24 per cent, which shows make-to-stock production strategy contributes to high operational cost of the company. Furthermore, the regression analysis also reveals a probability value (p-value) of 0.274 which is greater than the significance level of 0.05, F-cal value of 8.231, at degree of freedom 179. Hence, since the P-value (0.074) is greater than 0.05 significance level the null hypothesis which stated that there is no significant relationship between make-to-stock and operational cost management of food and beverage enterprises is retained.

This finding may not be far from the fact that food and beverages companies deal mainly on perishable products which get spoilt if not properly stored. Hence, using make-to-stock strategy will result to excess production (inventory), if not purchased by customer, they get spoilt and the cost of production become a waste. This without doubt, will definitely lead to poor operational cost management. The finding of this study is in agreement with the finding by Biswas and Baral (2021) who in their study revealed that MTS strategy helps firms meet customer demand quickly but may lead to higher costs related to inventory management and production inefficiencies, asserting that companies using MTS faced substantial costs due to inaccuracies in demand forecasting.

4.4.5 Just-in-time production strategy and operational cost management

Findings on the relationship between Just-in-time production strategy and operational cost management, revealed from the regression analysis a correlation coefficient (R-value) of 0.885 which indicates a high degree of positive linear association of 88.5 per cent just-in-time production strategy and operational cost management. The adjusted R-squared value of 0.724 indicates that, for every one-unit increase in just-in-time production, the operational cost management will increase by 72.4 per cent. This was also confirmed from the hypothesis testing, which showed the F-cal value of 15.011 at degree of freedom of 179. Since the p-value of 0.000 is less than 0.05, it implies that just-in-time production strategy has a significant relationship with operational cost management. This led to the rejection of the null hypothesis which states that there is no significant relationship between just-in-time production strategy and operational cost management of food and beverage enterprises in Akwa Ibom State.

This finding may be associated with companies which deals with fast food and snacks, as the foods are prepared based on the customer's demand which include the quantity, design, quality and size. Hence, the preparation and supply of foods is determined and triggered by customer's request. This helps to reduce wastage and cost of storage of excess foods if produced base on forecast. This finding is in line with a previous study by Hayya (2020) who asserted that JIT practices positively influence food quality and production, adding that application of JIT in the fast-food company aims at producing stable items with a salable quantity with good quality through a pulling system aiming to create an operational performance with zero defect or minimal waste possible, while maintaining effective operational cost management.

5. Summary, Conclusion and Recommendationss
5.1 Summary of Findings
This study examined different production strategies and their relationship with operational cost management in food and beverage enterprises in Akwa Ibom state. The study was guided by five objectives, research questions, and null hypotheses. Literature related to the study were reviewed under conceptual, theoretical, and empirical frameworks. The study employed the descriptive survey research design. This study was conducted in Akwa Ibom state, using 14 food and beverage enterprises as the population of the study. The population of the study thus, involved senior management and those whose job description gives them a direct link to production and inventory management. The population of study was 353 respondents. The sample size for this study is 187 respondents. Convenient and Purposive sampling technique was adopted to select the firms and the respondents for the study respectively. The sample size of this study consists of the seven (7) food and beverage enterprises operating in Akwa Ibom State. The researcher-developed structured questionnaire was used as instrument for data collection. Data analysis of the study was done with SPSS v21, using simple percentages and simple linear regression statistical tools. All hypotheses were tested at 0.05 level of significance. Findings of the study reveals that:

1. There is a significant effect assemble-to-order (ATO) production strategy on operational cost management of food and beverage enterprises in Akwa Ibom state.
2. There is a significant effect of level production strategy on operational cost management of food and beverage enterprises in Akwa Ibom state.
3. There is a significant effect of chase demand production strategy on operational cost management of food and beverage enterprises in Akwa Ibom state.
4. There is no significant effect of make-to-stock production strategy on operational cost management of food and beverage enterprises in Akwa Ibom state.
5. There is a significant effect of just-in-time (JIT) production strategy on operational cost management of food and beverage enterprises in Akwa Ibom state.

5.2 Conclusion
Production process demands adequate planning strategies to transform inputs resource such as man power, raw materials, capital, information, energy, among others into a demanded output such as finished products and services in appreciable quality and quantity, hence attaining organizational objectives of as an enterprise which will increase the market value of the goods and the firm. The study provides an overview of production planning strategies for operational cost management by food and beverage enterprises in Akwa Ibom state. Based on the findings of the study, it is concluded that the following production strategies; assemble-to-order, level production, chase demand production, and just-in-time production, significantly contribute to operational cost management of food and beverage enterprises in Akwa Ibom state. However, the study revealed that make-to-stock production strategy has no significant relationship with operational cost management of food and beverage enterprises in Akwa Ibom state.

5.3 Recommendations
Based on the findings made and conclusion drawn from the study, the following recommendations are provided:
1. Since findings of the study revealed that assemble-to-order production helps to manage operational cost of food and beverage enterprises, hence, this strategy is

recommended for use in food and beverage enterprises, especially those that has not been employing this strategy so as to reduce the operational costs of their enterprise.

2. Level production ensures consistent use of resources such as labour, machinery, and materials. Hence, food and beverage enterprises are encouraged to adopt level production strategy, as this strategy will reduce the risk of overburdening or underutilizing resources leading to more stable operating cost and better capacity planning.

3. Food and beverage enterprises are also advised to review their production plans to accommodate chase demand production for some of their products as this strategy helps to reduce the risk of excess stock or stock out, leading to minimized cost associated to warehousing, and storage.

4. Based on the negative relationship between make-to-stock strategy and operational cost management, food and beverage enterprises who adopt this strategy should review the strategy because it is not suitable for large food and beverage enterprises as it can lead to wastage.

5. Just-in-time production strategy is recommended for food and beverage firms especially start-ups. This strategy will help reduce operational costs, since products are produced only when needed and demanded by customer.

5.4 Contribution to Knowledge
This study provides empirical evidence of the relationship between production planning strategies and operational cost management with implications for food and beverage companies. This would help the food and beverage enterprises adopt production planning strategies suitable for the industry and peculiar needs. In addition, the findings of this study would contribute to the existing knowledge of similar studies conducted in different study areas while been beneficial to the general public who will have access to it when published.

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