

# The Impact of Material Planning on Customer Satisfaction and Productivity Optimisation in Port-Harcourt Manufacturing Industries

Dr Nwiyii, Blessing Joseph<sup>1</sup>, Dr. Amanawa, David Ebiegbere<sup>2</sup>, Dr Uelee, Micah Nyone<sup>3</sup>

1PhD in Management (Organizational Behaviour Option), Faculty of Business Studies,  
Ignatius Ajuru University of Education, Port Harcourt.

[nwiyiiblessing@gmail.com](mailto:nwiyiiblessing@gmail.com)

2Faculty Member / Researcher, Centre for Continuing Education, Ignatius Ajuru University of Education, Port-Harcourt.

[david.amanawa@iaue.edu.ng](mailto:david.amanawa@iaue.edu.ng)

3Ph.D in Management (Production Management Option), Faculty of Business Studies,  
Ignatius Ajuru University of Education, Port Harcourt.

[micah.nyone12@gmail.com](mailto:micah.nyone12@gmail.com)

**Abstract:** *The article identified how material planning affects customer satisfaction and production optimisation in the Port-Harcourt manufacturing industries. The study's goal was to experimentally investigate how material planning affects consumer happiness and production optimisation in Port Harcourt's industrial sectors. An explanatory cross-sectional survey research design was used for the investigation. Eighty-eight (88) managers from 22 manufacturing companies in Port-Harcourt, Nigeria, made up the study's population. The human resources departments of the manufacturing companies provided information on the number of responses. Since the study's population of 88 managers was thought to be manageable at a single time, the entire population was utilised without sampling, based on the census sampling approach. As a result, the researcher could retrieve 80 of the 88 issued questionnaires. The data obtained from the field were analysed using Spearman's Rank Order Correlation Coefficient and t-test with the aid of SPSS Version 22.0. Three hypotheses were tested using Spearman Rank Order Correlation. The empirical analysis showed that: (i) material planning has a strong positive influence on customer satisfaction in manufacturing industries in Port Harcourt, and (ii) material planning has a strong positive influence on the optimisation of output in manufacturing industries in Port Harcourt. The study concluded that material planning is a potent tool that manufacturing companies may use to maximise their productivity and level of customer service. The research suggested, among other things, that manufacturing companies utilise material planning for strategising and figuring out the needs crucial for carrying out the production plan, thereby enhancing customer satisfaction.*

**Keywords:** *Material Planning, Customer Satisfaction, Optimisation of Output.*

## Background of Study

Manufacturing firms in Rivers State, particularly Port Harcourt, seem to struggle with these two variables of achieving customer satisfaction and optimisation of output. The high cost and low supply of raw materials could contribute a lot to this. The definition of customer satisfaction used in this study is taken from Peeter et al. (2016). They claim that it occurs when a customer's evaluation of a product after purchase is in line with their expectations. Organisations place a high priority on meeting client needs and closely monitoring their level of satisfaction. This tactic aids businesses in keeping clients for longer, boosting revenue, among other things. The expense of acquiring new consumers is more significant than keeping current ones. A product is improved and refined through output optimisation to increase its value to current consumers and appeal to potential new users (Wills, 2020). Pre-launch product optimisation is something that a product manager should do. After the product is released to the market and up until your business sunsets it, the process should continue. It would help if you incorporated output optimisation throughout the lifecycle of your product because it is never finished. However, there is a need for manufacturing companies to scrutinise material planning, which this study suggests will positively contribute to the improvement of customer satisfaction and optimisation of output.

A systematic method of anticipating the needs for raw materials, auxiliary parts and components, and spare parts, as specified by the manufacturing program, is known as material planning. In line with economic investment strategies, Danny (2021) describes it as the scientific method of determining the needs for raw materials, components, and other goods required for production. A component of the overall planning process is the material planning system. A variety of elements influences the activity of material planning. Both macro and micro systems can be used to categorise these elements. The anticipated demand for the finished goods is the foundation for material planning. For the same, forecasting methods, including the weighted average method, exponential smoothing, and time series models, are used. Once a demand projection has been created, material planning can then be done. A bill of materials is a document that lists the materials needed and the location code per unit of consumption for a particular product. An explosive

chart is a collection of the bill of materials arranged in a matrix format to enable the calculation of the combined requirements for various components. The requirements of various materials are determined using a bill of materials, explosion charts, and demand projections. Thus, the formulation of the material delivery schedule and the purchase of those material requirements will result from the material requirement plan.

The study assumes that using material planning in an organisation such as a manufacturing firm will enhance customer satisfaction and output optimisation. However, it is yet to gain experimental proof. The study, therefore, aims at empirically establishing proof of how material planning can influence customer satisfaction and optimisation of output in Manufacturing Industries in Rivers State.

### **Statement of Problem**

One of the worrisome issues that have brought about this research effort is that manufacturing firms in Port Harcourt and the entire Rivers State are yet to understand the impact of a scientific tool such as material planning on customer satisfaction and optimisation of output in a manufacturing environment. Many still focus on other variables that will boost these organisational performance indices and pay little or no attention to acquiring and using the state-of-the-art scientific system that can boost customer satisfaction and output optimisation. As a result, they do not comprehensively come up with a bill of materials explosion and past consumption analysis in their production process. As a result, they waste raw materials and time, causing customer dissatisfaction and poor product output. Correspondingly, Dan (2018) asserted that manufacturing firms in Rivers State are still reluctant to provide scientific tools for their manufacturing teams to work with, which in turn is contributing negatively to their performance. This raises an issue that manufacturing firms in Port Harcourt and the entire Rivers State need to consider and handle with alacrity.

Also disturbing is the dearth of research effort on the influence of material planning on customer satisfaction and optimisation of output in manufacturing industries in Port Harcourt. This is worrisome and needs pressing attention. For example, Kim (2014) carried out a study on material resource planning in the United States of America; Jawad (2020) did a review on material requirement planning applications in the industry in Babylon. In a similar study, Segerstedt (2017) studied master production scheduling and compared material requirements and cover-time planning in the United Arab Emirates (UAE). It is understandable at this point that research on the influence of material planning on customer satisfaction and optimisation of output in manufacturing industries in Port Harcourt is yet to gain enough research effort. Based on these backdrops, the researcher deems it necessary to carry out this research.

### **Aim and Objectives of the Study**

The study aimed to determine how material planning influences customer satisfaction and output optimisation in the Port-Harcourt manufacturing industries. The specific objectives of the study include the following:

1. To determine the influence of material planning on customer satisfaction in manufacturing industries in Port Harcourt.
2. To determine the influence of material planning on the optimisation of output in manufacturing industries in Port Harcourt.

### **Research Hypotheses**

The researcher tested the following null hypotheses at a 0.05 level of significance:

Ho<sub>1</sub>: Material planning does not significantly influence customer satisfaction in manufacturing industries in Port Harcourt.

Ho<sub>2</sub>: Material planning does not significantly influence output optimisation in Port Harcourt manufacturing industries.

### **Implications of the Theory for the Research**

The theoretical foundation for this work is the Diffusion of Innovation Theory by Rogers (1962). According to this theory, social systems and individuals will adopt new technologies and innovative ideas at various times. The timing of an innovation's acceptance into a system will affect the system's consequences going forward. The theory is predicated on the following premises: There will always be differences in the rate and timing at which people within a particular social system embrace new concepts, methods, and technologies. Early adopters of innovations will inevitably outperform laggards and late adopters as individuals and parts of institutions.

This theory implies that as manufacturing firms work towards enhancing their customer service and optimising output by utilising material planning, there will be inconsistency on how and when these firms will accept to adopt this scientific approach. Some will think that setting up adopting this scientific approach could bankrupt them. The theory also predicts that manufacturing firms who accept this scientific approach early enough to adopt and utilise it will outperform those who will accept it later.

The justification of the Diffusion of Innovation Theory as the theoretical base of this study is based on the fact that the theory explains and predicts how early adoption of material planning will have a more significant positive effect on customer satisfaction and optimisation of output than late adoption.

## Concept of Material Planning

The scientific process of planning and calculating the needs for consumables, raw materials, spare parts, and other ad hoc materials necessary to implement the production plan is known as material planning (MBA Skool, 2022). This plan is always generated from the overarching organisational plan because it is a sub-component. In essence, material planning manages the process of forecasting and planning the acquisition of materials. The following two criteria have a significant impact on material planning:

- i. Macro factors: These include factors such as business cycles, import and export policies, price trends, credit policy and other global factors.
- ii. Micro factors: These elements affect the internal organisation, like the manufacturing schedule, investments, corporate guidelines, and inventory levels. Seasonality, working capital, acceptable inventory levels, and other crucial variables all impact the material's planning.

The scientific method of determining the requirements of raw materials, components, and other goods required for production within the parameters of economic investment strategies has been described as material planning (Danny, 2021). A systematic method of anticipating the needs for raw materials, auxiliary parts/components, and spare parts, as specified by the manufacturing program, is known as material planning (Daniel, 2019). It is a part of the entire planning process. It is more of a support mechanism for the whole planning process. Both micro and macro factors can have an impact on the materials planning process. Macro factors include price trends, business cycles, governmental regulations, and credit policies. In contrast, micro factors include corporate goals, plant capacity utilisation, working capital, lead times, inventory levels, authority delegation, seasonality, and communication systems. The methods of material planning consist of the following:

- i. Bill of Materials Explosion: Determining the demand for the finished products is the goal of materials management planning. Only through foresight or forecasting is this feasible. Forecasting is, therefore, "the foundation for materials planning." There are numerous forecasting methods. The forecasting of demand can also use these methods.

The exercise of materials planning begins after the demand forecast. The demand prediction is used to determine the requirements for various materials. Through explosion charts, the bill of materials is utilised for this purpose. Using computers to "explode" a bill of materials with demand estimates works quite well here. The planning or engineering department creates and distributes the bill of materials in a standardised format. An explosion chart is just a collection of bills of materials arranged in a matrix format so that the specifications for various components can be combined. It is normal to find that some materials are in limited supply and some are in surplus, as materials planning is often done quarterly and at the start of each quarter. Inaccurate forecasting is to blame for this. Quarterly planning is used to correct such inaccuracies in material estimation. Even quarterly planning in the engineering sector looks excessive, so suppliers receive realistic orders.

- ii. Past Consumption Analysis: This kind of analysis is used for materials that are continuously needed and for which it is impossible to create a bill of materials: previous consumption data is analysed, and future consumption is projected based on experience and anticipated future demand. The "average" or "mean" consumption, as well as the "standard deviation", are used as the basis and guidelines for each item when creating such a prediction. These statistical strategies are highly successful at absorbing the shock of volatility in direct and indirect material consumption when it is impossible to develop simple consumption standards. This method is especially useful in process industries.

## Customer Satisfaction

According to Peeter et al. (2016), customer satisfaction is the state in which a customer's opinion of a product after a purchase is consistent with that customer's expectations. Customers may be dissatisfied, satisfied, or delighted regarding the company's services. A satisfied consumer is crucial because they will be loyal and willing to spread good word of mouth about your business. For the past few decades, attention has focused solely on how a product behaves compared to a customer with functions, features, and traits. Customers today often request extra helpful features before committing to a purchase. One of the highly desired features is a friendly atmosphere. Jacobson (2017) emphasised that if clients do not receive prompt and courteous treatment, they will leave the business searching for one that provides quick, convenient, and better services.

Customer satisfaction is more crucial than ever in the modern business world. Making an excellent product is no longer enough. Thanks to the internet, today's consumers have almost limitless access to options and the capacity to communicate their happiness

— or lack thereof — via social media. Therefore, it is crucial to satisfy clients if you work in manufacturing. Listed below are some ideas for boosting client satisfaction in manufacturing businesses like yours (Wilson, 2021):

- i. **Dedicated Customer Service Representatives:** Many manufacturing businesses are inclined to let whoever is nearest to the phone handle customer service inquiries and grievances. This is just not acceptable in the present atmosphere that prioritises customer pleasure. Employing customer service representatives with the proper skill set, such as an understanding of the technical aspects of the business, good problem-solving abilities, and, perhaps most importantly, strong interpersonal skills, as they may frequently be dealing with customers who are frustrated or confused is one of the best ways to manufacture customer service practices.
- ii. **Feedback:** Whether or not a customer feels heard and understood by a firm is one of the critical determinants of whether they will be loyal. Customers are more satisfied when they believe their particular business is respected and they are not just another transaction. A competent manufacturing company will have a reliable method of receiving consumer feedback, such as a dedicated email address for recommendations or a particular online comment form. Moreover, it will be prompt in responding to it.
- iii. **Availability:** Customers prefer to believe that they can contact the businesses they use whenever they want to. While the consumer may feel entitled to this, and the business may find it inconvenient, the truth is that they are getting access to it, and if others in your industry are offering it while you are not, you run the risk of losing consumers. A 24-hour live hotline can provide a significant advantage in customer satisfaction, even if the agent on the other end is only there to record the issue and guarantee a callback during regular business hours.
- iv. **Guarantees/Return Policy:** Some manufacturers might hesitate to offer a generous return policy or a promise to fix any issues out of concern that customers will take advantage in such situations. However, experience has shown that clients value such immediacy much, and many businesses have successfully used this strategy.

It has been more challenging for businesses to sustain long-term profitability and sales growth in recent years due to changes in the business environment. Global competition has sharply intensified. With little development in the overall markets, more goods and services are available to the same group of customers. As a result, businesses place a high value on happy customers because, on average, repeat business accounts for about 70% of total revenues. As a result, companies must employ a defensive strategy that focuses on retaining current customers as devoted consumers of the company's goods or services to sustain volume or profits in the current market (Fornell, 2018). An increasing body of evidence supports the appropriateness of this technique by indicating a connection between increased customer satisfaction and enhanced firm performance. For example, in terms of reported profitability and market share, companies that rated themselves as delivering high levels of service quality outperform those that admit to delivering lower levels of service quality, according to an analysis of the Strategic Planning Institute's profit impact of marketing strategies (PIMS) database. In addition, studies have discovered a substantial correlation between market value, ROI, and total customer satisfaction as measured by customers (Aaker & Jacobson, 2019).

Customer pleasure is essential to organisational performance; thus, organisations work to increase the perceived quality of their services. In this regard, one may say that the most significant fact is that the customer is at the centre of attention. Furthermore, a "performance gap", a negative disparity between perceptions and expectations, causes discontent, whereas a "performance gap", a positive difference, leads to consumer contentment (Kumbhar, 2012). Customer satisfaction is a gauge of how well businesses perform concerning client requirements. This offers another way to gauge service quality. Customers can genuinely remark on items and services by giving feedback on aspects of the service (Al-Jazzazi & Sultan, 2017; Slusarczyk, 2017). Businesses today risk losing clients to rivals if they do not deliver high-quality goods and services (Cheng, 2013). Organisations must be customer-centred, provide superior customer value, cultivate connections, and concentrate on market engineering since customers are increasingly demanding and have higher expectations for quality. Organisations of today monitor their competitors as well as their performance, customer happiness, and customer expectations. As a result, the company has a significant impact on the economy. We can observe the difficulties brought on by more significant market rivalry due to technological advancements, shifting consumer wants, and governmental restrictions and policies (Tlapana, 2015). Organisations place a high priority on meeting client needs and closely monitoring their level of satisfaction. This tactic aids businesses in retaining clients for a longer time. The expense of acquiring new consumers is more incredible than keeping current ones.

The manufacturing industry is dominated by protracted, complex processes involving highly technical goods (Demoule, 2022). Manufacturing businesses emphasised the product and its production for a long time. The client was frequently ignored as efforts were primarily directed toward R&D, production, logistics, or quality. Customer relationship management has, however, evolved into a discipline that must be mastered. First of all, as Dawkins and Reichheld, the renowned authors of the book *Customer Retention as a Competitive Weapon*, so eloquently demonstrate, it is 5 to 7 times more expensive to recruit a new customer than it is to retain

one. A sales cycle is typically lengthier in the manufacturing industry, and companies have a stake in maintaining long-term relationships with and gratifying their current clients.

Additionally, the contemporary environment emphasises the value of customer connections in the sector. Manufacturers can no longer fully profit from their products due to globalisation, the ongoing rise of new players, and the appearance of new technology and communication methods. Indeed, it is getting harder and harder to keep customers due to the rising competition and the variety of offers on the market. Additionally, as digital technology has advanced, consumers have changed and become more demanding. They now demand individualised experiences, constant support, and speedy resolutions to their issues. In order to maintain their operations, manufacturing organisations must carefully consider the management of their client relations. Manufacturers must improve their products' accessibility, the effectiveness of their services, and, most importantly, the B2B customer experience in the era of Industry 4.0.

It should be noted that providing the consumer with a satisfying product is the first step in developing a long-lasting customer relationship. However, since a transaction does not end with the product purchase stage, this is insufficient to increase client loyalty sustainably. Therefore, manufacturers must consider the overall value a product creates throughout its life. In addition, costs for the product, replacement parts, and diagnostic and repair services are included. Thus, the calibre of an organisation's after-sales service plays a factor in determining if a client relationship is good in the industry.

### **Optimisation of Output**

Output optimisation enhances a product to increase its worth to current customers and appeal to potential new consumers (Wills, 2020). As a product manager, you must improve your product before launch when it is still in the early stages of development. After the product is released to the market, the process should continue until your business sunsets it. The lifecycle of your product should include output optimisation because it is never finished.

Once your goal has been established, you may make the necessary adjustments to your product. Of course, depending on the goal, you will choose a different framework. Nevertheless, the first step is always the same: Define your objective. The next step is to choose your success metrics, after which you should create and carry out a plan for product optimisation and assess your progress in light of your success criteria. Finally, you should adhere to a few universally applicable output-optimisation recommended practices, no matter your strategic aim or framework.

- i. Share your plan with stakeholders: Before you modify your product roadmap or add new objectives, share your ideas and justifications with the pertinent stakeholders. For example, your coworkers will be more willing to assist you if they realise your goal is to continuously improve your product to be quicker, more efficient, and more valuable to users. On the other hand, if your team notices you adding or eliminating features but does not understand why they will be less likely to support you.
- ii. Set a timeline for each optimisation: An effort to optimise a product may never end. Your product updates can be tweaked and improved for so long that the new functionality never reaches your users. Set a deadline for yourself to avoid this. Compare the work of your team against your success criteria. Stop making adjustments and release the product if your optimisation technique is thriving and it satisfies your criteria. Remember that optimisation is continuous, so you may always add more updates.
- iii. Let your customers know what you are doing: You should inform your user base that your staff is constantly looking for ways to improve your product's value. Send a message to customers when you optimise the product. It conveys the important message that you value them and work hard to make your product as helpful to them as possible.
- iv. Welcome optimisation ideas from your internal stakeholders: The product management department of a corporation should not be the only one in charge of product optimisation. Teams and individuals across your organisation may also offer ideas for improving your product. For instance, your sales and customer success teams are likely hearing things from the market that you may use to optimise your product. So speak well of their recommendations.
- v. Give product optimisation an ongoing role in your product's lifecycle: On a final note, keep in mind that there is always room for improvement. There is always room for improvement and methods to make products better and more valuable to customers. So continually include optimisation in your product planning process.

### **Methodology**

The study employed the use of an explanatory cross-sectional survey research design. The study population comprised eighty-eight (88) managers in 22 manufacturing firms in Port Harcourt, Nigeria (Source of Manufacturing Firms: Rivers State Yellow Page, 2022). The number of respondents was obtained from the Human Resource Departments of the manufacturing firms. Using the

census sampling technique, the entire population of eighty-eight (88) managers was used for the study without sampling since the population was considered not too much to be dealt with at a time.

Concerning primary data, the study used a structured questionnaire titled “Material Planning, Customer Satisfaction and Optimisation of Output Index (MPCSOOI)”. It was designed on a five-point Likert scale with the following response options: Very Great Extent (VGE) 5, Great Extent (GE) 4, Moderate Extent (ME) 3, Low Extent (LE) 2, and Very Low Extent (VLE) 1. The instrument was face and content validated by the researcher’s supervisor and two research experts in the Management Department of Ignatius Ajuru University of Education, Port Harcourt, Rivers State. Cronbach’s alpha via SPSS (Statistical Package for the Social Sciences) was used to ascertain the instrument’s reliability. The minor Cronbach’s alpha level obtained was 0.75, which indicated a highly reliable coefficient. Based on Nunnally (1978) criterion of 0.70, a reliability coefficient above 0.70 was considered to indicate good or reliable instruments. 88 questionnaires were distributed, and the researcher retrieved eighty (80) copies. In handling the data analysis, hypotheses were tested using Spearman’s Rank Order Correlation Coefficient via the Statistical Package for Social Sciences (SPSS) version 20.0. The Spearman’s (rho) correlation was used to analyse the relationship between independent and dependent variables at  $P < 0.05$  (two-tailed test). The formula is presented below:

$$r = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$$

Where:

n = number of pairs of data

d = difference between the ranking in each data set.

$\sum$  = Summation.

Decision Rule: The tests of hypotheses will be considered two-tailed and be carried out at a 95% confidence interval. Dynamics

**Results/Findings**

Ho<sub>1</sub>: Material planning does not significantly influence customer satisfaction in manufacturing industries in Port Harcourt.

**Table 1: Correlation between Material Planning and Customer Satisfaction**

		Material Planning	Customer Satisfaction
Spearman’s rho	Correlation Coefficient	1.000	0.713**
	Sig. (2-tailed)	.	.000
	N	80	80
	Correlation Coefficient	<b>0.713**</b>	1.000
	Sig. (2-tailed)	.000	.
	N	80	80

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

**Source: SPSS Output**

Table 1 above shows an r-value of 0.713 at a significance level of 0.00, less than the chosen alpha level of 0.05 for the hypothesis relating to material planning and customer satisfaction. Since the significance value is less than the alpha level of 0.05, the null hypothesis (Ho<sub>1</sub>), which states that material planning does not significantly influence customer satisfaction in manufacturing industries in Port Harcourt, was rejected. This implies that material planning strongly influences customer satisfaction in manufacturing industries in Port Harcourt.

Ho<sub>2</sub>: Material planning does not significantly influence output optimisation in Port Harcourt manufacturing industries.

**Table 2: Correlation between Material Planning and Optimisation of Output**

	Material Planning	Optimisation of Output
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		Correlation	1.000	0.668**
	Material	Coefficient		
	Planning	Sig. (2-tailed)	.	.000
Spearman's rho		N	80	80
		Correlation	<b>0.668**</b>	1.000
	Optimisation of	Coefficient		
	Output	Sig. (2-tailed)	.000	.
		N	80	80

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

### Source: SPSS Output

Table 2 above shows an r-value of 0.668 at a significance level of 0.00, less than the chosen alpha level of 0.05 for the hypothesis relating to material planning and optimisation of output. Since the significance value is less than the alpha level of 0.05, the null hypothesis ( $H_{02}$ ), which states that material planning does not significantly influence output optimisation in manufacturing industries in Port Harcourt, was rejected. On the contrary, material planning positively influences output optimisation in Port Harcourt manufacturing industries. These results show that setting a viable plan in place to cover the entire manufacturing process of a product has a notable positive influence on the satisfaction of customers and the optimisation of outputs.

### Summary of Findings

From the above empirical analysis, the following findings were made:

1. Material planning has a strong positive influence on customer satisfaction in manufacturing industries in Port Harcourt.
2. Material planning has a high positive influence on the optimisation of output in manufacturing industries in Port Harcourt.

### Discussion of Findings

The hypotheses one to two tests revealed that material planning positively influences customer satisfaction and output optimisation in the Port-Harcourt manufacturing industries. This finding implies that the scientific method of planning and determining the requirements of consumables, raw materials, spare parts and other miscellaneous materials essential for the production plan implementation has a positive effect on the satisfaction of customers and optimisation of output. Material planning as an industrial practice has been a viable exercise that earns the efficiency and effectiveness of raw material usage and leads to better products that fit into customers' tastes (Daniel, 2019). A type of inventory control called materials planning is used primarily in manufacturing companies. The materials planning process aims to ensure the company has all the raw materials required for manufacturing on hand but not in excess (Kokemuller, 2021). This planning process may affect production depending on how well it is executed. The empirical research shows that material planning will benefit customer satisfaction and optimisation since production requirements, such as raw materials, consumables, and spare parts, are planned and determined using science prior to each manufacturing operation. As a result, the output is maximised by allowing producers to develop needs that suit customers' preferences or requirements.

Planning materials includes a focus on quality as well as efficiency. Within your means, you want to purchase the highest-quality products you can. For example, a producer of high-end products must plan to have premium materials accessible for its manufacturing runs. You might occasionally need to purchase materials from specialised or far-off vendors. Short notice substitution of materials may result in completed products of lower quality and a tarnished reputation.

In a perfect environment, material planning ensures that manufacturing departments have the materials they need to carry out ongoing production or respond to requests for manufacture. A manufacturing company's top priority is to meet customer or client product demand. Optimising efficiency also involves reducing superfluous inventories. This situation is particularly troublesome because managing and storing inventory is expensive, and you might eventually need to discard things that decay or become stale. This aids the manufacturing divisions in the timely and quality fulfilment of customer needs. This suggests that, in addition to aiding manufacturing companies in achieving material economy, material planning also helps them improve their products and please their customers.

Your efforts to plan your materials will also increase worker productivity. Your employees can finish their responsibilities on time when the materials are available when they are needed. Scheduling workers becomes challenging when materials are not replenished on time. Employees can be idly waiting for production-related materials to arrive. Alternatively, you might impromptu decrease hours or change employee schedules. However, consistently implementing these measures can result in a workplace where morale is low.

Planners must also control the internal flow of materials. For example, materials may be transferred across a manufacturing facility multiple times during production. You can also have several production departments that share some resources. Good teams having suitable materials at the correct times is ensured with internal planning. For example, when it comes to using supplies, a project with an approaching deadline could take precedence over one with a further away completion date.

## Conclusions

The study has shown that material planning is a scientific approach through which manufacturing firms can enhance customer service and optimise output. This work concludes that material planning is a powerful machinery that manufacturing firms can utilise to maximise customer service and output. It, therefore, implies that manufacturing firms that undermine the use of this present-day scientific tool possibly stand the risk of customer dissatisfaction and even dwindling output.

## Recommendations

Based on the findings, the following recommendations are proposed:

1. Manufacturing firms should use material planning for planning and determining the requirements for the production plan implementation, building on customer satisfaction.
2. Managers of manufacturing firms should also deploy material planning to determine and plan all essential consumables, raw materials, spare parts and other miscellaneous materials, thereby optimising output, among other benefits.
3. Management should train their employee(s) or employ competent personnel to plan for better material and time effectiveness and efficiency. This will, in turn, trigger higher organisational productivity and performance.

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