

JUST-IN-TIME AND MANUFACTURING EFFECTIVENESS OF PAINT FIRMS IN PORT HARCOURT

David Onwuchekwa

Department of Management, Faculty of Management Sciences,
Ignatus Ajuru University of Education, Port Harcourt, Rivers State, Nigeria

Email:truedave4real@yahoo.com

ABSTRACT

The study examined just-in-time (JIT) and manufacturing effectiveness of Paint Firms in Port Harcourt. The objectives of the study were to determine the relationship between dimensions of just-in-time (frequent deliveries, small lot production and continuous improvement) and measures of manufacturing effectiveness (performance, cost effectiveness and flexibility) of Paint Firms in Port Harcourt. The study adopted the Contingency Theory of Management as its theoretical foundation. The study adopted explanatory cross-sectional survey research design. The population of the study consists of nineteen (19) registered Paint Manufacturing Firms in Port Harcourt. The above information was obtained from Rivers State Yellow Page Directorate. Since the population is small, the sample of the study consisted of the entire population. This is obtainable because the study adopted census sampling techniques. In terms of respondents, two managers were purposively selected because of their perceived organizational phenomenon investigated in this study. Structured questionnaire was used as the main instrument for the collection of primary data. To establish the validity of the instrument, copies of the questionnaire was submitted to an expert in Management for face ad content validity. Cronbach alpha via SPSS (Statistical Package for Social Sciences) was used to ascertain the reliability of the instrument. In line with the sample size, thirty-eight (38) copies of the validated questionnaire was distributed to the targeted audience. The researcher was able to retrieve twenty-nine (29) copies. The Statistical Package for Social Sciences (SPSS) Version 20.0 was used for the analysis. It was found that there is a significant positive relationship between dimensions of just-in-time (frequent deliveries, small lot production and continuous improvement) and measures of manufacturing effectiveness (performance, cost effectiveness and flexibility) of Paint Firms in Port Harcourt. It was concluded that Paint Manufacturing Firms that fall short of adopting the dimensions of just-in-time as used in this study, might really find it challenging in attaining an effective manufacturing organization. Consequently, it was recommended that management of Paint Manufacturing Firms should ensure they retain employees who are competent in following stipulated firms' approach of production as well as delivering services at the right time.

Background of Study

Considering the competitive nature of Paint Manufacturing firms, there is need for every manufacturing firm to boost mode of operations so as to suit the recent trend in their business line (Burjek, 2020). The ability to match their service with what the global market seek is what makes them effective. Thus, manufacturing effectiveness as used in this study refers to firm's ability to engage in production of goods and services using minimal resources to attain greater outcome. Whereby the organization gets the best output from each worker, resulting in maximum results and growth through the manager tell more about organizational effectiveness. For the organization, workers are tools for organizational growth and survival so there is need they are provided with fair working condition (Ahmed, 2018). Nevertheless, performance, cost effectiveness and flexibility are used here as measures of manufacturing effectiveness.

For Paint Manufacturing Firms such as Ebeths Paints International; Sloak Paints Nigeria Limited; Berger Paints; Demcok Paints Limited; New Rivoc Nigeria Limited; Portland Paints & Products Nigeria Plc; Intercolor Industries; Terra Paint; Apex Paint etc. to have said to be effective, they

must as a matter of fact create modalities for high performance. performance is operationally defined as how well a firm function and the extent to which set objectives and targets are met. Albrecht (2020) opined that the performance of organization is usually assessed in terms of the achievement of economic objectives. These objectives can be long term, such as sustainable growth and development, or short term, such as the stabilization of the economy in response to sudden and unpredictable events, called economic shocks. The second measure of manufacturing effectiveness as used in this study is cost effectiveness. According to Ebi (2021), being cost effective helps to determine the most efficient way to use resources in order to receive the most benefit for the least amount of money. Thus, it is a measure of how well money is being spent to achieve desired results. On the other hand, organization such as Paint Manufacturing Firms must be flexible and ready at all times to change and adapt to recent trend. Flexibility refers to as the capability of Paint Manufacturing Firms to explore new opportunities in order to adapt to or prepare for new events innovatively.

There are several approaches in which a manufacturing organization could adopt in their daily operation, just-in-time could be regarded as one. Just in time tries to give a quick service to the customers, while it minimizes the inventory. Most companies use just-in-time (JIT) production to improve their manufacturing processes and stock levels (Ben in Hamed & Hamid, 2020). However, it is defined as the process that focus on producing exactly the amount needed at exactly the time your customers need it. Just-in-time (JIT) system provides the raw materials in a timely manner and the right amount as well as the delivery of full production to the users. It works on the basis of customer orders selecting what inputs you require for the production process (Horngren *et al.*, 2011). This study dimensionalized just-in-time through frequent deliveries, small lot production and continuous improvement.

This study defined frequent deliveries as organizational ability to always and regularly distribute products or render services to those who demand them promptly. Frequent deliveries are a largely ignored but powerful way of leveling apparent demand within a supply chain and thereby reducing waste (Abbas & Al-Zweeni, 2021). Another way just-in-time manifest is through small lot production. Production is considerably more expensive, so organization choose the pattern they operate. Small lot production is the manufacture of a small number of items of the same type and design. They simplify scheduling and can enhance quality (Jamal & Sarker, 2019). Lastly, continuous improvement is conceptually defined as unceasing enhancement of series of actions or steps taken by an organization in order to achieve a particular end. According to Career Development (2020), continuous improvement can facilitate the development of a company's products and services. If an organization wants to actively look for ways to enhance the value of its processes, it can implement a continuous improvement model. The goal is to offer more economically competitive products or more sophisticated services to customers and shareholders. This background necessitated this study.

Statement of the Problem

It appears most Paint Manufacturing Firms are ineffective as a result of poor performance, inflexibility ineffective cost among others. This could be because Paint Manufacturing Firms suffer from effect of humidity on drying time, lack of research and development (R & D) expertise, access to raw materials, access to information on the selection of substitute ingredients and their use etc. The findings of Bao (2010); Ahmed (2018); Albrecht (2020) and Ebi (2021) points to the fact that even with the strategies set in place to address Paint Manufacturing Firms challenges, it still appears that most of the firms lack flexible skills and performance.

To this end, the question of the level at which production approaches manifests in these firms becomes necessary. We do not know the rate at which Paint Manufacturing Firms especially in Port Harcourt adopt just-in-time approach of production in terms of frequent deliveries, continuous

improvement and small lot production, this study seeks to find out. Although, there has been several research efforts in investigating the relationship between just-in-time and organizational outcome (Hamed & Hamid, 2020; Drury, 2018; Barfield, *et al.*, 2021; Horngren *et al.*, 2011). However, none of the aforementioned authors studied just in time and manufacturing effectiveness especially in Paint Firms in Port Harcourt. None of the aforementioned authors also adopted the same dimensions and measures as presented in the conceptual framework. There is need to close this gap.

Conceptual Framework

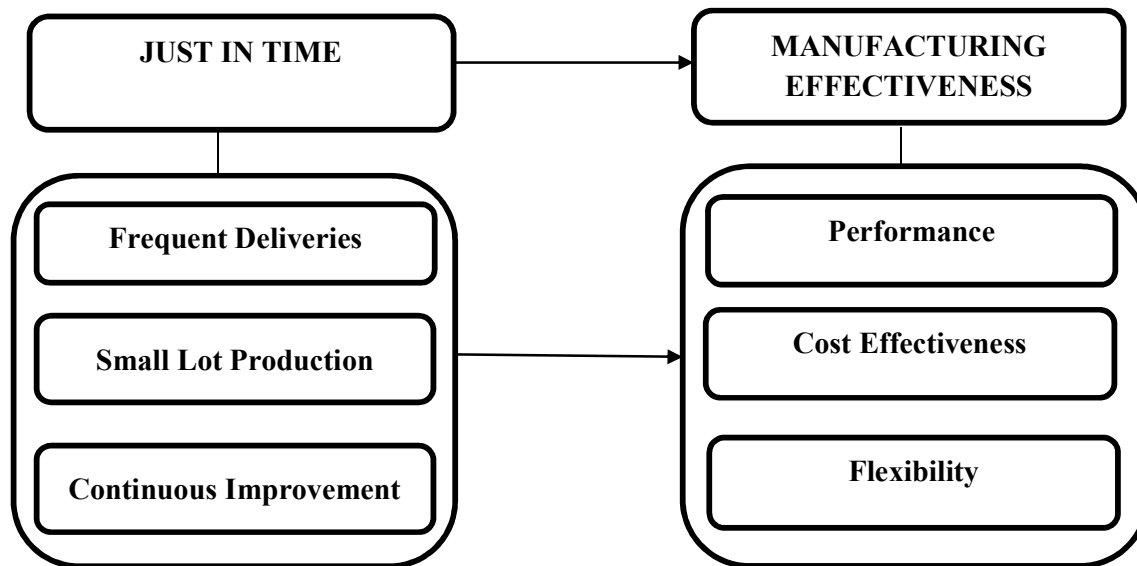


Fig. 1: Conceptual Framework of Just in Time and Manufacturing Effectiveness

Source: (Hamed & Hamid, 2020; Burjek (2020; Barfield, *et al.*, 2020).

Aim/Objectives of the Study

The aim of the study was to examine the relationship between just in time and manufacturing effectiveness of Paint Firms in Port Harcourt. Specifically, the study seeks to

1. Determine the relationship between frequent deliveries and performance of Paint Manufacturing Firms in Port Harcourt.
2. Ascertain the relationship between small lot production and cost effectiveness of Paint Manufacturing Firms in Port Harcourt.
3. To assess the relationship between continuous improvement and flexibility of Paint Manufacturing Firms in Port Harcourt.

Research Question

The following research questions are formulated to guide the study:

1. What is the relationship between frequent deliveries and performance of Paint Manufacturing Firms in Port Harcourt?
2. What is the relationship between small lot production and cost effectiveness of Paint Manufacturing Firms in Port Harcourt?
3. What is the relationship between continuous improvement and flexibility of Paint Manufacturing Firms in Port Harcourt?

Hypothesis

In line with the objectives, the following null hypothesis were formulated:

- Ho₁: There is no significant relationship between frequent deliveries and performance of Paint Manufacturing Firms in Port Harcourt.
- Ho₂: There is no significant relationship between small lot production and cost effectiveness of Paint Manufacturing Firms in Port Harcourt.
- Ho₃: There is no significant relationship between continuous improvement and flexibility of Paint Manufacturing Firms in Port Harcourt.

CONCEPTUAL REVIEW

Concept of Just in Time

Just in time (JIT) production system is a way of preparing materials in which all required goods are received on time. Successful application of this system involves different organizational factors such as upper-level managers' support, determination of main production problems, employees' participation in decision making, and simultaneous application of production flow and proper inventory system (Hamed & Hamid, 2020). Completing these organizational factors depends on some environmental conditions such as the relationship between supporters and customers, culture, relations, economic and political conditions of a country. Using this method, on the other hand, involves upper level precision, as one must prepare efficient safe pieces on time and in a proper situation for work station and/or production line. Just in time tries to give a quick service to the customers, while it minimizes the inventory. Most companies use just-in-time (JIT) production to improve their manufacturing processes and stock levels (Ben in Hamed & Hamid, 2020).

According to Drury (2018), just in time is 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 reduces preparation and configuration time as a result of production in small batches and a regular flow of production within a single manufacturing cell. To Horngren, *et al.* (2019), it is a system whereby each element on the production line is produced if the next step on the production line is needed. It helps to implement comprehensive quality control and strive to achieve the goal of zero defects and reduce costs associated with poor quality problems.

Operationally, just in time is the process that focus on producing exactly the amount needed at exactly the time your customers need it. JIT system provides the raw materials in a timely manner and the right amount as well as the delivery of full production to the users and the lack of production under operation so that the stock reaches zero with the quality in the full product and eliminate wasteful in any activity does not create any value added to the product, learning on the job Ideas and suggestions must be tried during the work to develop them and to improve the results of the actions taken (Barfield, *et al.*, 2021). Just-in-time manufacturing (JIT manufacturing) is a production model in which items are created to meet demand, not created in surplus or in advance of need. Organizations adopt the JIT approach to increase efficiency, reduce costs and speed up product delivery. To achieve these goals, however, they must eliminate the types of waste typically associated with manufacturing, such as overproduction, unnecessary wait times and excessive inventory only then can they implement an effective JIT strategy.

According to Horngren *et al.* (2011), just-in-time production is a lean production method that seeks to produce an item only when needed. It aligns the amount of inventory or raw materials required to manufacture a product precisely with that product's demand. The objectives of JIT are to eliminate waste production and improve productivity to reduce per-unit costs. It's a cost-efficient strategy for maintaining stock levels, improving stock turnaround, and decreasing the warehouse space to store products. It works on the basis of customer orders selecting what inputs you require for the production process. Inputs refer to the resources, such as materials, pieces of equipment, employees, and software companies use to manufacture goods. Based on a pull system of production, companies use specialist software to employ JIT by connecting the

production team with suppliers and logistics (Horngren *et al.*, 2011). This methodology ensures that suppliers deliver material into the production line only when needed. Within the context of this study, frequent deliveries, continuous improvement and small lot production are used here as dimensions of just in time (JIT).

Dimensions of Just in Time

Frequent Deliveries

This study defined frequent deliveries as organizational ability to always and regularly distribute products or render services to those who demands them promptly. Frequent deliveries are a largely ignored but powerful way of leveling apparent demand within a supply chain and thereby reducing waste. What is perhaps not so obvious is that this will reduce inventory levels and thereby assist progress along the Lean journey at the same time (Abbas & Al-Zweeni, 2021) Consistent delivery can help build customer trust and loyalty, reduce customer costs, and improve customer satisfaction. It is at this point that products are being handed to the customers. With that said, deliveries should be on time and businesses must ensure that their customers will experience a smooth transaction. Frequent deliveries connect potential customers who require certain products and services with brands and businesses that can provide these services. Improving the delivery systems can help you improve the experience of customers you encounter in a department.

Small Lot Production

Small lot production is defined as a state of manufacturing a small number of items of the same type and design. Hitomi (2020) posit that unlike industrial mass production, products are made in small numbers for a very limited market only. Production is considerably more expensive. Small lot productions are common in product design as well as in the crafts. Small lots reduce excess inventory and warehouse storage costs and all but eliminate waste. They simplify scheduling and can enhance quality. Small lots reduce variability in the system and smooth production. They enhance quality, simplify scheduling, reduce inventory and encourage continuous improvement (Jamal & Sarker, 2019).

Continuous Improvement

Conceptually, continuous improvement is defined as unceasing enhancement of series of actions or steps taken by an organization in order to achieve a particular end. It is equally an entity which represents the basic unit of work to be implemented in the system. It depicts nonstop improvement of series of actions, motions, or operations leading to meaningful result in the manufacturing process. Greg *et al.* (2014) averred that the general goal of continuous improvement is to increase client (customer) satisfaction as well as to improve the efficiency of business processes. Mona (2015) posits that continuous improvement is facilitation of activities which are carried out in order to achieve a particular result. It could also be seen as continuous improvement is a method for identifying opportunities to streamline work and produce an effort to improve business processes. Continuous improvement allows for more efficient processes, but it also helps companies find more and better ways to complete a task. Even if some of these innovations are small, sometimes companies can find an entirely new path to accomplish tasks, resulting in a shift in how a business operates.

According to Career Development (2021), continuous improvement can facilitate the development of a company's products and services. If an organization wants to actively look for ways to enhance the value of its processes, it can implement a continuous improvement model. The goal is to offer more economically competitive products or more sophisticated services to customers and shareholders. A well-thought continuous improvement plan can have a positive impact on the company's organizational culture. A suitable method sets realistic expectations for all stakeholders, and employees can begin to understand more about how their actions align with the company's

primary goal (Career Development, 2023). A better working environment also can lead to happier employees, less stress, better teamwork and higher productivity.

Concept of Manufacturing Effectiveness

The Cambridge Dictionary indicated that effectiveness is the ability to be successful and produce the intended results. Burjek (2020) maintained that effectiveness as a term refers to the ability to produce the desired result or success. Effectiveness is generally the capability of producing a desired result. Effectiveness in manufacturing firms is essential for improving results and in order to perform effectively, clarity is needed. If employees do not know what results are expected of them, there is a risk that they will work but will not perform. They are not doing the right things and so contribute insufficiently to the success of the organization. An employee is deemed effective, if he or she has met an intended or expected outcome on a job or task assigned to him/her. From the definitions given above, an effective employee can be described as a worker who judiciously and professionally executes his jobs to the point that goals or targets are met in the workplace or unit under them.

Operationally, manufacturing effectiveness refers to firm's ability to engage in production of goods and services using minimal resources to attain greater outcome. Effectiveness in manufacturing is an important element in current contemporary organizations (Bao 2010), as they need effective and competent workers to be able to reach their objectives and goals both efficiently and effectively. Moreover, effectiveness is a key component which enables effectual operation and delivery of complex initiatives. Effectiveness is doing the right thing at the right time, with the rightly available resources to achieve a delineated result. Workers' effectiveness is a crucial issue of concern across all organizations, as without them organization's growth, development and survival will remain fantasy. Workers who are effective in nature deploy unique behaviours that best align with the organization's mission, culture, customer needs and strategic goals as they attained predetermined goals and objectives for the organization. Effective employee solicits the input of employees to ensure the workplace is as free of stress and strife as possible, while still ensuring high productivity and a solid work product (Michael, 2018).

Effectiveness implies to the extent to which an organization achieves the output requirements by using and implementing his or her skills and strategies through his work force, peer groups and subordinates. Whereby the organization gets the best output from each worker, resulting in maximum results and growth through the manager. For the organization, workers are tools for organizational growth (Ahmed, 2018). Effectiveness could mean achievement of organizational goals, increase in productivity, profit, workers' satisfaction, growth, diversification, etc. (Michael, 2018). Within the context of Paint Firms in Port Harcourt as used in this study, manufacturing effectiveness is measured through performance, flexibility and cost effectiveness.

Measures of Manufacturing Effectiveness

Performance

The concept of performance has gained increasing attention in recent decades, being pervasive in almost all spheres of the human activity (Ion & Criveanu, 2016). Didier (2012) believes that the performance consists in "achieving the goals that were given to you in convergence of enterprise orientations". In his opinion, performance is not a mere finding of an outcome, but rather it is the result of a comparison between the outcome and the objective. Unlike other authors, Didier considers that this concept is actually a comparison of the outcome and the objective. The author's definition is far from clear, as both outcomes and objectives vary, most often, from one field of activity to another. Most recently, there are a variety of definitions attributed to the concept of performance due to its subjective nature. (Albrecht, 2021).

However, performance is operationally defined as how well a firm function and the extent to which set objectives and targets are met. Michel cited in Ion and Criveanu (2016) characterizes the performance as future-oriented, designed to reflect particularities of each organization/individual and is based on a causal model linking components and products. He defines a "successful" business as one that will achieve the goals set by the management coalition, not necessarily one that achieved them. Thus, performance is dependent as much of capability and future. Albrecht (2023) opined that the performance of organization is usually assessed in terms of the achievement of economic objectives. These objectives can be long term, such as sustainable growth and development, or short term, such as the stabilization of the economy in response to sudden and unpredictable events, called economic shocks. Performance of a firm is a function of its success in producing benefits for its owners in particular, through product innovation and the efficient use of resources.

Cost Effectiveness

Before exploring the cost effectiveness, it will be pertinent to briefly discuss cost. Cost refers to the amount incurred for the production of goods and services. Resources must be sacrificed for any organization to achieve its objectives. To an accountant, cost is defined as a resource forgone to achieve a specific goal. This can be expressed as the monetary amount which must be paid to acquire goods and services. ACCA (2012) defines cost as the amount of expenditure incurred on, or attribute to a specific thing or activity cost of anything ordinarily is money spent to acquire that things.

Cost Effectiveness is a term that is widely used in business, economics, and finance. In simplest terms. Thus, it is a measure of how well money is being spent to achieve desired results. According to Ebi (2020), being cost effective helps to determine the most efficient way to use resources in order to receive the most benefit for the least amount of money. There are many ways to determine whether a product or service is cost effective. One approach is to compare the price of the item with its quality. If two products are identical in terms of quality but one is priced lower than the other, then the first product would be considered more cost effective.

Flexibility

This work sees flexibility as the capability of Paint Manufacturing Firms to explore new opportunities in order to adapt to or prepare for new events innovatively. Flexibility denotes the organizational capacity to respond to a turbulent environment through innovation development of products, services and processes, based on a culture of learning and renewal (Lundvall, 2012). This definition builds on the concept of a learning economy, in which human resources and innovation development are at the center of strategic interests (Lundvall & Johnson, 2015).

Flexibility in a firm implies that such firm explore new opportunities in order to adapt to or prepare for new events, but succeeds commercially only to the extent that it is able to exploit these new opportunities. Therefore, flexibility rests on some sort of balance between exploration and application of assets (Teece, *et al.*, 2020). While exploration often requires that existing avenues for action are put aside from the organizational repertoire, application rests on the organizational ability to ensure a certain level of behavioural regularity (Volberda, *et al.*, 2020).

Theoretical Review

The study adopted the Contingency Theory of Management as its theoretical foundation. Contingency theory of management was proposed by Fred Edward Fiedler in 1964 as cited Teece, *et al.* (2020). Contingency theory suggests that in order to be effective, management must be consistent with other aspects of the organization and/or external environment. Contingency decisions within management have largely been understood on the basis of external and internal fit. External fit, also termed vertical alignment, requires that the management practices of the

organization must match the organizational strategy or environmental conditions faced by the organization. However, contingency theory is based on five assumptions:

- i. There is no one best type of organization which suites all enterprise. That is, different types of structures, processes and approaches are needed for different kinds of environments as well as internal situation.
- ii. Even in the same organization different approaches may be necessary to deal with different situations.
- iii. A large number of variables, including goals, attitude and sense of values of people technology and condition of the market determine the structure, process and overall approach of an organization.
- iv. Adaptability to change, particularly to environmental change constitutes one of the biggest challenges to modern organization. The organization should be so designed that it is flexible enough to change with the environment.

Justification of this theory to this study is predicted on its relevance to both the dependent and the independent variable (just in time and manufacturing effectiveness). This is because different paint manufacturing firms has set goals and objectives, they try as much as possible to achieve them. In cause of achieving these set goals, they encounter one form of problem or the other. These problem manifests as a result of lack of improvement, infrequent deliveries and small lot production among others. Thus, they tend to decide the production approach (just in time) to be used to satisfy their customers on time as well as reducing waste. Their ability to carry out this approach leads to increase manufacturing effectiveness.

METHODOLOGY

The study adopted explanatory cross-sectional survey research design. The population of the study consist of nineteen (19) registered Paint Manufacturing Firms in Port Harcourt. The above information was obtained from Rivers State Yellow Page Directorate. Since the population is small, the sample of the study consisted of the entire population ie nineteen (19) registered Paint Manufacturing Firms in Port Harcourt. This is obtainable because the study adopted census sampling techniques. In terms of respondents, two managers were purposively selected because of their perceived organizational phenomenon investigated in this study. The managers selected include General/Branch Managers and Procurement/Production Managers. Thus, the sample size of the study was nineteen (19) registered Paint Manufacturing Firms in Port Harcourt with thirty-eight (38) respondents. Structured questionnaire was used as the main instrument for the collection of primary data. To establish the validity of the instrument, copies of the questionnaire was submitted to an expert in Management for face ad content validity. His comments were used to validate the final copy of the instrument that was administered. Thus, Cronbach alpha via SPSS (Statistical Package for Social Sciences) was used to ascertain the reliability of the instrument. In line with the sample size, thirty-eight (38) copies of the validated questionnaire was distributed to the targeted audience. The researcher was able to retrieve twenty-nine (29) copies. The Statistical Package for Social Sciences (SPSS) Version 20.0 was used for the analysis. 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 set of data.

Σ = Summation.

ANALYSIS AND RESULTS

Ho₁: There is no significant relationship between frequent deliveries and performance of Paint Manufacturing Firms in Port Harcourt.

Table 1: Correlation of Frequent Deliveries and Performance

		Frequent Deliveries	Performance
Spearman's rho	Frequent Deliveries	Correlation Coefficient	1.000
		Sig. (2-tailed)	.454**
		N	.000
			29
Spearman's rho	Performance	Correlation Coefficient	1.000
		Sig. (2-tailed)	.454**
		N	.000
			29

****.** Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS Output

Table 1 above reveals r value of 0.454 at a $p=0.00 < 0.05$ for the hypothesis relating frequent deliveries and performance. Since the significance value 0.00 is less than the alpha level of 0.05, the null hypothesis (H_{01}) which states that there is no significant relationship between frequent deliveries and performance of Paint Manufacturing Firms in Port Harcourt was rejected and the alternate (H_{a1}) was accepted. This implies that there is a moderate positive relationship between frequent deliveries and performance of Paint Manufacturing Firms in Port Harcourt.

Ho₂: There is no significant relationship between small lot production and cost effectiveness of Paint Manufacturing Firms in Port Harcourt.

Table 2: Correlation of Small Lot Production and Cost Effectiveness

		Small Lot Production	Cost Effectiveness
Spearman's rho	Small Lot Production	Correlation Coefficient	1.000
		Sig. (2-tailed)	.899**
		N	.000
			29
Spearman's rho	Cost Effectiveness	Correlation Coefficient	1.000
		Sig. (2-tailed)	.899**
		N	.000
			29

****.** Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS Output

Table 2 above reveals r value of 0.899 at a $P=0.00 < 0.05$ for the hypothesis relating small lot production and cost effectiveness. Since the significance value 0.00 is less than the alpha level of 0.05, the null hypothesis (H_{02}) which states that there is no significant relationship between small lot production and cost effectiveness of Paint Manufacturing Firms in Port Harcourt was rejected and the alternate (H_{a2}) was accepted. This means that there is a very high positive relationship between small lot production and cost effectiveness of Paint Manufacturing Firms in Port Harcourt.

Ho₃: There is no significant relationship between continuous improvement and flexibility of Paint Manufacturing Firms in Port Harcourt.

Table 3: Correlation of Continuous Improvement and Flexibility

		Continuous Improvement	Flexibility
Spearman's rho	Continuous Improvement	Correlation Coefficient	1.000
		Sig. (2-tailed)	.643**
		N	.000
	Flexibility	Correlation Coefficient	.000
		Sig. (2-tailed)	.643**
		N	.000
		29	29

****.** Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS Output

Table 3 above reveals r value of 0.643 at a $P=0.00 < 0.05$ for the hypothesis relating continuous improvement and flexibility. Since the significance value 0.00 is less than the alpha level of 0.05, the null hypothesis (H_{03}) which states that there is no significant relationship between continuous improvement and flexibility of Paint Manufacturing Firms in Port Harcourt was rejected and the alternate (H_{a3}) was accepted. This means that there is a high positive relationship between continuous improvement and flexibility of Paint Manufacturing Firms in Port Harcourt.

Discussion of Findings

The findings of this study are discussed below:

The test of hypothesis one revealed that there is a moderate positive relationship between frequent deliveries and performance of Paint Manufacturing Firms in Port Harcourt. This implies that consequent deliveries of demanded goods and services as manufacturing by Paint Firms leads to improvement in effectiveness in terms of performance. This is in line with the finding of Abbas & Al-Zweeni (2021) that consistent delivery can help build customer trust and loyalty, reduce customer costs, and improve customer satisfaction. It is at this point that products are being handed to the customers. It equally deliveries connect potential customers who require certain products and services with brands and businesses that can provide these services. This go a long way in boasting their performance.

The test of hypothesis two revealed that there is a very high positive relationship between small lot production and cost effectiveness of Paint Manufacturing Firms in Port Harcourt. This implies that consequent adoption of small lot production triggers a corresponding enhancement of cost effectiveness. Supportively, Jamal and Sarker (2019) found that small lot production is capable of enhancing quality, simplify scheduling, reduce inventory and encourage continuous improvement. Thus, small lots reduce excess inventory and warehouse storage costs and all but eliminate waste as well as improving performance of the firms through cost effectiveness.

The test of hypothesis three revealed that there is a high positive relationship between continuous improvement and flexibility of Paint Manufacturing Firms in Port Harcourt. This implies that the unceasing firms' ability in series of actions, motions, or operations leading to meaningful result in the manufacturing process brings about manufacturing effectiveness in terms of flexibility. The finding of Career Development (2021) revealed that continuous improvement can facilitate the development of a company's products and services. If an organization wants to actively look for ways to enhance the value of its processes, it can implement a continuous improvement model. The goal is to offer more economically competitive products or more sophisticated services to customers and shareholders. This enhances their effectiveness in the competitive market.

CONCLUSION

Based on the findings, the study concludes that there is a significant positive relationship between just-in-time and manufacturing effectiveness of paint firms in Port Harcourt. This is because JIT system provides the raw materials in a timely manner and the right amount as well as the delivery of full production to the users. Paint Manufacturing Firms that fall short of adopting the dimensions of just-in-time as used in this study, might really find it challenging in attaining an effective manufacturing organization.

RECOMMENDATIONS

Based on the findings, the following recommendations were made:

1. Management of Paint Manufacturing Firms should ensure they retain employees who are competent in following stipulated firms' approach of production as well as delivering services at the right time.
2. Management of Paint Manufacturing Firms should ensure their process of production are improved through engaging workers innovatively.
3. Employees of Paint Manufacturing Firms should adopt small lot production for waste reduction in their respective firm.

REFERENCES

- Abbas, N. K. A. & Al-Zweeni, M. S. K. (2021). Just-in-time production. <https://www.researchgate.net/publication/337827308>
- ACCA (2012). Cost reduction. <https://edusounds.com.ng/short-history-nigerias-railways-1/>
- Ahmed, A. A. H. E. (2018). *An exploration into senior managers' effectiveness: The case of Muscat Municipality Oman*. University of Northampton.
- Albrecht, J. (2023). Firm resources and sustained competitive advantage. *Journal of Management*, 6(17), 99-120.
- Bao, C. (2010). *Exploring the parameters of effectiveness in private and public sector in China*. University of Bradford.
- Barfield, J., Bern, C. & Kinney, M. (2021). Cost accounting: Traditions and Innovations. https://ar.wikipedia.org/wiki/%D8%A5%D9%86%D8%AA%D8%A7%D8%AC_%D9%85%D8%A8%D8%B1%D9%85%D8%AC
- Burjek, A. (2020). *Staffing management: How to improve managerial effectiveness*. <https://www.workforce.com/uk/news/how-to-improve-manager-effectiveness>
- Career Development (2021). Continuous improvement. <https://au.indeed.com/career-advice/career-development/what-is-continuous-improvement#:~:text=Continuous%20improvement%20allows%20for%20more,in%20how%20a%20business%20operates.>
- Didier N., (2012). *Manager is performances: Managing performance*. Insep Consulting Editions.
- Drury, C. (2018). *Management and cost accounting*. Canale & Italy Business.
- Ebi, O. (2020). Linking team work with performance. *Journal of Team performance management* 2(4), 5-10.

- Greg, U., Hill, E. J., Hawkins, A.J., Ferris, M. & Weitzman, M. (2014). Finding an extra day a week: The positive influence of perceived job flexibility on work and family life balance. *Family Relations Journal*, 50(3) 49–58.
- Hamed, P. & Hamid, P. (2020). Just in time (JIT) production and supply chain management. *International Iron & Steel Symposium*, 2(4), 1221-127
- Hitomi, K. (2020). Strategic integrated manufacturing systems: The concept and structures. *International Journal of Production Economics*, 25(1), 5–12.
- Hornigren C., Datar T., Strikant M. & Foster, G. (2011). *Cost accounting: A managerial emphasis, 14th ed.* Prentice-Hall.
- Hornigren, C. T., Foster, G. & Datay, Sr. M. (2019). *Cost accounting: Managerial emphasis, 12th ed.* Pearson Prentice Hall Inc.
- Ion, E. I. & Criveanu, M. (2016). Organizational performance: A concept that self-seeks to find itself. *Annals of the Constantin Brâncuși University of Târgu Jiu, Economy Series*, 4, 179-183.
- Jamal, A.M.M. & Sarker, B. R. (2019). An optimal batch size for a production system operating under a just-in-time delivery system. *International Journal of Production Economics*, 32(2), 255–260.
- Lundvall, B. A. (2012). National systems of innovation. Towards a theory of innovation and technology. *Management Information System Quarterly*, 16(2), 173-186.
- Lundvall, B. A., & Johnson, B. (2015). The learning economy. *Journal of Industry Studies*, 1(2), 23-42.
- Michael, K. (2018). *What makes an effective manager?* <https://www.michaelpage.co.uk/advice/management-advice/development-and-retention/what-makes-effective-manager>
- Mona, U. (2015). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185-214.
- Teece, D., Pisano, G., & Shuen, A. (2020). Dynamic capabilities and strategic management. *Strategic Management Journal*, 18(7), 509-533.
- Volberda, H. W., Foss, N. J., & Lyles, M.A. (2020). Perspective--absorbing the concept of learning. *Human Relations*, 54(3), 1325–1351.