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Production Management Practices and Production Performance in Manufacturing: Evidence from a Home-Appliance Manufacturer

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ABSTRACT

Proper production management ensures the proper working and efficiency of manufacturing industry organizations. The present study is conducted in order to know the practices of production management in a manufacturing organization by analysing various aspects such as production planning, inventory control, quality control, machine maintenance and utilization of the resources. The present study is conducted in a manufacturing organization situated in Chennai and has used data obtained from employees of production-related activities. The study highlights the need for production practices of an organization, its problems and possible solutions for improving efficiency of production. The results have provided valuable information regarding the significance of proper planning, coordination, timely availability of materials, and improvements in manufacturing.

***Keywords**: Production Management, Production Planning, Inventory Management, Production Efficiency, Manufacturing Industry.*

Introduction

Production management is one of the crucial factors that contribute to the effective operation of manufacturing organizations. Production management includes planning, scheduling, controlling resources, inventory management, maintaining quality, and achieving the production targets within the desired timeframe. Effective production management helps organizations utilize the available material, machinery, labor, and time more efficiently.

Manufacturing organizations may be confronted with several problems such as delays in production, shortage of material, machinery problems, wastages, and quality problems. Planning and coordination can help in overcoming some of these issues.

In this regard, the current research will try to examine the practices of production management, production planning, and inventory management and their contribution to improving production performance in manufacturing organizations.

Review of Literature

The review of literature provides an understanding of previous research related to production management and manufacturing performance. It helps identify the major areas studied by earlier researchers, including production planning, inventory management, quality control, safety practices, and the use of modern technologies in manufacturing. The following studies published between 2023 and 2026 provide a recent foundation for understanding these aspects and help establish the background for the present study.

Renna (2024): Renna studied the use of game theory in production planning and scheduling. The study highlighted that analytical decision-making could support better production planning, capacity planning and scheduling. It also pointed out the potential of digital approaches for improving sustainable manufacturing systems.

Esteso et al. (2023): Esteso et al. examined the application of reinforcement learning in production planning and control. The study showed that intelligent approaches can support production planning and control decisions and help manufacturing organizations respond more effectively to changing operational conditions.

Albayrak Ünal, Erkayman and Usanmaz (2023): The study reviewed the applications of artificial intelligence in inventory management. The findings indicated that AI and machine-learning techniques can improve inventory forecasting, decision-making and operational efficiency. The study also highlighted the future potential of AI in inventory management.

Hamilton, Topalcengiz and Gibson (2023): Hamilton et al. examined safety practices in production environments. The study emphasized that proper safety procedures, employee training and hygiene practices are important for maintaining production safety and product quality. It also showed that good safety practices can support operational efficiency.

Aksoy et al. (2023): Aksoy et al. studied the use of artificial intelligence for improving workplace safety in Industry 5.0 production environments. The research found that AI can help identify potential hazards, assess risks and monitor safety conditions in real time, thereby supporting safer production operations.

Nazia and Fuad (2023): Nazia and Fuad examined the importance of Statistical Quality Control in manufacturing. The study found that statistical quality-control techniques help organizations monitor production processes, identify defects and maintain product quality. Effective quality control was also associated with better production efficiency.

Islam et al. (2024): Islam et al. investigated the use of deep learning and computer vision in manufacturing quality control. The study highlighted the ability of these technologies to improve defect identification and quality inspection. The research recommended the use of advanced digital technologies to strengthen manufacturing quality management.

Madamidola et al. (2024): Madamidola et al. reviewed existing inventory management systems and their applications. The study highlighted the importance of effective inventory systems in maintaining material availability and improving operational efficiency. It also discussed the growing role of technology in modern inventory management.

Onyeaka et al. (2024): Onyeaka et al. examined safety and contamination issues in production and processing environments. The study emphasized the importance of proper regulations, continuous monitoring and adherence to manufacturing practices for maintaining production safety and product quality.

Liu et al. (2025): Liu et al. examined the use of multi-agent deep reinforcement learning for multi-echelon inventory management. The study highlighted the importance of intelligent decision-making and coordination in managing inventory across different levels of the supply chain. Such approaches can support better inventory and operational performance.

Liu et al. (2025): Liu et al. studied production performance in the context of labour shortages and technological development. The findings indicated that improved production services and the use of modern production techniques can increase production efficiency, improve productivity and reduce dependence on labour.

Sharmile, Chowdhury and Desai (2025): Sharmile et al. reviewed quality-control and reliability practices in manufacturing. The study found that statistical methods, machine learning and artificial intelligence can improve quality control, defect detection and reliability. The study also highlighted the need for further research as manufacturing systems become more complex.

Megahed et al. (2026): Megahed et al. examined AI-based image inspection for manufacturing quality control. The study found that AI-supported image inspection can identify and classify product defects effectively, showing the potential of advanced technology to improve the speed and efficiency of quality-control activities.

Frennert, Fischer and Alce (2026): Frennert et al. examined human–robot collaboration in modern manufacturing environments. The study found that robotic systems can contribute to workplace safety and reduce employee stress, while also creating new challenges related to job roles and employee autonomy.

Galyon et al. (2026): Galyon et al. examined factors affecting production performance and productivity. The study showed that production conditions and process-related factors can influence output and overall production performance. The findings highlight the importance of selecting appropriate production practices to achieve better operational results.

Research Gaps

The extant literature highlights that production efficiency depends on various aspects such as production planning, inventory management, quality control, safety measures, and modern technologies usage. Modern research pay more attention to the use of artificial intelligence, Industry 4.0, smart production, and advanced quality control. At the same time, comparatively less attention is paid to the use of basic production management practices and production planning from the employees' perspective in a particular manufacturing organization. Thus, the gap emerges in terms of the lack of information about the relation between basic production management practices and production planning, inventory management and production efficiency in a particular manufacturing organization. This research intends to fill in this gap by studying the abovementioned factors in a particular manufacturing organization.

Research Questions

- What production management practices are followed in the selected manufacturing organization?
- How does production planning influence production performance?
- How does inventory management influence production performance?
- What is the relationship between production management practices and overall production performance?
- Which production management practice has the greatest influence on improving production performance?
- What measures can be adopted to improve production efficiency in the manufacturing organization?

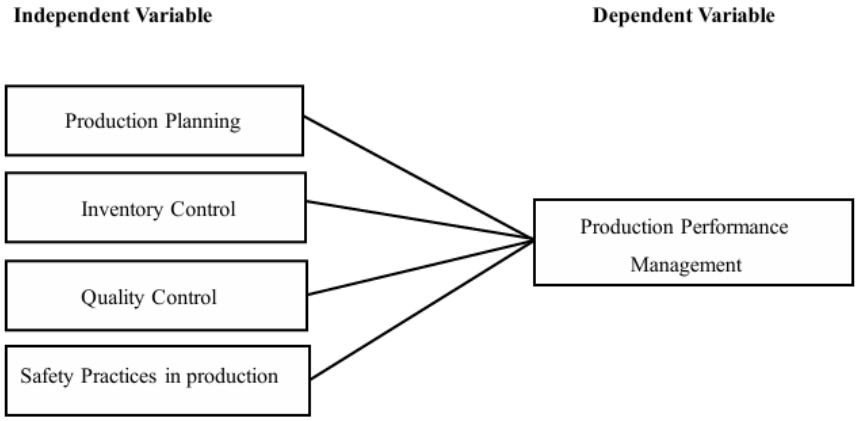
Objectives

- To examine the production management practices followed in the manufacturing organization.
- To assess the influence of production planning on production performance.
- To examine the influence of inventory management on production performance.
- To identify the relationship between production management practices and production performance.
- To identify practical measures for improving production efficiency in the manufacturing organization.

Hypothesis

- There is a significant relationship between Production Management Practices and Production Performance.
- There is a significant relationship between Production Planning and Production Performance.
- There is a significant relationship between Inventory Management and Production Performance

Conceptional Framework



Research Methodology

The research employed descriptive research approach to analyse the production management and their connection with production performance. Data was gathered through primary sources, and a sample size of 120 people was selected through the convenient sampling method. To gather relevant data, a structured questionnaire with 25 questions was used. Statements related to the study variables were measured through the 5-point Likert scale, i.e., from 1 – Strongly Disagree to 5 – Strongly Agree. The collected data were analysed through SPSS employing descriptive statistics, reliability analysis, factor analysis, correlation, and regression analysis.

Data Analysis

The data collected from the respondents was systematically analyzed to determine the production management practices that exist and the relationship of those practices with production performance. Descriptive analysis was employed in summarizing the results and understanding the perceptions held by the respondents.

The reliability analysis was performed to determine whether the questionnaire items were reliable. Factor analysis was performed to determine the main factors that were involved in the study. Pearson correlation analysis was done to determine the correlation between the production management practices, production planning, inventory management, and production performance.

Regression analysis was also done to determine the influence of the independent variables on the production performance. The analysis reveals that production planning has the highest influence, followed by production management practices. Inventory management has a positive association, but the independent influence is low.

Frequency Analysis

Table 1: Age Wise Distribution of Respondents

Age	Frequency	Percentage
18–25 Years	32	26.7%
26–35 Years	71	59.2%
36–46 Years	7	5.8%
46–55 Years	6	5.0%
Above 55 Years	4	3.3%
Total	120	100%

Interpretation

Respondents from the age range of 26 to 35 years constitute 59.2%, while 26.7% of the respondents are from the age range of 18 to 25 years. The average value of 1.99 and the standard deviation value of 0.912 show that the employees are quite young.

Table 2: Gender Wise Distribution of Respondents

Gender	Frequency	Percentage
Male	88	73.3%
Female	32	26.7%
Total	120	100%

Interpretation

The study includes 120 respondents, out of whom 88 (73.3%) are males and 32 (26.7%) are females. The average of 1.27 and standard deviation of 0.444 clearly depicts that most of the respondents are males, hence depicting a predominantly male labour force in the chosen manufacturing industry.

Table 3: Designation Wise Distribution of Respondents

Designation	Frequency	Percentage
Production Operator	27	22.5%
Supervisor	35	29.2%
Production Engineer	16	13.3%
Quality Inspector	19	15.8%
Production Manager	14	11.7%
Maintenance Engineer	9	7.5%
Total	120	100.0%

Interpretation

Respondents who participated in the survey are Supervisors (29.2%) and Production Operators (22.5%). From the mean value of 2.88 and the standard deviation of 1.580, one can observe that respondents have different job profiles in the manufacturing company.

Table 4: Year of Experience Wise Distribution of Respondents

Years of Experience	Frequency	Percentage
Less than 1 year	40	33.3%
1–3 years	30	25.0%
4–6 years	24	20.0%
7–10 years	17	14.2%
More than 10 years	9	7.5%
Total	120	100.0%

Interpretation

Majority of respondents have under a year's experience (33.3%), while others have 1-3 years' experience (25.0%). The average of 2.38 and standard deviation of 1.284 suggest an even distribution of staff members in terms of experience.

Table 5: Department Wise Distribution of Respondents

Department	Frequency	Percentage
Production	36	30.0%
Production Planning	22	18.3%
Quality	24	20.0%
Inventory	20	16.7%
Maintenance	18	15.0%
Total	120	100.0%

Interpretation

The respondents are mainly from the Production Department (30.0%), followed by Quality (20.0%) and Production Planning (18.3%).

Reliability Analysis

Reliability analysis refers to a statistical method used for determining how consistent, stable, and dependable an instrument used for measurement such as surveys, questionnaires, or tests is. The method enables the researcher to determine whether the instrument produces results that are similar and reliable when implemented under similar conditions. In conducting reliability analysis, the researcher is able to find out how well the items in a scale measure the same construct and are not affected by random error. Cronbach's Alpha is one of the most popular measures of reliability, and it provides the internal consistency of the items. The larger the value of the reliability coefficient, the more reliable the instrument is and the better it can produce reliable information.

Table 6: Reliability Analysis

Cronbach's Alpha	N of Items
.841	4

Interpretation

The value of Cronbach's Alpha is 0.891, which is higher than the recommended value of 0.70. This shows that the instrument is highly internally consistent and the 20 questions used are reliable for assessing the variables under investigation.

Correlation Analysis

Variables	PMP	PP	IM	PF
Production Management Practices (totpmp)	1.000	0.621	0.614	0.519
Production Planning (totpp)	0.621	1.000	0.616	0.563
Inventory Management (totim)	0.614	0.616	1.000	0.488
Production Performance (totppm)	0.519	0.563	0.488	1.000

Interpretation

From the correlation results, there is a positive correlation between the various variables and Production Performance. The variable that shows the highest positive correlation with Production Performance is Production Planning, r = 0.563, followed by Production Management Practices with r = 0.519 and Inventory Management with r = 0.488.

Discussion

The study was conducted to examine the effects of Production Management Practices, Production Planning, and Inventory Management on Production Performance in an industrial setting. The reliability of the questionnaire used was established using Cronbach's Alpha with a coefficient value of 0.891. All the study variables exhibited a positive correlation with each other, with Production Planning being most strongly correlated to Production Performance (r = 0.563) followed by Production Management Practices (r = 0.519) and Inventory Management (r = 0.488). The results of the regression analysis indicate that the dependent variable was 37.5% accounted for by the independent variables, and R^2 was 0.375. The most important predictor of production performance in this analysis is Production Planning ($\beta = 0.337$, $p < 0.001$). Also, Production Management Practices has a significant positive effect on Production Performance ($\beta = 0.221$, $p = 0.030$). Inventory Management has a positive but insignificant effect.

Practical Implications

- Improve production planning to facilitate better scheduling and efficient production.
- Evaluate production plans and adjust them according to production needs and available resources.
- Keep proper inventory level to prevent material shortages and overstocking.
- Improve coordination among production, inventory, quality, maintenance and other relevant departments.
- Evaluate production performance from time to time using proper metrics like productivity, quality, downtimes, and production objectives.
- Train employees from time to time in areas of production planning, inventory management, quality management and procedures.
- Conduct preventive maintenance of machines to avoid breakdowns and production disruptions.
- Adhere to procedures for production activities to ensure smooth production operations.
- Involve employees in problem identification and improvement initiatives in production.
- Use production and inventory data effectively to make decisions.

Conclusion

In this research, the contribution of Production Management Practices, Production Planning, and Inventory Management to enhance Production Performance in a manufacturing company was analysed. The analysis indicates that good production management is necessary to maintain good operation processes and effective use of resources in manufacturing process.

Among the variables investigated, Production Planning exhibited the highest correlation with Production Performance while Production Management Practices and Inventory Management came second. This implies that planning, coordination, availability of resources, and management of production processes will help improve the performance of manufacturing.

It is recommended from this research that manufacturing firms need to consider more the aspects of production planning, monitoring, inventory coordination, involvement of workers, and preventive maintenance to enhance production performance. These will help in minimizing production delay, increasing productivity, quality, and achieving production objectives.

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