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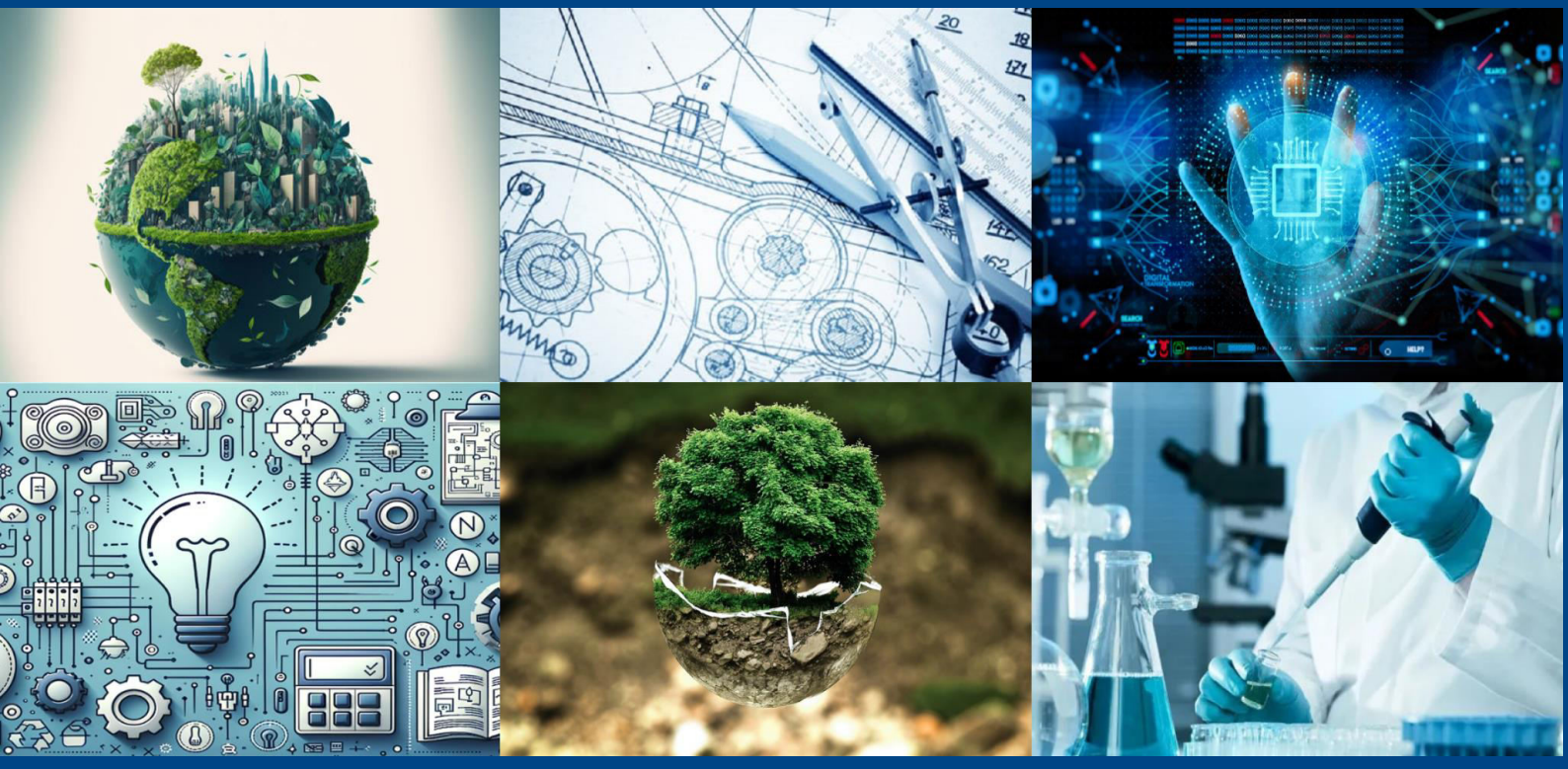

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A Study on Production Planning and Control in Manufacturing Companies at Chhatrapati Sambhajinagar

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ABSTRACT: Production Planning and Control (PPC) is one of the most important functions in manufacturing industries because it helps organisations maintain proper coordination between production activities, inventory systems, machine utilisation, manpower allocation, and workflow management. Ineffective production planning often results in delays, excess inventory, workflow interruptions, increased operational cost, low machine productivity, and customer dissatisfaction. This research study analyses the impact of PPC functions such as production scheduling, routing, dispatching, inventory management, capacity planning, and quality control on operational efficiency in manufacturing companies. The study uses a descriptive and applied research methodology with a case study approach conducted in a manufacturing company located in MIDC Waluj, Chhatrapati Sambhajinagar. The findings reveal that structured PPC implementation significantly improved production efficiency, workflow coordination, inventory accuracy, machine utilisation, and delivery performance while reducing operational delays, production losses, and workflow interruptions. The study also validates the effectiveness of the Production Planning and Control Integration Framework (PPCIF) in improving manufacturing performance and operational coordination.

KEYWORDS: Production Planning and Control, Production Efficiency, Inventory Management, Workflow Coordination, Production Scheduling

I. INTRODUCTION

Production Planning and Control (PPC) is a systematic approach used by manufacturing industries to manage production activities efficiently and effectively. It involves planning production schedules, allocating resources, controlling workflow, managing inventory, coordinating manpower, and ensuring timely delivery of finished products. In modern manufacturing environments, PPC has become an essential operational management function because industries are facing increasing competition, changing customer expectations, rising production costs, and demand for high-quality products.

In many manufacturing organisations, production activities are not properly coordinated due to weak production planning systems and poor communication between departments. This creates operational problems such as machine idle time, excess inventory accumulation, delayed production schedules, workflow interruptions, material shortages, production bottlenecks, and increased operational expenditure. These problems negatively affect organisational productivity and customer satisfaction.

Production Planning and Control provides a structured framework for integrating production scheduling, routing, dispatching, inventory control, quality management, and workflow monitoring activities. Effective PPC systems help organisations improve resource utilisation, minimise wastage, reduce production lead time, and increase operational transparency.

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The Indian manufacturing sector is experiencing rapid industrial growth, especially in regions such as Chhatrapati Sambhajinagar, where automotive, engineering, pharmaceutical, and component manufacturing industries are expanding continuously. Manufacturing companies are increasingly adopting ERP systems, digital workflow management systems, and structured production planning practices to improve operational efficiency and maintain global quality standards.

This study focuses on analysing the application of Production Planning and Control systems in manufacturing industries and evaluates their contribution toward improving production efficiency and operational coordination. The study also validates the Production Planning and Control Integration Framework (PPCIF) through a practical case study conducted in a manufacturing company located in MIDC Waluj, Chhatrapati Sambhajinagar.

II. LITERATURE SURVEY

Taylor (1911) introduced the principles of scientific management and explained that systematic planning and workflow standardisation improve production efficiency and organisational productivity. Taylor emphasised the importance of proper scheduling, work measurement, and operational coordination in industrial management systems.

Henry Fayol (1916) explained that planning, organising, directing, coordinating, and controlling are essential managerial functions that improve industrial performance. Fayol stated that effective coordination between departments reduces operational confusion and increases workflow efficiency.

Buffa (1956) conducted extensive research on production management systems and found that organisations using structured production planning methods reported better manufacturing efficiency, improved inventory management, and reduced operational wastage. However, Buffa also identified poor coordination between production planning and shop floor operations as a major challenge in many industries.

The APICS Framework (2010) established forecasting, scheduling, routing, dispatching, inventory management, and production control as the major functions of Production Planning and Control systems. According to APICS, effective production planning systems improve workflow balance, reduce machine idle time, minimise inventory shortages, and improve delivery reliability.

Chary (2004) studied the application of Production Planning and Control systems in manufacturing industries and concluded that structured production scheduling and workflow coordination significantly reduce operational delays and improve shop floor efficiency.

Stevenson (2007) analysed production management practices across various industries and found that production scheduling and inventory management have a strong positive relationship with manufacturing productivity and product quality.

Sharma and Aggarwal (2012) studied PPC implementation in Indian SMEs and reported production efficiency improvements ranging between 18% and 30% after the adoption of structured PPC systems. They also found that long-term operational improvement requires continuous coordination between planning departments and production operations.

Kumar, Singh, and Verma (2015) highlighted the importance of workflow monitoring, inventory coordination, and production scheduling in reducing operational bottlenecks and improving manufacturing productivity. Their research also emphasised the importance of employee involvement in maintaining production efficiency.

The literature clearly indicates that Production Planning and Control systems are essential for improving production efficiency, reducing operational losses, maintaining inventory accuracy, improving workflow coordination, and enhancing overall organisational productivity in manufacturing industries.

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III. METHODOLOGY / APPROACH

The study adopts a descriptive and applied research design using both quantitative and qualitative research methods. A manufacturing company located in MIDC Waluj, Chhatrapati Sambhajinagar, was selected as the case study organisation for analysing the implementation and effectiveness of Production Planning and Control systems.

Data Collection
Primary Data
Primary data were collected through:

- Semi-structured interviews with production managers, supervisors, machine operators, and quality executives
- Direct observation of workflow coordination and production planning activities
- Structured questionnaires distributed among technical employees

Secondary Data
Secondary data were collected from:

- ERP reports
- Production records
- Inventory management reports
- Production scheduling documents
- Machine utilisation reports
- Operational performance reports

PPCIF Implementation Phases
Phase 1 – Assess

- Analysis of production efficiency baseline
- Workflow evaluation
- Inventory management assessment
- Identification of operational bottlenecks

Phase 2 – Stabilise

- Implementation of structured production scheduling
- Inventory monitoring systems
- Workflow coordination standards
- Employee training programmes

Phase 3 – Improve

- Quality control implementation
- Statistical Process Control (SPC)
- ERP integration with inventory management
- Workflow performance monitoring

Phase 4 – Sustain

- Continuous operational monitoring
- Digital production dashboards
- Performance review systems
- Continuous employee development programmes

Performance Metrics Used
The following performance indicators were used:

- Production Efficiency Ratio (PER)
- Inventory Accuracy Rate
- Machine Utilisation Rate
- Production Lead Time

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- Order Fulfilment Compliance Rate
- Workflow Interruption Frequency
- Production-Operations Performance Index (POPI)

IV. RESULTS & DISCUSSION

The implementation of PPCIF produced major improvements in production efficiency and operational coordination across the manufacturing organisation.

Table: Pre- and Post-Implementation Performance Metrics

Performance Metric	Before PPCIF	After PPCIF	Improvement
Production Efficiency Ratio	54%	83%	▲53.7%
Inventory Accuracy Rate	66%	94%	▲42.4%
Machine Utilisation Rate	38 hrs	84 hrs	▲121.0%
Production Lead Time	4.5 days	1.9 days	▼57.8%
Unplanned Production Delays	17.8 hrs/week	6.4 hrs/week	▼64.0%
Order Fulfilment Compliance	59%	97%	▲64.4%
Workflow Interruptions	10 per quarter	3 per quarter	▼70.0%
Planned Production Compliance	56%	92%	▲64.3%
Rework Rate	5.1%	1.3%	▼74.5%

The findings indicate that structured Production Planning and Control systems significantly improve operational performance and workflow management. The integration of inventory management with ERP systems reduced material shortages and improved inventory accuracy. Structured production scheduling reduced machine idle time and improved production coordination across departments.

The machine utilisation rate improved from 38 operational hours to 84 operational hours due to effective scheduling and workflow balancing. Production lead time reduced from 4.5 days to 1.9 days because of better coordination between production planning and inventory systems.

Workflow interruptions and production delays were also reduced significantly after implementing structured PPC practices. These findings support the research conducted by Stevenson (2007), Sharma and Aggarwal (2012), and Chary (2004), which also concluded that structured production planning improves manufacturing productivity and workflow coordination.

The study further revealed that employee training and operational awareness programmes played a significant role in maintaining workflow discipline and improving production coordination at the shop floor level.

V. CONCLUSION

Production Planning and Control is an essential operational management function that helps manufacturing organisations improve production efficiency, workflow coordination, inventory accuracy, machine utilisation, and delivery performance. The study concludes that structured PPC systems significantly reduce operational delays, workflow interruptions, production losses, and inventory-related problems in manufacturing environments.

The implementation of the Production Planning and Control Integration Framework (PPCIF) in the selected manufacturing company produced substantial improvements in operational performance and organisational productivity. ERP integration, workflow coordination systems, inventory management practices, production scheduling, and quality control activities collectively contributed to improved manufacturing performance.

The research highlights that successful PPC implementation requires continuous operational monitoring, employee involvement, effective communication between departments, and strong management commitment. Manufacturing

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industries adopting integrated Production Planning and Control systems can achieve long-term operational excellence, reduced operational cost, improved production quality, and enhanced customer satisfaction.

The study also suggests that future manufacturing organisations should integrate Industry 4.0 technologies, digital production monitoring systems, and AI-based forecasting tools with Production Planning and Control systems to achieve sustainable industrial growth and smart manufacturing excellence.

REFERENCES

1. Taylor, F. W. (1911). *The Principles of Scientific Management.* Harper & Brothers, New York.
2. Fayol, H. (1916). *General and Industrial Management.* Pitman Publishing, London.
3. Buffa, E. S. (1956). *Modern Production Management.* John Wiley & Sons, New York.
4. APICS. (2010). *Production and Inventory Management Framework.* APICS Publications, Chicago.
5. Chary, S. N. (2004). *Production and Operations Management.* Tata McGraw-Hill Publishing Company, New Delhi.
6. Stevenson, W. J. (2007). *Operations Management (9th ed.).* McGraw-Hill/Irwin, New York.
7. Sharma, V., & Aggarwal, S. (2012). "Production Planning and Control Implementation in Indian SMEs." *International Journal of Engineering Research and Applications,* 2(3), 1254–1261.
8. Kumar, R., Singh, P., & Verma, A. (2015). "Impact of Production Scheduling on Manufacturing Performance in Indian Industries." *International Journal of Production Research,* 53(7), 2145–2158.
9. Heizer, J., & Render, B. (2011). *Operations Management.* Pearson Education, New Jersey.
10. Slack, N., Chambers, S., & Johnston, R. (2010). *Operations Management.* Pearson Education, London.

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