

The Impact of Production Planning On Reducing Waste in the Pharmaceutical Field

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Introduction:

Production planning is an essential factor in the success of pharmaceutical companies, as it helps organize operations and use resources efficiently.

This sector often faces the problem of waste, such as damaged raw materials, overproduction and time loss which leads to higher cost.

Therefore, companies focus on effective production planning to reduce waste, improve operational efficiency and ensure the continuous availability of medications.

This research aims to explain the role of production planning in reducing waste within the pharmaceutical field.

Research Problem:

Some pharmaceutical companies experience waste in materials and cost due to weak production planning, which negatively affects work efficiency and may lead to financial losses.

From here the question comes of how can pharmaceutical companies improve production planning to reduce the waste.

Importance of the Research:

- helps reduce costs and improve production efficiency.
- supports better organization of operations in pharmaceutical companies.
- adds academic value that can support future studies.
- contributes to minimizing waste and ensuring medicine availability.

Research Questions:

- What is production planning?
- What causes waste in pharmaceutical companies?
- How does production planning reduce waste?

. Dose production planning improves efficiency.

Research Objectives:

- . To explain production planning in the pharmaceutical field.
- . To identify causes of waste.
- . To explain how production planning reduces waste.
- . To study relationship between planning and efficiency.

Research Hypotheses:

- . There is relationship between production planning and waste reduction
- . Good production planning improves efficiency
- . Poor production planning increases waste

Research Model:



Suggested Organization:

The study can be applied at king fahad specialist hospital-Dammam in supply chains department to see how planning affects waste in materials, time and costs.

Research Methodology:

This research uses a descriptive method by collecting information from Arabic references about Production planning and waste then analyzing them.

Project Structure:

Introduction

Theoretical framework

Suggested study

Results and Recommendations

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Literature Review:

Production planning is important in all industries, especially in the pharmaceutical industry, it helps companies organize production and use resources better, which reduces mistakes and cost.

Many studies show that good production planning helps reduce waste, Heizer et al. (2020) explained that planning helps control production and reduce unnecessary costs.

In the pharmaceutical industry, waste is a big problem because the expiration and overproduction, shah (2024) mentioned that poor forecasting and extra production lead to waste.

Also, good planning helps match production with demand, which reduces extra inventory and waste (Slack & Brandon-Jones, 2019) .

In conclusion, production planning has an important role in reducing waste in pharmaceutical companies.

References:

- 1- Shaarawy,
- 2- Arab institute for operations management
- 3- Al-marsal website
- 4- The role of lean production in achieving sustainable
- 5- Heizer, j render, B&Munson , C (2020) . Operations Management pearson
- 6- Shah,N&Brandon – Jones, A (2019) operation management pearson

Questionnaire Appendix for Research Variables:

Section A: Demographic information

1- Gender

Male
Female

2- Age

under 30 years
30-40 years
41-50 years
Above 50 years

3- Years of experience

Less than 5 years
5-10 years
More than 10 years

Section B: Production Planning

Please indicate your level of agreement with the following statements:

Statement	Strongly Agree	Agree	Neutral	Disagree
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The company relies
On demand forecasting when
preparing production plane

Production schedules are clearly
developed and regularly update

Inventory level are effectively
planned and controlled

There is effective coordination
among departments during
production planning

Accurate data are used to support
production planning decisions

Section C : Waste Reduction

Statement	Strongly Agree	Agree	Neutral	Disagree
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Production planning helps
Reduce raw materials waste

Improved planning has
reduced the number of
defective products

Production planning helps
minimize losses due to
product expiration

Effective planning improves
the efficient utilization of
resources

Production planning contributes
to reducing waste-related costs

Research Methodology

Introduction:

This chapter explains the research methodology used to study the impact of production planning on reducing waste in the pharmaceutical industry. It describes the research design, population, sampling method, data collection, data types and statistical analysis .

Operational Definitions of Research Variables;

Production planning :

Production planning is the process of organising production activities , resources and schedules to ensure products are produced efficiently and on time .

Waste Reduction :

Waste reduction refers to minimising the loss of materials, time and costs during the production process to improve efficiency .

Research Design

This study uses a descriptive analytical research design because it is suitable for examining the relationship between production planning and waste reduction in the pharmaceutical industry .

Research Population and Sampling Method :

The research population consists of employees working in pharmaceutical , a simple random sampling method is used to select participants for the study .

Data Collection Method :

The data will collected using a questionnaire

The questionnaire includes question related to production planning and waste reduction .

Types Of Data :

Data collected through the questionnaire

Statistical Analysis Procedure :

The collected data will be analysed using google form, the study will use frequencies , percentages, means, standard deviations and correlation analysis to examine the relationship between the research variables .

<https://docs.google.com/forms/d/1WKE33A1mS7mZZB8lqdluGYF6euemldsDr6xNBsNaNAho/edit#responses>

Description of the Study Sample

The study sample consisted of 38 respondents . the demographic characteristics of the participants are presented as follows

Gender

Female 71.1%

Male 28.9%

Age

under 30 years 5.3%

30-40 years 73.7%

41-50 years 13.2%

Above 50 years 7.9%

Years of experience

Less than 5 years 23.7%

5-10 years 31.6%

More than 10 years 44.7%

Interpretation of the Sample Characteristics

The results indicate that the majority of the respondents were female (71.1%) , while 28.9% were male . most participants (73.7%) were between 30 and 40 years old indicating that the sample mainly consisted of professional in their active working years , regarding work experience 44.7% had more than 10 years of experience , suggesting that a significant proportion of respondents possessed substantial professional

Knowledge and experience. this enhances the credibility of the finding and provides reliable insights into the impact of production planning on reducing waste in the pharmaceutical sector.

Discussion of the Questionnaire Results

1. The company relies on demand forecasting when preparing production plans.

The results indicate that the majority of respondents agreed that demand forecasting is an essential component of production planning. This suggests that pharmaceutical companies recognize the importance of forecasting customer demand to improve planning accuracy and reduce production waste.

2. Production schedules are clearly developed and regularly updated.

Most respondents agreed that production schedules are regularly updated, indicating that organizations continuously review and improve their production planning processes to enhance operational efficiency.

3. There is effective coordination among departments during production planning.

The findings show that respondents generally agreed that effective coordination exists among departments. This coordination contributes to smoother production processes and helps minimize operational waste.

4. Accurate data are used to support production planning decisions.

The majority of respondents agreed that production planning decisions are based on accurate and reliable data, which improves planning quality and supports waste reduction.

5. Production planning helps reduce raw material waste.

The findings demonstrate that respondents believe effective production planning contributes to minimizing raw material waste by improving resource utilization.

6. Production planning helps minimize losses due to product expiration.

Most respondents agreed that proper production planning reduces losses resulting from expired pharmaceutical products by aligning production volumes with actual demand.

7. Improved planning has reduced the number of defective products.

The results indicate that respondents believe improved production planning has contributed to reducing defective products, thereby improving product quality and reducing waste.

8. Effective planning improves the efficient utilization of resources.

The majority of respondents agreed that effective production planning enhances the efficient use of organizational resources, leading to improved productivity and reduced waste.

9. Production planning contributes to reducing waste-related costs.

The findings reveal that most respondents agreed that effective production planning reduces costs associated with production waste, thereby improving overall organizational performance.

Overall Discussion

Overall, the questionnaire results demonstrate a positive perception of production planning practices among the respondents. The majority agreed that effective production planning improves resource utilization, enhances coordination, reduces raw material waste, minimizes losses due to product expiration, lowers the number of defective products, and decreases waste-related costs. These findings support the study's main hypothesis that effective production planning has a significant positive impact on reducing waste in the pharmaceutical sector.

Abstract

This study investigates the impact of production planning on reducing waste in the pharmaceutical field. Production planning is considered an important managerial function in pharmaceutical organizations because it helps coordinate production

activities, manage resources, forecast demand, and ensure the availability of materials at the appropriate time. Effective production planning can contribute to reducing different types of waste, including raw-material waste, product expiration, defective products, and inefficient utilization of resources.

The study adopted a quantitative research approach using a structured questionnaire based on a five-point Likert scale. The questionnaire was distributed among employees and personnel related to production, planning, inventory, and quality activities in the pharmaceutical field. A total of 38 valid responses were collected and analyzed. The findings indicated generally positive perceptions regarding the role of production planning in waste reduction. Respondents agreed that accurate demand forecasting, regular production schedule updates, coordination between departments, and the use of accurate production data contribute to improving production efficiency and reducing waste. The findings also indicated that effective production planning can help reduce raw-material waste, product expiration losses, defective products, and unnecessary resource utilization.

Overall, the study concludes that production planning has an important role in reducing waste in the pharmaceutical field. Improving forecasting, coordination, scheduling, inventory management, and the continuous monitoring of production activities can enhance operational efficiency and contribute to sustainable pharmaceutical production.

Keywords: Production Planning, Waste Reduction, Pharmaceutical Industry, Inventory Management, Production Scheduling, Operational Efficiency.

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CHAPTER FIVE: RESEARCH LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

This chapter presents the main conclusions of the study based on the findings discussed in Chapter Four. It also identifies the limitations encountered during the research and provides recommendations that may help pharmaceutical organizations improve their production planning practices and reduce waste. Finally, suggestions for future research are presented.

5.2 Research Limitations

Although the study provides useful insights into the relationship between production planning and waste reduction in the pharmaceutical field, several limitations should be considered.

First, the study was conducted using a relatively small sample of 38 respondents. Therefore, the findings may not fully represent all employees and organizations within the pharmaceutical industry.

Second, the study relied mainly on questionnaire responses. The information provided by respondents reflects their perceptions and experiences and may therefore be influenced by personal opinions or differences in understanding.

Third, the study focused on production planning and waste reduction within the pharmaceutical field. Other factors that may influence waste, such as equipment conditions, supplier performance, regulatory requirements, production technology, and organizational culture, were not examined in depth.

Fourth, the study was conducted within a specific research period. Changes in production systems, technologies, market demand, and organizational practices over time may influence the relationship between production planning and waste reduction.

Finally, the study focused primarily on the respondents' perceptions rather than measuring the actual financial or quantitative amount of waste before and after implementing production-planning practices.

5.3 Recommendations

Based on the findings of the study, the following recommendations are proposed:

Improve demand forecasting: Pharmaceutical organizations should strengthen demand forecasting techniques to ensure that production quantities are aligned with actual market requirements.

Improve production scheduling: Production schedules should be regularly reviewed and updated according to changes in demand, inventory levels, and production capacity.

Strengthen coordination between departments: Effective communication between production, purchasing, inventory, quality, and other relevant departments should be maintained to minimize delays, duplication, and unnecessary waste.

Improve inventory management: Organizations should monitor inventory levels carefully and apply appropriate inventory-management practices to reduce excess stock and the risk of product expiration.

Use accurate and timely data: Production decisions should be based on reliable and updated information regarding demand, inventory, capacity, materials, and production performance.

Monitor waste continuously: Pharmaceutical organizations should establish regular waste-monitoring procedures and identify the main causes of raw-material waste, defective products, expired products, and inefficient resource utilization.

Invest in employee training: Employees involved in production planning and inventory management should receive appropriate training in forecasting, scheduling, inventory control, and waste-reduction practices.

Use technology to support planning: Organizations should consider using appropriate digital systems to improve production planning, inventory visibility, demand forecasting, and communication between departments.

Develop performance indicators: Pharmaceutical organizations should establish measurable indicators related to waste levels, expired products, defective products, inventory turnover, and resource utilization to evaluate the effectiveness of production-planning practices.

5.4 Conclusion

The purpose of this study was to examine the impact of production planning on reducing waste in the pharmaceutical field. Based on the findings, production planning plays an important role in improving operational efficiency and reducing different forms of waste.

The results showed generally positive responses toward the importance of demand forecasting, production scheduling, coordination between departments, and the use of accurate production information. The findings also indicated that effective production planning can contribute to reducing raw-material waste, product expiration losses, defective products, inefficient resource utilization, and waste-related costs.

Therefore, the study supports the view that effective production planning can contribute significantly to waste reduction in pharmaceutical organizations. Proper forecasting, scheduling, inventory management, coordination, and continuous monitoring can help organizations use their resources more efficiently while reducing unnecessary losses.

In conclusion, pharmaceutical organizations should treat production planning as an important strategic and operational activity rather than simply a scheduling function. Improving production-planning practices can support cost reduction, operational efficiency, resource optimization, and more sustainable pharmaceutical production.

5.5 Suggestions for Future Research

Future studies could use a larger sample size involving several pharmaceutical organizations to improve the generalizability of the findings. Future researchers could also use interviews, observations, and actual production and waste records in addition to questionnaires. Furthermore, future research could examine the financial impact of waste reduction and investigate the role of technologies such as Enterprise Resource Planning , automated inventory systems, and advanced forecasting tools in improving pharmaceutical production planning