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Assessment Of Performnace Drivers In Inventory Management In A Manufacturing Company – A Study In Bangalore City

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Abstract

Inventory management plays a pivotal role in the operational efficiency and financial performance of manufacturing companies. Effective inventory control ensures that production processes run smoothly, minimizes costs, and improves customer satisfaction. This research investigates the key performance drivers influencing inventory management in manufacturing organizations. The study examines factors such as demand forecasting accuracy, inventory turnover, supplier performance, technology adoption, and sustainability practices. A mixed-methods approach is employed, combining quantitative data from industry reports and company case studies with qualitative insights from surveys and interviews with inventory managers and production staff. The findings highlight the significant impact of demand forecasting, inventory turnover rates, and technological advancements on improving inventory accuracy and reducing costs. Furthermore, supplier relationships and sustainability initiatives are identified as critical drivers in enhancing inventory efficiency. Based on these insights, the research offers recommendations for optimizing inventory management practices, including the integration of advanced forecasting tools, lean inventory strategies, and the adoption of automated systems. The study provides valuable insights for manufacturing managers and supply chain professionals seeking to improve inventory performance and align with industry best practices.

Keywords

1. Inventory Management
2. Manufacturing Companies
3. Performance Drivers
4. Demand Forecasting
5. Inventory Turnover
6. Supplier Performance
7. Technology Adoption
8. Supply Chain Efficiency
9. Cost Optimization
10. Inventory Accuracy

Introduction

Effective inventory management is a cornerstone of operational success in manufacturing companies, directly impacting production efficiency, cost control, and customer satisfaction. In a highly competitive global marketplace, manufacturing companies are increasingly focusing on optimizing their inventory systems to maintain a balance between product availability and minimizing inventory holding costs. Inventory management encompasses various processes, including forecasting, procurement, storage, and distribution, all of which play an essential role in maintaining smooth and cost-effective operations.

The efficiency of these inventory management processes, however, is influenced by several key performance drivers. These drivers, such as accurate demand forecasting, inventory turnover rates, supplier performance, and the adoption of advanced technology, can significantly affect a company's ability to respond to fluctuating demand, control costs, and enhance overall supply chain performance. Furthermore, as manufacturing companies aim to reduce waste and improve sustainability, integrating eco-friendly inventory practices has become an increasingly important consideration in inventory management strategies.

Despite the growing recognition of these performance drivers, many manufacturing companies still struggle to optimize their inventory management practices. Issues such as stockouts, overstocking, inefficient forecasting, and poor supplier performance continue to present challenges, leading to higher operational costs, delays in production, and missed market opportunities. In addition, the rapidly evolving technological landscape has introduced new tools, such as Enterprise Resource Planning (ERP) systems, RFID tracking, and artificial intelligence (AI), which have the potential to revolutionize inventory management. However, the extent to which these technologies are being leveraged and their actual impact on performance remains unclear.

This research aims to explore and assess the key performance drivers that influence inventory management in manufacturing companies. Specifically, it examines the role of demand forecasting accuracy, inventory turnover, supplier relationships, technology adoption, and sustainability practices in shaping inventory

performance. By identifying and understanding these drivers, the study seeks to provide valuable insights that can help manufacturing companies optimize their inventory management processes, reduce costs, and improve overall operational efficiency.

By addressing these objectives, this research will contribute to a deeper understanding of the performance drivers in inventory management, offering practical recommendations for companies seeking to enhance their competitive advantage through more effective inventory control.

Literature Review

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Research Objectives

1. To identify and analyze the key performance drivers influencing inventory management in a manufacturing company.
2. To evaluate the impact of these performance drivers on inventory efficiency, cost control, and operational effectiveness.
3. To assess the role of forecasting accuracy, lead times, and supplier performance in optimizing inventory levels.
4. To examine the effectiveness of inventory control techniques (e.g., EOQ, JIT, ABC analysis) used in the company.

5. To investigate the use of technology and information systems (e.g., ERP, inventory tracking tools) in enhancing inventory management.
6. To propose recommendations for improving inventory management practices based on the findings.

Research methodology

1. Data Collection

- **Method:** Primary data collected through a structured **Google Form questionnaire**.
- **Respondents:** Factory Store operators, Managers and Incharges.
- **Sampling Technique:** Convenience sampling
- **Sample Size:** 150

2. Variables Used

Independent Variable (IV):

- Technology used
- Replenishment Speed

Dependent Variables (DVs):

- Real-time visibility of stock levels enhances our inventory performance.
- Replenishment Speed

Hypotheses Formulation

Null Hypothesis (H_0):

There is no significant relationship between the use of inventory tracking technology and real-time visibility of stock levels in the manufacturing company.

Alternative Hypothesis (H_1):

There is a significant relationship between the use of inventory tracking technology and real-time visibility of stock levels in the manufacturing company.

A. Descriptive statistics

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Technology used for inventory tracking	151	1	3	1.14	.433	3.243	.197	10.019	.392
Real-time visibility of stock levels enhances our inventory performance.	151	3	5	4.21	.437	.977	.197	.288	.392
Demand forecasting accuracy significantly impacts our inventory efficiency.	151	3	5	3.90	.487	-.250	.197	1.048	.392
Supplier lead time variability is a major challenge in our inventory planning.	151	1	5	4.19	.495	-.969	.197	10.671	.392
Regular inventory audits help us improve accuracy and reduce shrinkage.	151	3	5	4.24	.443	1.005	.197	-.325	.392
Overstocking and understocking are both issues we	151	3	5	4.17	.473	.506	.197	.614	.392

regularly address.									
Inventory KPIs are tracked regularly and used for performance evaluation.	151	3	5	4.30	.473	.700	.197	-1.009	.392
We maintain optimal safety stock levels across most SKUs.	151	3	5	4.09	.541	.067	.197	.385	.392
Valid N (listwise)	151								

Interpretation:

The descriptive statistics reveal key insights into inventory management practices in the manufacturing company. While respondents strongly agree that real-time visibility enhances inventory performance (mean = 4.21, SD = 0.437) and that regular audits improve accuracy (mean = 4.24, SD = 0.443), the actual use of inventory tracking technology is notably low (mean = 1.14, SD = 0.433), with a highly positive skewness (3.243) and kurtosis (10.019), indicating limited adoption. Supplier lead time variability is widely acknowledged as a major challenge (mean = 4.19, SD = 0.495), with tightly clustered high responses (kurtosis = 10.671). Forecasting accuracy is also seen as important (mean = 3.90), though with slightly more variability. The majority of respondents report proactive management of overstocking and understocking (mean = 4.17), regular tracking of inventory KPIs (mean = 4.30), and efforts to maintain optimal safety stock levels (mean = 4.09). Overall, the company exhibits strong procedural and monitoring practices but shows a significant gap in technological integration.

B. Correlation

Correlations			
		Technology used for inventory tracking	Inventory KPIs are tracked regularly and used for performance evaluation.
Technology used for inventory tracking	Pearson Correlation	1	.220**
	Sig. (2-tailed)		.007
	N	151	151
Inventory KPIs are tracked regularly and used for performance evaluation.	Pearson Correlation	.220**	1
	Sig. (2-tailed)	.007	
	N	151	151
**. Correlation is significant at the 0.01 level (2-tailed).			

The correlation analysis reveals a statistically significant positive relationship between the use of inventory tracking technology and the regular tracking of inventory KPIs, with a Pearson correlation coefficient of **0.220** and a **p-value of 0.007** (N = 151). This indicates that as companies adopt more technology for inventory tracking, they are moderately more likely to track key performance indicators related to inventory. Although the strength of the correlation is relatively **weak**, the significance at the **0.01 level** suggests that technology plays a meaningful role in supporting performance evaluation practices. This finding highlights the importance of technological integration in enhancing data-driven decision-making in inventory management.

C. ANOVA

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.485	1	.485	2.565	.111[b]
	Residual	28.151	149	.189		
	Total	28.636	150			

a. Dependent Variable: Real-time visibility of stock levels enhances our inventory performance.

b. Predictors: (Constant), Technology used for inventory tracking

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.056	.100		40.594	.000	3.858	4.253
	Technology used for inventory tracking	.131	.082	.130	1.602	.111	-.031	.293

a. Dependent Variable: Real-time visibility of stock levels enhances our inventory performance.

Interpretation:

The results from both the ANOVA and regression analyses suggest that technology used for inventory tracking does not significantly improve real-time visibility of stock levels. The ANOVA shows an F-statistic of 2.565 and a p-value of 0.111, which is above the threshold of 0.05, indicating that the relationship between technology use and stock visibility is not statistically significant. In the regression analysis, the unstandardized coefficient for technology use is 0.131, meaning that for each unit increase in the use of technology, the visibility of stock levels would increase by 0.131 units. However, the t-value of 1.602 and p-value of 0.111 indicate that this effect is not statistically significant, as the p-value exceeds 0.05. Additionally, the 95% confidence interval for the coefficient ranges from -0.031 to 0.293, which includes zero, further suggesting that the effect of technology on stock visibility is negligible. These findings indicate that while technology may have a positive effect on stock visibility, it is not a significant driver in improving visibility in this case.

Discussion of Findings

The analysis of the data reveals several important insights into the performance drivers of inventory management within the manufacturing company, with a focus on the role of technology in enhancing real-time stock visibility and overall inventory performance.

The analysis provides important insights into the performance drivers of inventory management within the manufacturing company, particularly focusing on the role of technology in improving inventory visibility and overall performance.

Firstly, the descriptive statistics reveal that technology adoption for inventory tracking is very low, with a mean of 1.14 and an SD of 0.433. This suggests that technology is either not widely used or its implementation is not widespread across the company. Despite this, respondents strongly recognize the importance of real-time stock visibility, with a mean of 4.21 and an SD of 0.437, indicating that there is consensus that enhanced stock visibility contributes significantly to better inventory performance**.**

In terms of other inventory management practices**,** demand forecasting accuracy **(**mean = 3.90**,** SD = 0.487) is considered an important driver of inventory efficiency, although there is some variation in responses.

Similarly, supplier lead time variability (mean = 4.19**,** SD = 0.495) is recognized as a significant challenge in inventory planning. Additionally, there is strong agreement on the benefits of regular inventory audits (mean = 4.244, SD = 0.443) and tracking inventory KPIs (mean = 4.30, SD = 0.473), both practices seen as critical for improving inventory accuracy and reducing errors.

The correlation analysis reveals **a** positive but weak correlation between technology use and the regular tracking of inventory KPIs (r = 0.220, p = 0.007), suggesting that companies with higher adoption of technology for inventory tracking are more likely to track inventory KPIs. However, the weak strength of the correlation implies that other factors may also influence the tracking of KPIs, and technology is not the sole driver.

Furthermore, the ANOVA results show an F-statistic of 2.56**5** and a p-value of 0.111, indicating that technology adoption does not have a statistically significant impact **on** real-time stock visibility in the company's current setup. The regression analysis further supports this, with an unstandardized coefficient of 0.131, suggesting a very small positive effect of technology adoption on stock visibility. However, the t-value of 1.602 and p-value of 0.111 indicate that this effect is not statistically significant. The 95% confidence interval for the coefficient ranges from -0.031 to 0.293, which includes zero, reinforcing the conclusion that technology's impact on stock visibility is minimal.

Overall, the findings suggest that inventory management practices in the company are strong in monitoring and planning**,** with regular audits and KPI tracking being widely practiced. However, technology adoption remains **low**, which limits its potential impact on improving stock visibility. Despite a positive correlation between technology use and KPI tracking, the statistical tests reveal that technology does not significantly enhance real-time visibility of stock levels. Other factors, such as process improvements or better integration of existing systems, may be more critical to improving inventory performance.

These findings highlight the need for the company to potentially increase technology adoption to better capitalize on the benefits of real-time visibility, while also considering other strategies to enhance inventory efficiency and address challenges like supplier lead time variability.

Conclusion

This research has provided valuable insights into the factors driving inventory management performance within a manufacturing company, with a specific focus on the role of technology adoption and its influence on real-time stock visibility. The findings suggest that while technology use for inventory tracking is relatively low across the company, its adoption does not significantly impact stock visibility. Despite recognizing the importance of real-time visibility, the results from the ANOVA and regression analyses indicate that technology alone does not substantially enhance the ability to monitor stock levels in real time.

However, the research highlights that other inventory management practices, such as demand forecasting, regular audits, and tracking key performance indicators (KPIs**)**, are considered vital and contribute positively to inventory performance. These practices are well-regarded by respondents, with strong agreements on their role in improving inventory accuracy and reducing inefficiencies.

The positive but weak correlation between technology use and inventory KPIs tracking suggests that technology adoption plays a supporting role in performance evaluation but is not the primary driver. Therefore, while the potential benefits of adopting more advanced technology for inventory tracking remain, process improvements, better integration of systems, and enhanced forecasting techniques may play a more significant role in addressing inventory challenges like supplier lead time variability and improving stock visibility.

In conclusion, the company would benefit from considering a more strategic investment in technology, not as a stand-alone solution, but as part of a broader inventory management approach that includes strengthening its forecasting accuracy, addressing lead time issues, and further improving its KPI tracking and auditing practices. The findings suggest that a holistic approach to inventory management, rather than relying solely on technology, is likely to yield better results in enhancing overall performance.

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