

Effectiveness on Inventory Management System at Kuberan Explosives and Co. at Chennai

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ABSTRACT

Inventory is one of the most valuable assets of an organization and effective inventory management is essential for maintaining operational continuity, controlling costs and satisfying customers. This article presents an empirical study of the inventory management system followed by Kuberan Explosives and Co. The study examines inventory planning, stock control, storage, inventory recording, stock verification, inventory monitoring and the use of inventory management technology. A descriptive research design was adopted and primary data were collected through a structured questionnaire. The study was based on 100 respondents and convenience sampling was used. The questionnaire contained demographic questions and statements measured mainly through a five-point Likert scale. Percentage analysis, descriptive statistics, reliability analysis, chi-square, ANOVA and correlation analysis were used to interpret the responses. The results indicate that respondents generally have a positive perception of the inventory management system, with most mean scores above 3.50. The highest mean score was 3.78 for the statement that the inventory management system reduces delivery delays. Regular stock verification, timely reordering and support for better decision-making also recorded high mean scores. However, the overall effectiveness of the system and control of overstocking received comparatively lower mean scores. Cronbach's Alpha of 0.971 indicates excellent internal consistency of the questionnaire. Correlation results show a significant positive relationship between perceived inventory-management effectiveness and overall satisfaction. The article concludes that strengthening technology, stock verification, forecasting, employee training and internal controls can further improve inventory efficiency.

Keywords: *Inventory Management, Stock Control, Inventory Accuracy, Warehouse Management, Inventory Technology, Operational Efficiency.*

Introduction

Inventory management refers to the systematic planning, purchasing, storing, recording, controlling and monitoring of materials and products. The objective is to maintain the right quantity of inventory at the right time while avoiding unnecessary carrying costs and stock shortages. An effective system supports production, sales, customer service and profitability by ensuring the continuous availability of materials and accurate inventory information.

The importance of inventory management becomes greater in industries handling hazardous materials. Kuberan Explosives and Co. operates in an environment where inventory movements require careful recording, secure storage, continuous monitoring and compliance with applicable safety requirements. Every receipt, storage activity, issue and movement of inventory needs to be controlled to reduce operational and safety risks.

Modern inventory management increasingly uses ERP systems, computerized records, barcode technology, RFID, warehouse management systems and real-time monitoring. These technologies can

reduce manual errors, improve inventory visibility and support faster decision-making. The present article evaluates the existing inventory management practices at Kuberan Explosives and Co. and identifies areas that can be strengthened.

Background and Significance of the Study

Inventory affects the efficiency of purchasing, warehousing, sales, finance and other organizational functions. Overstocking may increase storage and carrying costs, while understocking can cause delays in delivery and loss of business opportunities. Therefore, the central challenge is to maintain an optimum level of inventory that balances availability and cost.

In the explosives industry, inventory control has an additional safety dimension. Materials must be properly stored, accurately documented and monitored. The study report notes that the Petroleum and Explosives Safety Organisation (PESO) regulates important aspects of licensing, storage, transportation, handling and distribution of explosives in India. Accurate inventory documentation therefore contributes not only to operational efficiency but also to accountability and regulatory compliance.

Problem Statement

Organizations may face inventory-related problems such as inaccurate stock records, excess inventory, stock shortages, high carrying costs, warehouse inefficiencies and delays in replenishment. Such issues can reduce productivity, affect customer service and increase financial and operational risks. For Kuberan Explosives and Co., these challenges are particularly important because inventory consists of materials requiring strict control and documentation.

The study therefore addresses the need to evaluate whether the existing inventory management system effectively supports inventory planning, stock control, storage, recording and monitoring. It also seeks to identify comparatively weaker areas and provide practical suggestions for improving inventory accuracy, cost control and operational performance.

Objectives of the Study

- To understand the inventory planning, purchasing, storage and stock-control practices followed by the organization.
- To evaluate the effectiveness of inventory recording, stock verification and inventory monitoring.

Scope of the Study

The study is confined to the inventory management system of Kuberan Explosives and Co. It covers inventory planning, procurement, storage, stock control, inventory recording, warehouse management, replenishment, stock verification and monitoring. The study also considers the importance of inventory accuracy, safety and compliance in an organization dealing with industrial explosives. The findings are specific to the selected organization and study period and should not automatically be generalized to all organizations.

Review of Literature

The literature reviewed in the project indicates that inventory management is closely associated with operational efficiency, cost control, customer satisfaction and supply-chain performance. Earlier studies also emphasize the growing role of digital technologies in improving inventory visibility and decision-making.

- **Munyaka and Yadavalli (2022)**

Munyaka and Yadavalli examined inventory management practices and their impact on organizational performance. Their work emphasized inventory planning, inventory classification, demand forecasting and stock-control techniques. The study concluded that proper inventory management helps organizations maintain material availability while reducing unnecessary inventory costs and improving operational efficiency and customer satisfaction.

- **Madeka et al. (2022)**

Madeka and colleagues studied the application of Artificial Intelligence in inventory management using deep reinforcement learning. The study highlighted the ability of AI-based systems to support inventory decisions under uncertain demand conditions. It reported benefits such as improved forecasting, reduced shortages and lower inventory holding costs.

- **Ria et al. (2023)**

Ria et al. focused on computerized inventory accounting information systems. The study found that digital inventory systems can reduce manual errors, provide real-time information, improve stock monitoring and support managerial decision-making. Computerized inventory management was also associated with better inventory control and financial performance.

- **Farah et al. (2024)**

Farah and colleagues conducted a systematic review of effective inventory management practices. Their findings emphasized real-time inventory monitoring, warehouse automation and digital inventory tracking. Efficient systems were associated with higher productivity, lower inventory carrying costs, reduced wastage and improved supply-chain performance.

- **Grützner et al. (2025)**

Grützner and colleagues proposed a modern inventory-management framework for supply-chain automation. The study highlighted inventory classification, warehouse automation and digital systems as important components of modern inventory control. Automation can improve inventory visibility, reduce stock discrepancies and increase warehouse efficiency.

Research Methodology

- **Research Design**

The study adopted a descriptive research design. This design is appropriate because the purpose is to describe and evaluate the existing inventory management practices without manipulating the organizational environment. It helps understand how inventory planning, stock control, storage, recording and monitoring are performed.

- **Sources of Data**

Both primary and secondary data were used. Primary data were collected from respondents through a structured questionnaire and interaction. Secondary information was obtained from company records, inventory registers, annual reports, books, journals, research articles, websites, government publications and previous studies related to inventory management.

- **Sampling Method**

Convenience sampling, a non-probability sampling technique, was used. Respondents were selected based on accessibility, availability and willingness to participate. The study included respondents associated with inventory, warehouse, purchasing, logistics, sales, accounts and administrative activities.

- **Questionnaire Design**

The questionnaire consisted of 31 questions divided into two sections. Section A contained five demographic questions covering age, gender, department, designation and years of work experience. Section B contained 26 questions relating to inventory planning, stock control, inventory accuracy, purchasing, stock verification, storage, inventory software, satisfaction, operational efficiency and overall effectiveness. Most statements used a five-point Likert scale ranging from Strongly Agree (5) to Strongly Disagree (1).

- **Data Analysis**

The collected responses were classified and analyzed using percentage analysis, descriptive statistics and weighted-average based interpretation. Reliability was tested using Cronbach's Alpha. Chi-square and ANOVA were used to examine differences or associations across respondent groups, while Pearson correlation was used to examine relationships between selected inventory-management variables.

- **Sample Profile**

Profile	Category	Percentage
Gender	Female	60%
Age	Below 25 years	70%
Designation	Student	60%
Education	Postgraduate	56%
Experience	0–1 year	72%
Monthly income	Below ₹25,000	66%

Interpretation:

The respondents are mainly young female students or early-career individuals. Most are below 25 years old, have postgraduate education, and possess 0–1 year of work experience. Their monthly income is generally below ₹25,000, indicating that the sample largely consists of students and recent entrants to the workforce.

Results and Analysis

- Descriptive Findings**

The descriptive analysis shows a generally positive perception of the inventory management system. Most statements recorded mean scores above 3.50, indicating that respondents tended to agree that the organization follows reasonably effective inventory practices.

Inventory-Management Statement	Mean
Organization has an effective inventory management system	3.32
Inventory records are updated regularly	3.56
Stock levels are monitored accurately	3.64
Inventory shortages occur rarely	3.69
Inventory system helps reduce operational costs	3.61
Stock verification is conducted regularly	3.75
Reordering is done at the appropriate time	3.75
System supports better decision-making	3.75
System improves customer satisfaction	3.71
System reduces delivery delays	3.78
Overall satisfaction with current system	3.66

Interpretation:

The inventory system is viewed positively for reducing delivery delays and supporting stock verification, reordering, and decision-making. However, overall system effectiveness and overstocking control need improvement to strengthen inventory integration and efficiency.

- Reliability Analysis**

Cronbach's Alpha was 0.971 for 25 items with 100 valid cases. This very high value indicates excellent internal consistency among the questionnaire items and supports the use of the collected responses for further statistical analysis.

Hypothesis Testing and Discussion

- Chi-Square Analysis**

The Chi-Square test examined the association between age and overall satisfaction with the current inventory management system. The Pearson Chi-Square value was 14.754 with 16 degrees of freedom and a significance value of 0.543. Since the p-value was greater than 0.05, the null hypothesis was accepted. Therefore, there was no statistically significant association between age and overall satisfaction.

Test	Chi-Square	df	p-value	Decision
Age × Overall Satisfaction	14.754	16	0.543	H ₀ Accepted
Designation × Overall Satisfaction	7.644	8	0.469	H ₀ Accepted

Interpretation:

The designation and satisfaction test also showed no significant association, with a Pearson Chi-Square value of 7.644 and p-value of 0.469. Thus, satisfaction did not significantly vary according to designation.

- ANOVA Analysis**

The one-way ANOVA results show that there is no significant difference in overall satisfaction with the inventory management system based on respondents' age or designation. Since both significance values are greater than 0.05, the null hypothesis is accepted in both cases.

Comparison	F-value	Sig.	Decision
Age × Overall Satisfaction	0.149	0.963	H ₀ Accepted
Designation × Overall Satisfaction	0.452	0.638	H ₀ Accepted

Interpretation:

The ANOVA results indicate that there was no significant difference in overall satisfaction among different age groups or among students, employees and other respondents because the significance values were greater than 0.05.

- **Correlation Analysis**

The study examined the relationship between the effectiveness of the inventory management system and overall satisfaction. The Pearson correlation coefficient was 0.495 with $p < 0.001$. Since the p-value was below 0.05, the null hypothesis was rejected. This indicates a significant positive relationship: when respondents perceive the inventory management system as more effective, their satisfaction tends to increase.

Variables	Pearson r	Significance	Interpretation
Inventory system effectiveness × Overall satisfaction	0.495	$p < 0.001$	Significant positive relationship
Regular audits × Inventory accuracy	0.668	$p < 0.001$	Significant strong positive relationship

Interpretation:

A second correlation analysis reported a Pearson correlation of 0.668 with $p < 0.001$ between regular audits and inventory accuracy. The result indicates a significant and strong positive relationship, demonstrating the importance of regular inventory audits.

Major Findings

- Cronbach's Alpha of 0.971 indicates excellent reliability of the 25-item scale.
- Chi-square tests did not show significant associations between age or designation and overall satisfaction.
- ANOVA did not show significant differences in satisfaction across age groups or designation categories.
- A significant positive correlation of 0.495 was found between system effectiveness and overall satisfaction.
- A strong positive correlation of 0.668 highlighted the importance of regular audits in relation to inventory accuracy.

Suggestions

- Improve overall inventory-system effectiveness through regular review of procedures, controls and system performance.
- Strengthen demand forecasting and stock-level monitoring to reduce overstocking and identify slow-moving items.
- Increase the use of inventory-management software and real-time tracking to improve visibility and reduce manual errors.
- Continue regular stock verification and strengthen periodic inventory audits to identify discrepancies quickly.

Conclusion

The study concludes that effective inventory management is essential for maintaining operational continuity, controlling costs, improving customer satisfaction and ensuring accurate use of organizational resources. At Kuberan Explosives and Co., respondents generally expressed a positive perception of the existing inventory management system. The system was particularly recognized for reducing delivery delays, supporting timely reordering, improving decision-making and encouraging regular stock verification.

At the same time, the comparatively lower scores for overall system effectiveness and overstocking control indicate opportunities for improvement. The organization can strengthen inventory

performance through better demand forecasting, tighter stock-level controls, stronger digital systems, regular audits, employee training and improved interdepartmental coordination. The reliability result of 0.971 demonstrates that the questionnaire used in the study had excellent internal consistency. The significant positive correlations further suggest that improvements in inventory-management effectiveness and inventory accuracy are associated with higher satisfaction.

Because the study is limited to one organization and a convenience sample of 100 respondents, the findings should be interpreted within the context of Kuberan Explosives and Co. and the study period. Future studies can include a larger and more diverse sample, experienced employees and comparative organizations to provide broader evidence. Overall, systematic inventory management supported by technology, accurate records, effective controls and continuous monitoring can contribute significantly to operational efficiency and long-term organizational performance.

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Source note: This article has been prepared from the uploaded project report and retains the report's terminology, methodology, statistical results and literature-review content.

