



# **Study on Effectiveness of Inventory Management and its Impact on Production Adopted By E3 Technology**

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**ABSTRACT:** The study examines the effectiveness of inventory management practices and their impact on production efficiency at E3 Technology, a Bengaluru-based electric vehicle startup. In the rapidly evolving technology sector, efficient inventory control is critical for minimizing costs, reducing downtime, and enhancing overall production performance. The research investigates key inventory techniques including EOQ, JIT, ABC analysis, supplier integration, and modern technologies such as ERP, AI, RFID, and cloud-based systems. Primary data was collected through a structured questionnaire from 151 employees across various departments and hierarchical levels using a five-point Likert scale. Descriptive statistics, correlation analysis, multiple regression, and chi-square tests were employed to analyze the data. Findings reveal widespread skepticism among respondents regarding the effectiveness of both traditional and advanced inventory practices, with predominant disagreement on most statements. Statistical tests indicated no significant correlation or predictive relationship between inventory strategies and production efficiency. The study concludes that there is an urgent need for better training, digital integration, and cross-functional coordination at E3 Technology. Recommendations are provided to strengthen inventory systems and improve production outcomes in technology-driven firms.

**KEYWORDS:** Inventory Management, Production Efficiency, EOQ, JIT, ERP Systems, AI in Inventory, Supply Chain Integration, Technology Sector, E3 Technology, Manufacturing Performance

## **I. INTRODUCTION**

In the contemporary landscape of industrial operations, inventory management emerges as a pivotal component that significantly influences organizational efficiency and productivity. This study delves into the effectiveness of inventory management practices and their profound impact on production processes, particularly as adopted within technological enterprises. Inventory management encompasses the systematic oversight of stock levels, procurement, storage, and utilization of materials to ensure seamless operational flow. The effectiveness of these practices is measured by their ability to minimize costs, reduce waste, and enhance responsiveness to market demands.

As production systems evolve with technological advancements, the integration of efficient inventory strategies becomes indispensable for maintaining competitive advantage. This introduction sets the stage by exploring the foundational concepts, historical evolution, and theoretical underpinnings that frame the discourse on inventory management's role in production. By examining key keywords and associated theories, the narrative builds a research-oriented perspective, highlighting how optimized inventory control can mitigate disruptions and foster sustainable production outcomes. The discussion avoids specific organizational profiles, focusing instead on broader implications and scholarly insights. Through this lens, the study underscores the necessity for robust inventory frameworks in driving production efficiency.

**OBJECTIVES OF THE STUDY****Primary Objective**

To evaluate the effectiveness of inventory management and its impact on production at E3Technology.

**Secondary Objectives**

- To analyze the current inventory practices adopted by E3 Technology.
- To assess the relationship between inventory control and production output.
- To identify factors influencing inventory efficiency in the technology sector.
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**II. REVIEW OF LITERATURE****Idi Ismaila, Abubakar Ibrahim, and Suleiman Abubakar (2025): The Role of Effective Inventory Management in Enhancing Production Timeliness and Market Responsiveness among SMEs in Northwestern Nigeria**

The researchers investigated the link between inventory practices and operational outcomes in small enterprises. They employed regression analysis to quantify the influence, revealing that accurate forecasting and audits significantly boosted efficiency. The study highlighted how safety stocks mitigated disruptions, ensuring consistent flow. Waste minimization emerged as a mediator, facilitating quicker adaptations to demands. Empirical data supported a strong correlation, with practices explaining substantial variance in performance metrics. The authors emphasized the role of systematic controls in reducing costs and idle times. Their findings advocated for integrated strategies to enhance overall responsiveness. The work contributed to understanding resource optimization in constrained settings.

**Wang Xingkai (2025): The Impact of Inventory Management on Enterprise Financial Performance: A Case Study of HLA Co., LTD**

The author analyzed inventory dynamics using mixed methods, identifying paradoxes in turnover and holdings. The research demonstrated that large scales negatively affected returns through increased impairments. High turnover improved asset utilization but required better collaboration for full benefits. Risk controls influenced solvency, with transfers masking liquidity issues. DID models confirmed causal links to financial metrics over multiple years. The study recommended technological integrations for optimization. Findings underscored the need for balanced approaches to sustain growth. The investigation provided insights into cost and efficiency interplays.

**Syed Saleheen and Dr. Yogita Parihar (2025): The Effect of Inventory Management on Working Capital Efficiency in Retail Chains**

The scholars explored techniques like JIT and optimization tools in retail settings. They found that these methods reduced outstanding days and enhanced liquidity. The study showed minimized carrying costs leading to better cash cycles. Empirical evidence linked turnover improvements to financial advantages. Analysis revealed competitive edges from efficient practices. The authors discussed technological aids in achieving these outcomes. Their work emphasized strategic alignment for performance gains. The research contributed to operational finance discussions.

**III. RESEARCH METHODOLOGY****Research Design**

The study adopted a descriptive research design with analytical components. Descriptive design was used to portray the current perceptions of employees on various inventory management techniques and production efficiency parameters. Analytical aspects were incorporated through statistical tools such as correlation, regression, and chi-square analysis to examine relationships between variables. This design was suitable to fulfill the objectives of assessing effectiveness and identifying associations between inventory practices and production outcomes at E3 Technology.

**Type of Data**

The study primarily utilized quantitative data. Primary data was collected in the form of responses measured on a five-point Likert scale ranging from Strongly Disagree to Strongly Agree. This allowed for numerical analysis and statistical interpretation of employee opinions regarding inventory control techniques, supply chain integration, technology utilization, and production efficiency.

**Sources of Data**

The data for this study was collected from primary sources. A structured questionnaire was distributed to employees working at E3 Technology. The questionnaire consisted of demographic questions and statements related to inventory management practices and production efficiency. Secondary data was used only for the industry profile and company background from reliable reports and websites.

**Sampling Technique**

Convenience sampling technique was employed to select the respondents. The sample consisted of 151 employees from different departments including Production/Manufacturing, Procurement/Supply Chain, Inventory Management, and IT/Technology. This non-probability sampling method was chosen due to time constraints and easy accessibility of respondents within the organization.

**Data Collection Method**

Data was collected using a structured questionnaire method. The questionnaire consisted of 20 statements measured on a 5-point Likert scale along with 5 demographic questions. It was distributed both physically and through digital forms to employees at E3 Technology. Clear instructions were provided to ensure accurate responses, and confidentiality of responses was assured.

**Tools and Techniques for Data Analysis**

The collected data was analyzed using both descriptive and inferential statistical tools with the help of SPSS software. The following techniques were applied:

- Percentage analysis for demographic profile and frequency distribution Formula: Percentage = (Frequency / Total Respondents) × 100
- Pearson’s Correlation Coefficient to measure the relationship between variables Formula:  $r = \frac{\sum[(x - \bar{x})(y - \bar{y})]}{\sqrt{[\sum(x - \bar{x})^2 \times \sum(y - \bar{y})^2]}}$
- Multiple Regression Analysis to examine the predictive impact of independent variables on production efficiency
- Chi-Square Test for association between categorical variables (gender and perception) Formula:  $\chi^2 = \sum[(O - E)^2 / E]$

**Data analysis and interpretation**

**Table 1: Correlation Analysis between EOQ and Quality Control Measures Hypotheses**

**H01:** There is no significant correlation between the perception that EOQ helps determine optimal order sizes to minimize costs and the perception that quality control measures enhance throughput and reliability.

**H1:** There is a significant correlation between the perception of EOQ and quality y control measures.

**Correlation table**

Variable	EOQ helps determine optimal order sizes to minimize costs	Quality control measures enhance throughput and reliability
EOQ helps determine optimal order sizes to minimize costs	1	-.041
Sig.(2-tailed)		.613
N	151	151
Quality control measures enhance throughput and reliability	-.041	1
Sig.(2-tailed)	.613	
N	151	151

Source: Primary data

**Interpretations:**

From the above table, there exists a very weak negative correlation ( $r = -0.041$ ) between EOQ perception and quality control perception. The p-value of 0.613 indicates that this relationship is statistically not significant at 0.05 level. With 151 respondents, the data fails to establish any meaningful association between the two variables. Both variables show almost no linear relationship with each other in the sample. This suggests that respondents' views on EOQ and quality control are largely independent. Overall, the null hypothesis is accepted due to the high significance value.

**Table 2: Multiple Regression Analysis on Agile Production Systems**

**Hypotheses H02:** ERP systems and collaborative forecasting do not significantly predict agile production systems adapt quickly, boosting efficiency.

**H2:** ERP systems and collaborative forecasting significantly predict agile production systems.

**Model Summary:**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.161a	.026	.013	1.111

**ANNOVA**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	4.834	2	2.417	1.958	.145b
Residual	182.742	148	1.235		
Total	187.576	150			

**Coefficients**

Model	Unstandardized Coefficients (B)	Std. Error	Beta	t	Sig.
(Constant)	4.541	.436		10.424	.000
Collaborative forecasting reduces demand variability	-.164	.083	-.162	-1.976	.050
ERP systems provide real-time visibility for inventory tracking	.013	.082	.013	.159	.874

Source: Primary data

**Interpretations**

From the above table, the regression model explains only 2.6% of the variance in agile production efficiency ( $R^2 = .026$ ). The overall model is not statistically significant with  $F = 1.958$  and  $p = .145$ , failing to reject the null hypothesis. Collaborative forecasting shows a marginal negative effect ( $\beta = -0.162$ ,  $p = .050$ ) on agile production. ERP systems have almost negligible and non-significant impact ( $p = .874$ ) on the dependent variable. The predictors together do not meaningfully contribute to explaining agile production adaptability. This indicates weak predictive power of the selected variables on operational efficiency.

**Table 3: Chi-Square Test–Gender and Cost Savings Perception Hypotheses**

**H03:** There is no significant association between gender and perception on cost savings from efficient processes improving production performance.

**H3:** There is a significant association between gender and perception on cost savings.

**Cross tabulation**

What is your gender?	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
1. Male	5	9	10	37	38	99
2. Female	2	2	11	18	19	52
Total	7	11	21	55	57	151

**Chi-Square Tests**

Test	Value	df	Asymptotic Significance(2-sided)
Pearson Chi-Square	4.491a	4	.344
Likelihood Ratio	4.476	4	.345
Linear-by-Linear Association	.004	1	.949
N of Valid Cases	151		

Source: Primary data

**Interpretations**

From the above table, the Pearson Chi-Square value is 4.491 with 4 degrees of freedom and p-value of 0.344. This p-value greater than 0.05 indicates no statistically significant association between gender and cost savings perception. Male respondents show slightly higher disagreement (75 out of 99) compared to females. The distribution of responses across agreement levels appears independent of gender. The null hypothesis is accepted as gender does not influence views on cost savings and production performance. Overall, perceptions regarding cost savings improving production are similar across both genders.

**IV. SUGGESTIONS**

- Organize comprehensive training workshops on EOQ, JIT, and ABC analysis to build employee confidence and correct understanding.
- Implement automated cycle counting and digital audit systems to eliminate manual errors and stock discrepancies.
- Establish data-driven safety stock policies using historical demand patterns and lead time variability analysis.
- Develop long-term strategic partnerships with suppliers and introduce Vendor Managed Inventory (VMI) systems.
- Adopt advanced collaborative forecasting platforms involving all supply chain stakeholders.
- Invest in full ERP implementation with mobile access for real-time inventory visibility across departments.
- Integrate Artificial Intelligence and Machine Learning tools for accurate demand prediction and dynamic reorder management.
- Form dedicated cross-functional teams to improve coordination between procurement, production, inventory, and IT departments.
- Deploy RFID technology combined with cloud-based solutions to automate tracking and reduce human errors.
- Initiate pilot projects on agile manufacturing practices with regular performance reviews and continuous improvement mechanisms.

**V. CONCLUSION**

The present study explored the effectiveness of inventory management practices and their influence on production processes at E3 Technology. Theoretical foundations such as Economic Order Quantity, Just-in-Time systems, ABC analysis, and Theory of Constraints were examined alongside modern digital tools including ERP, AI, and RFID. Analysis of primary responses indicated substantial skepticism toward the benefits of both conventional and advanced inventory techniques in enhancing production outcomes. Statistical evaluations through correlation, regression, and chi-square tests confirmed the absence of significant relationships between inventory strategies and production efficiency. The Indian electronics manufacturing industry profile illustrated the strategic importance of optimized inventory systems for maintaining competitiveness and growth. Company insights from E3 Technology revealed the critical need for integrated and agile inventory approaches in technology startups. This research addressed the identified gap in

literature regarding inventory management in emerging tech firms. Practical strategies were recommended to improve adoption and alignment between inventory control and production planning. The study reaffirms that effective inventory management serves as a vital driver of production performance in dynamic technological environments. Future research should emphasize longitudinal studies and customized digital transformation frameworks for startups.

#### REFERENCES

1. Chopra, S., & Meindl, P. (2016). *Supply chain management: Strategy, planning, and operation* (6th ed.). Pearson.
2. EY India. (2025). Growth in India's electronics manufacturing. <https://www.ey.com>
3. Goldratt, E. M. (1984). *The goal: A process of ongoing improvement*. North River Press.
4. Harris, F. W. (1913). How many parts to make at once. *Factory, The Magazine of Management*, 10(2), 135–152.
4. Ohno, T. (1988). *Toyota production system: Beyond large-scale production*. Productivity Press.
5. Silver, E. A., Pyke, D. F., & Peterson, R. (1998). *Inventory management and production planning and scheduling* (3rd ed.). John Wiley & Sons.
6. Statista. (2025). India-electronics manufacturing market. <https://www.statista.com>



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