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Impact of Inventory Management Practices on Financial Performance of Sugar Manufacturing Firms in India

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ABSTRACT
Manufacturing companies employ diverse strategies in inventory management. The implemented methods substantially influence returns, profitability, and sales volume. Manufacturing companies that effectively implement these techniques have superior financial success. This article analyzes the influence of inventory management strategies on the financial performance of sugar production companies in India, focusing on the implementation of lean inventory systems, strategic supplier partnerships, and technology. The study survey was executed across all eight operational sugar manufacturing enterprises from 2019 to 2024. Primary data was gathered by structured and semi-structured questionnaires distributed to key informants inside the businesses. Secondary data was acquired from the annual financial performance statements published in the Book of Sugar Statistics. Descriptive statistics were employed to assess the influence of inventory management strategies. Correlation analysis was employed to ascertain the nature and size of the relationship among inventory management variables. The findings demonstrate a favorable association between inventory management and Return on Sales, as well as with Return on Equity, all of which are statistically significant at the 5% level.
KeyWords: Inventory Management, Financial Performance, Return on Sales, Return on Equity, Sugar Manufacturing

INTRODUCTION

Asset management, regardless of kind, can be regarded as an inventory challenge, as the same concepts pertain to both liquid and fixed assets (Koumanakos, 2008). The balance between ordering costs and holding costs defines the transactional approach to inventory management exemplified by the Economic Order Quantity (EOQ) models established decades ago (Koumanakos, 2008). In recent years, the evolution of operations management has introduced numerous new concepts to the inventory control discourse.

These management-oriented concepts encompass materials requirements planning systems (MRP), Just-In-Time (JIT), and ERP methodologies, while another rising body of research posits that the attributes of a firm's demand and marketing environments significantly influence outcomes.

Despite the theoretical and practical limitations of these concepts and methodologies, their use in actual business operations should influence a firm's performance (Koh, Demirbag, Tatoglu, and Zaim, 2007). This study aims to examine the correlation, if any, between inventory management techniques and the financial success of sugar production companies in India. Inventory management is regarded as a crucial amalgamation of the primary performance influencing elements in the sugar sector.

Effective inventory management and control are essential for a company, as inventory mismanagement jeopardizes its profitability (Sprague and Wacker, 1996). Excess inventory occupies physical space, imposes financial strain, and heightens the risk of damage, spoilage, and loss. In this context, the lean production approach introduced by Womack et al. (1990) is associated with diminished inventories; yet, insufficient inventory frequently disturbs industrial operations and heightens the probability of inadequate customer service.

The Concept of Inventory Management

Inventory denotes the value or quantity of raw materials, suppliers, work in progress (WIP), and finished goods maintained for future utilization (Lyons and Gillingham, 1981). Raw materials are commodities like steel and lumber utilized in the final product. Supplies encompass goods such as Maintenance, Repair, and Operating (MRO) inventory that are not incorporated into the end product. Work in progress refers to materials that have undergone partial fabrication but remain unfinished. Finished goods are fully completed objects prepared for transportation (Kothari, 1992).

Inventory management is the systematic practice of regulating stock quantities of certain commodities while

minimizing costs in alignment with management's established goals and objectives (Jessop, 1999). Managers of firms that handle inventory must prioritize satisfying customer needs while minimizing inventory expenditures. Drury (2004) contends that inventory expenses encompass holding costs, ordering costs, and shortfall costs. Holding costs pertain to the expenses associated with maintaining physical inventory. This encompasses insurance, obsolescence, and opportunity expenses related to capital that could be allocated elsewhere but is instead immobilized in inventory.

Ordering costs refer to the expenses incurred in placing an order and receiving inventory. This encompasses assessing the required quantity, generating invoices, calculating transportation expenses, and evaluating the cost of products inspection. Shortage costs arise when demand surpasses the available inventory supply. The expenses encompass opportunity costs associated with sales, loss of customer goodwill, late fees, and analogous expenditures.

Theory of Economic Order Quantity (Wilson EOQ Model)

Mathematical models have been established in operations management to ascertain the best inventory level. The EOQ model is the most prevalent model utilized. This model was created by F.W. Harris in 1913. Nonetheless, R.H. Wilson is acknowledged for his comprehensive early examination of the concept (Arsham, 2006). The model is referred to as the Wilson EOQ model. This model posits that certain expenses (ordering costs) decrease with inventory levels, whilst others (holding costs) increase, resulting in a total inventory-related cost curve that features a minimum point. This is the juncture at which total inventory expenses are minimized.

Objectives of Inventory Management

Magad and Amos (1989) contend that the principal aim of inventory management is to enhance customer service. This is achieved by safeguarding against stockouts resulting from demand fluctuations in the marketplace. Kothari (1992) contends that the objective of inventory management is to enhance production efficiency. Inventory maintenance is intrinsically linked to production control, facilitating effective materials management. Magad and Amos (1989) contended that the fundamental consideration in developing inventory policy is the minimizing of costs. The purpose of inventory management is to reduce inventory investment. A key advantage of effective inventory management is enhanced managerial efficiency across all functional domains of management.

Inventory Management Practices

Information Technology

Carter and Price (1995) contend that information is the vital essence of all organizations. An inventory manager need information technology to excel in their role. Computers can aid in inventory management by determining the optimal quantity of goods to maintain and distribute to meet user demands. The computer accomplishes this by analyzing inventory variables such as stock levels, demand, and delivery dates. Electronic Data Interchange (EDI) is a method that facilitates direct communication between businesses without human interaction. This technology has transformed inventory management.

EDI refers to the transmission and reception of structured data between the computer systems of trading partners, typically without human intervention. The International Data Interchange Association defines EDI as "the transfer of structured data, by agreed message standards, from one computer system to another via electronic means" (Jessop, 1999). The EDI system connects the purchasing organization with its suppliers, enabling replenishment to be initiated immediately upon the emergence of need, with the message transmitted from the original source without risk of corruption during transit.

An EDI link allows suppliers' and customers' computers to query one another regarding inventory levels, production schedules, and related information to ensure proper synchronization of activities. This offers prospective advantages such as diminished paperwork, enhanced information accuracy, lowered personnel expenses, and abbreviated lead times due to immediate communication. Electronic Point of Sale (EPOS) is a technology utilized in inventory management.

The function of EPOS is to scan and record data pertaining to merchandise sold. An EPOS system authenticates checks, generates immediate sales data, processes transactions, and facilitates intra- and inter-store communications. The EPOS system facilitates significant cost reductions and provides real-time data on sales patterns, store traffic, and the popularity and profitability of each product line. It restricts inventory to match demand, mitigates the danger of obsolescence and deterioration of stock, diminishes the likelihood of theft, and offers information to consumers. This results in enhanced customer service and, consequently, increased financial success (Lysons, 1984).

Barcoding is a method utilized for inventory management of raw materials and finished items. It provides inventory levels, enables expedited data entry with enhanced precision. Its advantages encompass decreased labor expenses via time efficiency and enhanced output. It also facilitates enhanced responsiveness to customers and suppliers.

Lean Inventory System

The notion of lean production was introduced by Womack et al. in 1990. This principle was associated with diminished inventories. The assertion is that diminishing inventory will lead to enhanced profitability through interest savings, alongside a decrease in storage costs, handling expenses, and waste. Literature estimates these savings to be between 20 and 30 percent (Brigham & Gapenski, 1993). Lean Management is increasingly garnering attention in the current highly competitive landscape. Advocates of the Lean Inventory approach contend that surplus inventory negatively impacts a firm's net cash flows.

The most apparent costs associated with inventory management include capital costs (interest or opportunity

costs) and physical costs (storage, insurance, and spoiling). In recent years, several solutions have been devised in operations management to address the issue of surplus inventory. Management-oriented systems encompass Just-In-Time (JIT), Materials Requirements Planning (MRP), and Enterprise Resource Planning (ERP). Just-In-Time denotes a set of methodologies aimed at waste elimination. These organization-wide practices include the full supply chain.

The components of JIT encompass collaborative product design with suppliers and customers, a shift towards single sourcing from nearby providers, minimized machine setup durations, and comprehensive preventive maintenance. This inventory approach is employed to enhance a business's return on investment by minimizing inventory levels and their related carrying expenses. To get Just-In-Time (JIT), the process must possess indicators of all activities occurring throughout the system. Just-in-Time (JIT) can significantly enhance a manufacturing organization's return on investment, quality, and efficiency. It underscores that production must generate goods that arrive precisely when required, neither prematurely nor belatedly.

Timely communication of the depletion of old inventory, which prompts the procurement of new stock, is essential for Just-In-Time (JIT) practices and inventory minimization. This conserves warehouse space and reduces expenses. The fundamental principle of JIT is that inventory is regarded as waste. The method was initially employed by the Ford Motor Company. It was later embraced and promoted by Toyota Motor Corporation of Japan in the 1950s. The MRP system is a product-oriented automated technology designed to minimize inventory and uphold delivery schedules. It connects the dependent requirements for materials and components of a final product to timeframes over a projected horizon, based on estimates from marketing, sales, and other input data (Lysons and Gillingham, 2003).

This system acknowledges that the demand for one item may be contingent upon the demand for other inventory items. The focus is on the final product that integrates linked components. The required inventory numbers are determined based on anticipated demand. The requirement for inventory items is accurately derived from the master production schedule for the final products. The implementation of lean inventory systems, such as Just-In-Time (JIT) and Material Requirements Planning (MRP), yields comparatively low inventory levels. The expenses associated with warehousing and material handling are markedly diminished.

Strategic Supplier Partnership

Lysons and Gillingham (2003) define partnership as a commitment from both customers and suppliers, irrespective of their size, to a long-term relationship founded on clear, mutually accepted objectives aimed at achieving world-class capabilities. The focus is on fostering positive working relationships between clients and vendors. The notion of supplier partnerships emerged prominently in the 1980s due to the shift towards just-in-time (JIT) manufacturing. JIT prioritizes waste reduction, lead time minimization, enhancement, and simplification. These objectives also pertain to supplier collaboration (Bicheno, 1996). The idea posits that cooperation, as opposed to confrontation, yields mutual benefits for both parties.

The alliance aims to establish long-term, collaborative partnerships instead of short-term, combative ones. The contracts are extended to provide the supplier with assurance and the incentive to invest and enhance. Effective communication is a crucial element for a successful cooperation. Suppliers and customers who communicate plainly and directly are deemed more effective. Personal relationships with supplier representatives continue to be significant, notwithstanding the growing prevalence of various forms of internet contact. It is essential to adopt the notion of early supplier involvement in design.

This diminishes the likelihood of defective products and the risk of obsolescence, as the supplier participates in the design process (Brownell, 2005). Vendor Managed Inventory (VMI) represents an innovative aspect of supplier collaborations. In a Vendor Managed Inventory (VMI) arrangement, the supplier maintains inventory on-site or in proximity to the client, thereby granting the customer immediate access to the stock. This prompt access enables the customer to retrieve goods as required and pay solely for what is utilized, so minimizing inventory expenditure and enhancing inventory turnover. In VMI arrangements, the supplier is responsible for stock replenishment, encompassing ordering, logistics management for material shipment, and inventory counting.

By transferring these expenses often borne by the client to the supplier, the customer can diminish the total cost of their product and enhance their profit margins. The supplier gains a larger portion of the buyer's overall procurement needs (Loughrin, 2008).

Inventory Management and Financial Performance

Numerous efforts have been made to elucidate the financial performance of firms throughout the domains of strategic management, accounting, finance, marketing, and management science. This study restricts the survey to papers deemed directly pertinent, as each section focuses on distinct explanatory variables. Sanghal (2005) examined the impact of surplus inventories on the long-term stock price performance in the United States. The research assessed the long-term pricing implications of surplus inventory using 900 announcements of excess inventory by publicly traded companies from 1990 to 2002. These statements unequivocally acknowledge that Affirm is experiencing surplus inventory.

Examples encompass production reductions, temporary closures, price reductions, promotional efforts to liquidate stock, and inventory write-offs to address surplus inventories. He discovered data indicating that the stock market somewhat anticipates excess inventory scenarios, and that companies do not swiftly recover from the adverse impacts of excess inventory. He additionally observed that the adverse impact of surplus inventory is both economically and statistically significant. Agus and Noor (2006) investigated the correlation between

inventory management strategies and financial success in Malaysia. The study assessed the manager's perceptions of inventory and supply chain management methods alongside the industry's performance level.

The approaches encompass lean inventory systems, technological integration, and strategic supplier alliances. A standardized questionnaire was utilized to evaluate the companies based on the specified dimensions.

The sample companies were randomly selected from medium to high technology manufacturing firms (non-food) in the Klang Valley, Malaysia. The findings indicate that inventory management methods are significantly correlated with profitability and return on sales (ROS). Roumiantsev and Netessine (2005) examined the relationship between inventory management policies and the financial performance of firms. The study aimed to evaluate the influence of inventory management strategies on financial performance from 1992 to 2002.They employed traditional firm-specific variables (inventory levels, profit margins, and lead times) as explanatory factors. No evidence was discovered indicating that lower relative levels correlate with financial performance as assessed by return on assets. Eckert (2007) analyzed inventory management and its impact on enhancing customer satisfaction. He identified a favorable correlation between customer happiness and supplier collaborations, employee education and training, and technology.

Koumanakos (2008) examined the impact of inventory management on the performance of 1,358 manufacturing enterprises across three industrial sectors in Greece food, textiles, and chemicals during the period from 2000 to 2002. The concept that lean inventory management enhances a firm's financial performance was evaluated. The data indicate that an increase in inventory levels, diverging from lean operations, correlates with a diminished rate of return for a firm. In conclusion, the majority of the research examined focused on traditional firm-level variables, including inventory levels, demand, and lead time.

Minimal effort was undertaken to ascertain managers' perceptions regarding the influence of inventory management strategies on corporate financial performance. Agus and Noor (2006) assessed managers' perceptions regarding the influence of inventory management methods on the financial performance of manufacturing enterprises in Malaysia. Nonetheless, the conditions in Malaysia may differ from those in India. This study aims to examine the influence of inventory management methods on the financial performance of sugar production companies in India.

Methodology

This research employed a descriptive design. A survey was administered to all eight (8) sugar producing enterprises in India to assess the influence of effective inventory management strategies on their financial performance. The sugar industry in India presently has an annual production of approximately 530,000 tons. The Ministry of Agriculture holds the primary responsibility for the advancement of the sugar sector.

Research design and Sampling Technique

The research population comprised all eight (8) operational sugar manufacturing enterprises in India. Due to the limited number of enterprises, a census survey was administered across all eight (8) sugar firms. The timeframe encompassed was from 2019 to 2024.

Data Collection and Analysis

Both primary and secondary data were utilized. The principal data was gathered utilizing structured and semi-structured questionnaires. The secondary data was sourced from the publications of the India Sugar Board and the annual performance statements included in the Year Book of Sugar Statistics. Descriptive statistics, including frequencies, proportions, percentages, mean scores, and standard deviation, were employed to analyze the data. The correlation coefficient (r) was employed to ascertain the type and extent of the association between inventory management variables and financial performance. The pertinent software applications were utilized to evaluate the data. Cronbach's alpha was computed to assess the internal consistency reliability. Data was exhibited via tables and charts. This study utilized Return on Sales and Return on Equity as proxies for financial performance. Roumantsev and Netessine (2005) and Agus and Noor (2006) employed these measures.

Data Analysis

The subsequent conclusions are organized according to inventory management strategies, financial performance, and corrective analysis. The presentation and analysis of data about inventory management methods utilized a Likert scale ranging from 1 to 4, where: 1 = the practice is not employed at all, 2 = the practice is employed to a limited level, 3 = the practice is employed to a moderate extent, 4 = the practice is employed to a significant extent.

Descriptive statistics

Table 1; Lean Inventory System X_1

	Parameters	N	Min	Max	Freq	%	Mean	SD
X1.1	Implementation of a Just-In-Time purchasing system, characterized by the absence of safety stock.	8	1	4	8	65	4.651	0.546
X1.2	Contracts with suppliers for expedited deliveries	8	1	5	6	75.5	5.125	1.645
X1.3	Precise forecasting of vendor delivery timelines	8	1	5	5	87.5	5.251	0.576

X1.4	Material operation Requirements planning system (MRP) - wherein bills of materials are entirely precise	8	1	5	7	55	2.756	0.753
X1.5	Minimal or absent expediting	8		5	7	55.5	3.751	0.951
							X=4.306	

Table 1 illustrates managerial perspectives regarding the degree of implementation of lean inventory systems inside different organizations. The primary factors in the Lean Inventory System are Materials Requirement Planning, averaging 4.651 with 65% accuracy in predicting vendor supply dates, averaging 5.251 with 75.5% accuracy, and agreements with suppliers for short cycle deliveries, averaging 3.125 with 75.5% accuracy. MRP is the predominant system utilized, as all manufacturing enterprises must develop master production schedules, supported by precise bills of materials, which are essential components of the MRP system. Additional metrics deemed significant factors in the Lean Inventory system encompass minimal or absent expediting, with a mean of 3.751 at 55.5%, and the implementation of a Just-In-Time (JIT) purchasing system, with a mean of 2.756 at 75%. The results indicate that the Lean inventory system has an average score of 4.306, suggesting that sugar companies have partially implemented Lean Inventory systems.

Financial Performance

Tables 2 and 3 pertain to the financial performance of sugar firms in India from 2019 to 2024.The return on sales for a specific year is the ratio of profit after tax to net revenue. The return on equity for a specific year is the ratio of profit after tax to equity capital plus reserves.

Table 2 Return on Sales (ROS)

YEAR	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6
2019	0.951	-9.1	-4.365	-.31.75	-7.85	6.74
2020	-0.36	-.15.14	-4.361	-13.45	9.75	-4.57
2021	9.05	-2.25	3	19.71	11.12	4.85
2022	13.752	2.45	11.236	21.16	13.45	-5.74
2023	21.4	-3.45	-9.91	22.45	14.47	-2.11
2024	11.265	3.86	4.61	12.45	11.74	13.7
Mean	9.343	-3.938	-0.035	5.095	8.78	2.145

Source: Year Book of sugar statistics 2019 – 2024

Table 2 indicates that return on sales (ROS) differs among all enterprises, despite their implementation of analogous inventory management strategies. This suggests that a firm's profitability is contingent upon particular qualities unique to each firm. Firm 1 and Firm 5 have recorded remarkable average returns on sales over the six-year period. Nevertheless, two companies have reported a negative average return on sales throughout the six-year period. This outcome is anticipated due to the two companies incurring losses over a six-year duration.

Table 3 Return on Equity (ROE)

Year	Firm 1	Firm 2	Firm 3	Firm 4	Firm 5	Firm 6
2019	2	-6	8	-7	8	7
2020	-3	-5	-6.5	-5	13	-3
2021	15	-7	2.6	21	14	-0.5
2022	22	5	21	9	25	-0.8
2023	17	-12	-7.6	8	15	-0.3
2024	19	14	15	3	14	4
Mean	12	-1.833	5.416	4.833	14.833	1.06

Source: Year Book of Sugar statistics 2019 – 2024

According to the data in Table 3, return on equity differs among the firms despite their implementation of analogous inventory management strategies. Consequently, ROEs seem to be contingent upon the internal characteristics of each organization. Companies such as Firm 1 and Firm 5 have documented elevated average ROEs during the six-year duration. Firms 2 and 3 have exhibited negative average return on equities over the six-year duration. A positive link exists between ROE and ROS.

Summary of Findings

The research aimed to determine the influence of inventory management strategies on the performance of sugar production companies in India. The research encompassed all eight operational sugar firms in India. The primary data for the study was collected via questionnaires distributed to finance managers of the organizations. The secondary data was sourced from sugar statistics yearbooks. This indicates that sugar companies have utilized information technology to a certain degree in inventory management. All firms have digitized their inventory management methods. Nevertheless, only a limited number of companies are utilizing EDI and EPOS technologies. Concerning financial performance, two firms have exhibited negative average returns on sales and equity over the six-year period. The remainder have shown favorable average ROE and ROS. The data indicate a generally above-average favorable link between inventory management procedures and the financial performance of sugar enterprises. This is evident in the computed correlation coefficient between inventory management practices and ROS, as well as between inventory management techniques and ROE. The predictor variables of inventory management strategies have been found to be associated.

Conclusion and Recommendations

Financial performance tables and numbers reveal distinct growth patterns for each organization. This indicates that whereas sugar companies utilize identical inventory management procedures as factors influencing their performance levels, the execution of these practices is tailored to the distinct circumstances of each organization. There is typically a good link across various inventory management strategies. Particular performance indicators have been demonstrated to rely on the quality of inventory management techniques. Return on Sales (ROS) exhibits a robust positive link with strategic supplier agreements, significant at P= 0.05 (two-tailed). ROE exhibits a robust link with lean inventory systems and strategic supplier agreements, which is noteworthy. The performance of sugar companies is consequently a function of their inventory management strategies. The predictor variables of inventory management methods are interrelated, with each affecting the intensity of the others

REFERENCES

1. Agus, A & Noor, Z.M (2006). Supply chain management and performance. An Empirical Study. A working paper university of Malaysia.
2. Bicheno, J. (1996). Supplier partnerships. National institute for manufacturing management, London Brigham, E.F & Gapenski L.C (1993). Intermediate Financial Management. New York:Dryden Press. Brownell, J. (2005), Strengthening the Purchase Supplier Partnership. A working paper Cornell University. Drurry, C. (2004), Management and Cost accounting. London: Prentice Hall
3. Eckert, S.G (2007) Inventory Management and its effects on customer satisfaction Journal of Public policy Vol 1 no.3
4. Koh, C., Demirbag, M., Tatoglou ,E, & Zaim, S. (2007) The impact of supply chain practices on Performance on SMES Industrial Management & Data systems Vol 107 No 1 (pp 103 -240)
5. Kothari, C.R (1992) An introduction to operational Research. New Delhi: Vikas publishing Koumanakos, D.P (2008).The effect of inventory management on firm performance International Journal of productivity and performance Management, Vol 57 (pp 355-369) Emerald Group Publication
6. Loughrim, M. (2008). Lean Thinking and Vendor Managed Inventory. A working Paper University of Liverpool. Lysons, K and Gillingham, M. (2003). Purchasing and supply chain management. London:Prentice Hall
7. Magad, E.and Amos, J. (1989)Total materials management.NewYork: Van Nostrand ReinholdSinghal ,V.R. (2002). Excess Inventory and Long- term stock price performance A working. paper, Georgia Institute of Technology. Roumianstev, S, and Netessine, S (2005), Should inventory policy be lean or responsive?: AnEmperical Analysis working paper university of Pennsylvania.
8. Womack J.P. Jones , D.T and Roos ,D. (1990), The Machine changed the world RawsonAssociated. Newyork...