

Original Article

Impact of Predictive Analytics on Pune Food Retail Inventory Balance

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**Abstract**

This predictive analytics in the background of a small frozen food shop in Pune called Food and Fruits by Deshpande forms the core focus here. Through past sales records and inventory logs, methods such as pattern recognition, basic projection models, item classification via ABC procedure, along with fixed restocking triggers were explored. Insights into how choices guided by numbers influence product presence on shelves while limiting loss begin from this process. Research shows forecasts study the earlier transactions, moving patterns, plus environmental emerge help estimate future need more precisely. Improved alignment between supply size and customer demand appears possible when these inputs are combined thoughtfully. Avoiding excess stock buildup alongside minimizing missing items becomes feasible under such basis. (Agrawal et al., 2023). Sales figures each quarter fall within ₹3.5 to 4 lakh, while inventory refreshes every 15-days without losses recorded pointing toward basic prediction methods working well in frozen food shops. Though digital networks attracting to, incomes through account for interaction 21st of overall receipts. Because past records are handled systematically, focusing on fast-moving items and following fixed reallocation patterns might enable smaller stores to deliver constantly, reduce excess stock, and prepare regularly for deeper analytical approaches down the line.

Keywords: Predictive Analytics, Inventory Management, Demand Forecasting, ABC analysis, Frozen Food

Introduction

Finding the right amount of stock often depends on smart guesses about what customers will want. Past sales figures help point toward future needs, while changes in the market add further clues, outside impression also play a role, quietly shaping buying patterns. Between, these pieces of shape smarter decisions behind the scenes. What gets ordered and when starts creation better sense because of them. (Agrawal et al., 2023). In the retail sector, effective demand forecasting helps maintain optimal stock levels and reduces excess inventory and stockouts (Chen, 2024). In small-scale retail trade with perishables, keeping stock within slight margins matters greatly because surplus often drains earnings. A shop specializing in frozen items from pune becomes the focus here, showing what happens when simple forecasts depend only on records already at hand. From patterns pined over time, adjustments emerge quietly balancing supply more closely with demand. Growth follows as systems begin responding faster than before, efficiency improve without new tools involving the part.

Objectives

1. To analyze the role of predictive analytics in managing inventory balance in small food retail stores.
2. To examine sales trends and product-wise performance using secondary data from "Food and Fruits by Deshpande."
3. To apply ABC analysis and basic reorder point calculations to support stock control decisions

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Review Literature

Research regularly, shows that predictive analytics improves inventory management by leveraging past data, trends, and external factors to anticipate demand and determine ideal stock levels. Unlike expected approaches, which depend on fixed rules and regulations, predictive models help companies respond proactively to estimated moves in demand, seasonal patterns, promotional activities, and broader market movements reducing the risks of excess inventory or stock lacks. (Agrawal et al., 2023). In retail, advanced analytics approaches such as SARIMAX period series. (Chen, 2024). With artificial intelligence models such as gradient boosting regressors included, past sales figures feed into calculations alongside shifting market patterns and outside influences. Through these inputs, modifications emerge in how much stock is held at any time, replenishment sequences adapt therefore. Accuracy in predictions tends to rise under this method. At the same time, surplus buildup becomes less frequent. So does running out of goods on shelves across stores. (Sekhar, 2022). Practical would-be reduces stockout rates, increases inventory turnover, and lowers holding costs, specifically for items with highly variable demand. (Bandaru, 2026). Outside forecasting alone, integrated decision support systems that link predictive models directly with inventory control policies enable real-time (Tulli, 2021). Overall, the literature suggests that even when easy, the same principles using past sales data, identifying patterns, and tying forecasts to reorder decisions are applicable and helpful for small retailers such as food outlets in Pune.

Hypothesis

This study is based on the statement that predictive analytics, even in simple forms, can improve inventory balance for small retailers. The working hypothesis is that using old sales data for trend analysis, classifying products through ABC analysis, and applying basic reorder point calculations will help maintain satisfactory stock levels, reduce waste and support sales growth. This reflects larger evidence that predictive methods improve demand forecasting and enable more efficient inventory decisions compared with static or purely instinctive approaches. (Agrawal et al., 2023).

Research Methodology

This study assumed an expressive research plan based on secondary data. Past sales and inventory records were obtained from "Food and Fruits by Deshpande," a small frozen food retailer in Pune, India. These figures include product-wise sales values, replenishment cycles, and observed excess. Expressive figures, basic sales trend analysis, ABC classification by sales value, and simple reorder point (ROP) calculations were used to examine how predictive analytics concepts can be applied in a small-business background. This method follows the overall idea in the literature that predictive systems trust on past sales data and trends for demand forecast and inventory optimization. (Chen, 2024).

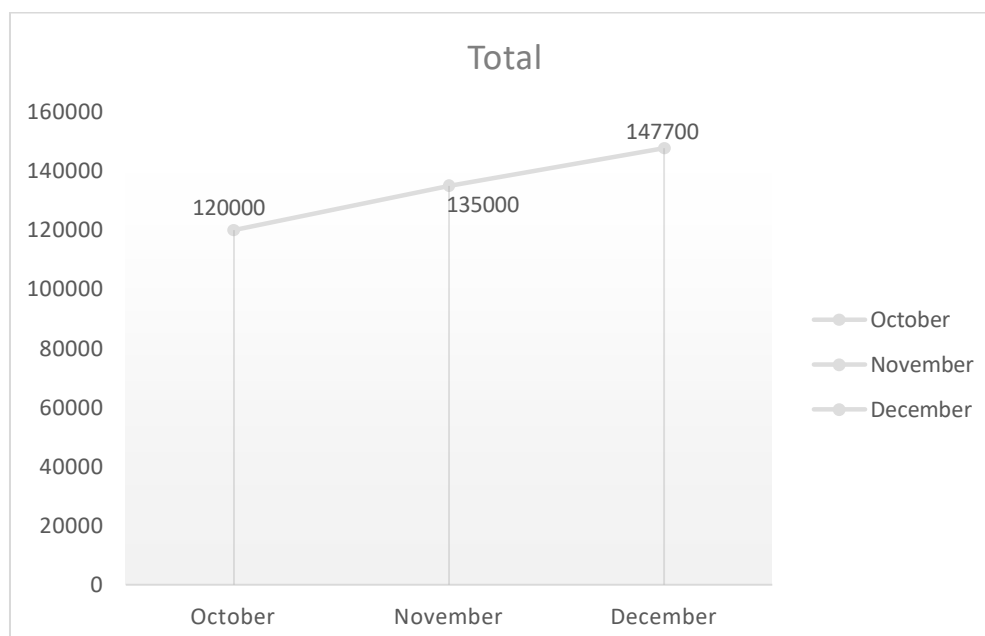
Data Analysis and Result

The collected figures were analysed using a combination of simple measurable procedures, all implementable in Microsoft Excel, to derive actionable insights.

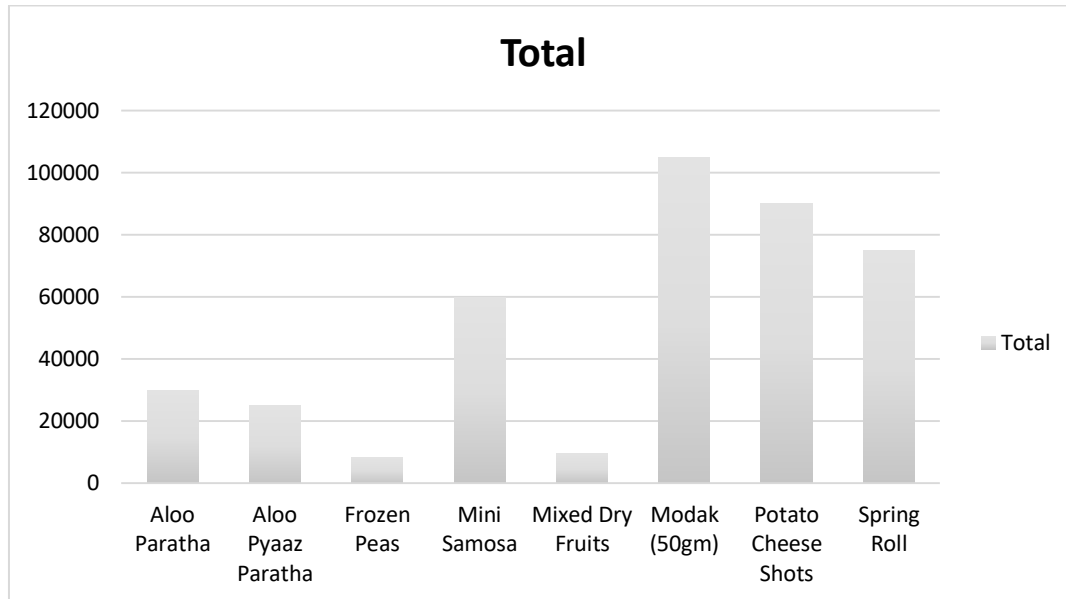
Data Analysis

- Secondary Data: Secondary data were collected to analyse basis of primary findings and understand larger market trends and logical procedures.

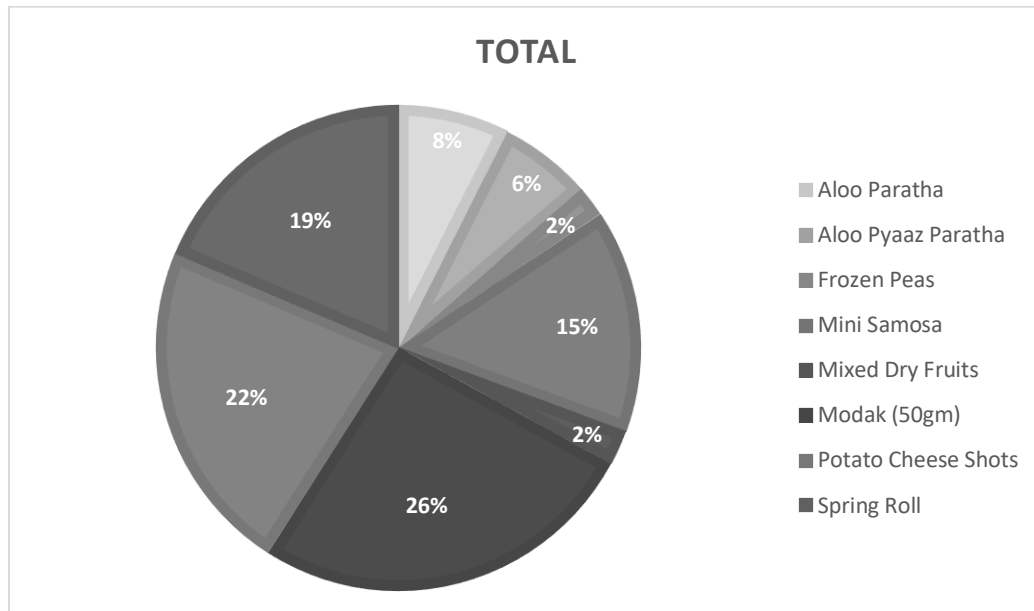
Q1. During October, November, and December, how did overall monthly sales shift? What might that pattern suggest about buyer interest across those months?



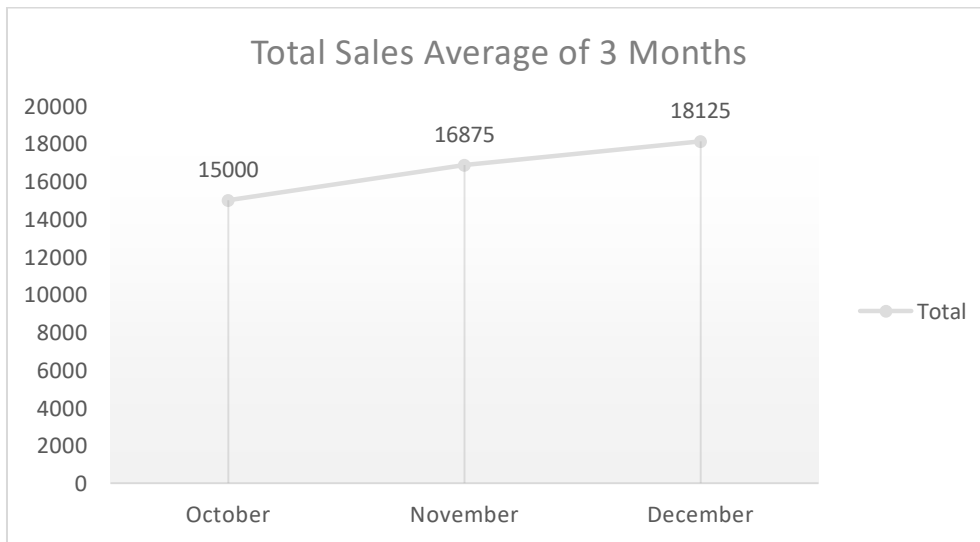
Q2. What items bring in the most money? Could it be that just a few best-selling goods make up nearly all earnings - something close to an 80–20 split among everything offered?



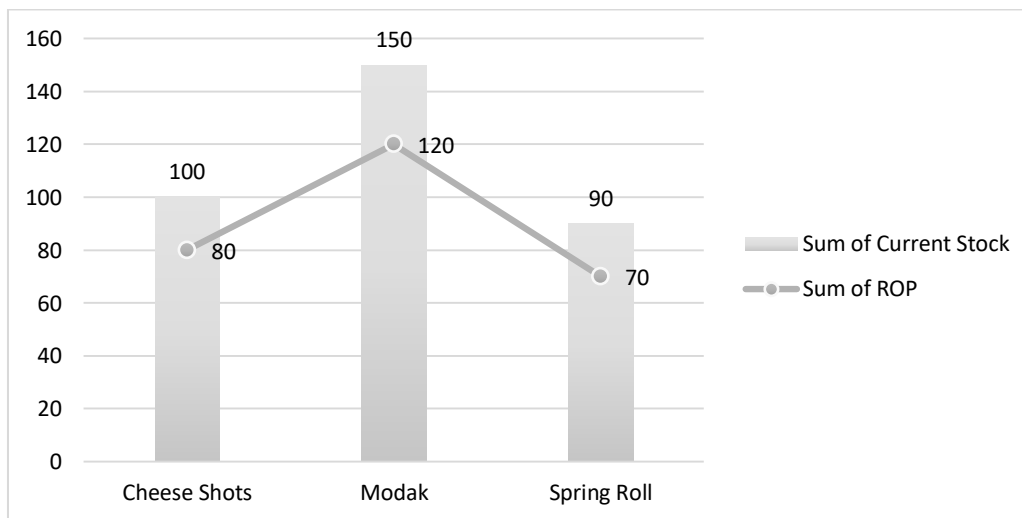
Q3. To be extended on product-wise income, which items can be classified as Category A, and why should they be observed more closely?



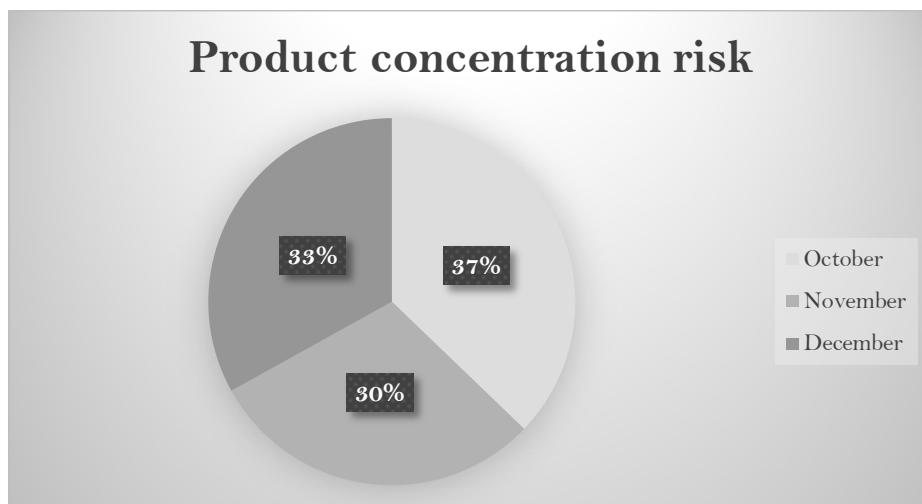
Q4. What are the simple moving average forecast compare with actual monthly sales, and what does it recommend about demand instability?



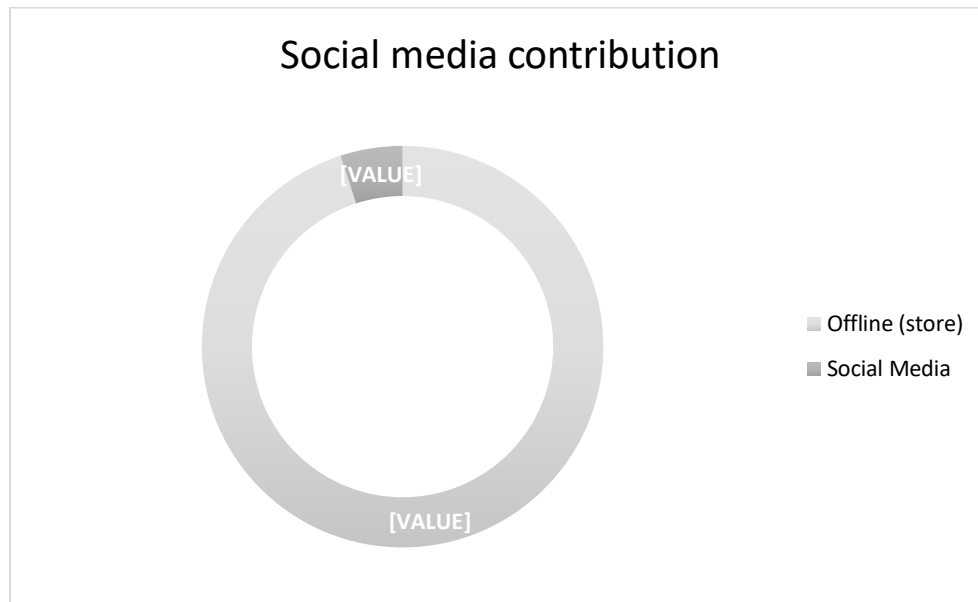
Q5. Assumed the estimated 15-day refill cycle, what reorder points can be derived for the top-selling products to avoid stockouts?



Q6. In what manner dependent on the business in small set of products, and what are the suggestions for inventory risk and forecasting?



Q7. What share of total sales is driven by social media (WhatsApp/Instagram), and how does this encouragement future inventory and marketing decisions?



• Monthly Sales Trend

Sales data show an increase from ₹1.16 lakhs to ₹1.37 lakhs over the observed period, representing a strong growth in demand. From a predictive viewpoint, in this upward trend suggests that future demand estimates and reorder points should be adjusted periodically rather than kept static, line up with the principle that models must reflect evolving sales patterns for accurate predicting (*Chen, 2024*).

• ABC Analysis

Using collective sales value as the portion, the major frozen food items from Category A, contributing the largest share of returns. The top items include:

- 50 g Modaks
- Potato Cheese Shots
- Spring Rolls
- (Two additional high-revenue frozen products as per full dataset)

These Category A products require constricted monitoring and more accurate prediction, similar to how studies recommend focusing sophisticated methods on high-impact SKUs for inventory optimisation (*Agrawal et al., 2023*).

• Reorder Point Calculation

The reorder point was calculated using the following evaluation:

$ROP = \text{Average Daily Demand} \times \text{Lead Time}$

This judgement supports continuous accessibility and aligns with modern predictive systems where demand forecasts directly inform reordering (*Sekhar, 2022*)

Challenges

Applying predictive analytics in small-scale retail is a high-reward plan, but it requires overcoming important operational and mental barriers.

Data & Time Limitations

- Manual Habits: Transitioning from memory-based tracking to disciplined daily data entry is a trying approach change.
- Data Integrity: Manual records are likely to mistakes and identification conflicts, which can lead to imperfect critical models.

Skill & Technology Barriers

- Analytical Literacy: Physical records are inclined to errors and naming variations, which can lead to flawed analytical representations.
- Supposed Complexity: There common misconception that "analytics" requires expensive, high-end software rather than simple, available tools.

Operational Hurdles

- Market Instability: Short ledge lives and demand points due to local festivals or weather make forecasting integrally complex.

- Supply Chain Gaps: Variable lead times from multiple small suppliers can render even the best reorder points unproductive.

Findings

The analysis indicates that even basic critical analytics grounded in secondary sales data, ABC sorting, and simple reorder rules can efficiently support inventory balance for small retailers of frozen food. The 15-day replenishment cycle, collective with an understanding of product-wise demand, has helped the case firm achieve zero wastage, which is important for frozen products. The growth from ₹1.16 lakhs to ₹1.37 lakhs advises that the current approach supports this rising demand. However, social media contributes only approximately 5% of sales, revealing a gap between offline strength and online reach. These results echo the literature, which shows that data-driven demand predicting and integrated stock decisions improve inventory efficiency and reduce stockouts (Bandaru, 2026; Tulli, 2021)

Justification of Hypothesis

The hypothesis is accepted, as basic predictive analytics can improve inventory balance for small retailers. Indication from the case supports this: zero wastage of frozen products, stable and growing sales, and clear identification of high-priority SKUs indicate that data-based forecasting is operational for effective. The literature also confirms that predictive analytics and AI-based forecasting improve inventory results, including turnover and cost optimization (Agrawal et al., 2023; Bandaru, 2026). Collected, these points justify accepting the hypothesis that predictive analytics, even in simple forms, has a positive impact on inventory balance in the Pune-based food retail company.

Recommendations

1. **Authenticate data-driven method:** Continue all daily sales records and control ABC and ROP calculations in simple spreadsheets or basic software package.
2. **Update predictions regularly:** Evaluation sales movements and adjust ROPs at least periodical to reflect growth, seasonal, and product overviews.
3. **Improve digital channels:** Increase social media marketing and track online orders separately so that digital demand can be combined into estimates, as research strains the value of including external factors and advancements in predictive models (Chen, 2024).
4. **Plan for advanced analytics:** In the extended period, explore low-cost decision support tools or cloud services that integrate demand forecasting and inventory control, following leveras described in DSS-oriented research (Tulli, 2021).

Table 2: SWOT of Predictive Analytics Usage at “Food and Fruits by Deshpande”

Strengths	Weaknesses
15-day cycle with zero wastage, clear Category A frozen products and increasing sales. (Agrawal et al., 2023)	Limited formal analytics tools, low digital sales share, and necessity on simple heuristics. (Agrawal et al., 2023)
Opportunities	Threats
Taking of organized predictive analytics, integration of social media data, and future AI-based tools (Chen, 2024).	Competitive from larger retailers with advanced analytics and supply difficulties disturbing lead times. (Tulli, 2021)

Conclusion

The study shows that predictive analytics, even when applied in a basic way using secondary data, can effective improvement in the inventory stability for a small frozen food retailer in Pune. Through simple sales trend study, ABC organization, and reorder point controls, “Food and Fruits by Deshpande” achieved zero wastage and stable sales growth. These results are steady with academic findings that data-driven prediction and combined inventory decisions improve working productivity and inventory act. Small retailers can build on such basics by formalizing data processes, consolidation digital networks, and slowly moving toward more advanced predictive tools as their data and abilities to grow.

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Conflicts of interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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