"A Study on Impact of Sales Trend on Inventory Management in the Bakery Industry in Karnataka"

[1]Bhavana K, [2]M Vidya Shree

[1]Final Year of B.com, [2]Assistant Professor, FOMC
[1]Faculty of Management and commerce,
[1]PES University, Bengaluru, India

Abstract: *The study on the impact of sales trends on inventory management in the bakery industry in Karnataka revealed crucial insights for optimizing inventory practices. Seasonal variations in sales, particularly during festivals and special occasions, highlight the importance of aligning inventory levels with demand to avoid stockouts and minimize holding costs. Bakeries that effectively used sales data for inventory decisions demonstrated better performance, emphasizing the need for data-driven strategies. Additionally, the study underscored the role of technology, such as inventory management software, in enhancing inventory practices. Bakeries leveraging technology were better equipped to track sales trends, manage inventory levels efficiently, and respond promptly to changes in demand, improving operational efficiency and competitiveness.*

Keywords – Sales Trend, Inventory Management, Bakery Industry, Inventory management software.

I. INTRODUCTION

Background

The bakery industry in Karnataka plays a significant role in the state's economy, contributing to the food industry's growth and providing employment opportunities. The bakery business is an ever-changing sector that is impacted by shifting customer tastes, prevailing economic situations, and developments in technology. Seasonal fluctuations, changing customer tastes, and health trends all have an impact on sales patterns in this market. Efficient inventory management is crucial for bakery businesses to ensure cost-effectiveness, customer satisfaction, and overall operational efficiency. Sales trends, including fluctuations in demand, seasonality, and changing consumer preferences, directly impact inventory management practices. Despite the importance of this relationship, there is a gap in the existing literature regarding the specific influence of sales trends on inventory management in the bakery industry in Karnataka.

Need for the study

The study on the impact of sales trends on inventory management in the bakery industry is essential for several reasons.

- Effective inventory management based on sales trends can lead to cost savings and improved financial performance for bakeries.
- Aligning production levels with demand can help bakeries reduce waste and manage costs more effectively.
- Maintaining optimal inventory levels can improve cash flow by reducing the amount of capital tied up in excess inventory.
- Anticipating fluctuations in demand and adjusting inventory levels accordingly can reduce the risk of stockouts and excess inventory, improving financial stability.
- Bakeries that effectively manage their inventory based on sales trends can gain a competitive advantage by enhancing customer satisfaction and loyalty.

Theoretical implication of the study

The study has theoretical significance since it deepens our knowledge of how sales patterns and inventory control interact in the bakery sector. The study can add to conceptual frameworks in inventory management, especially when it comes to perishable commodities, by examining this link. it extends existing inventory management theories by providing empirical evidence of how sales trends impact inventory management practices in the bakery industry in Karnataka. By addressing a gap in the literature, this research contributes to the broader body of knowledge in inventory management and sales trend analysis, laying the groundwork for future theoretical developments and empirical studies in this field. The study may also provide light on customer preferences and behaviour, giving a theoretical foundation for comprehending how these elements affect inventory management choices in the

Bakery sector.

Recent trends in bakery industry and Inventory management.

➢ Data Analytics: By using data analytics technologies to examine customer behaviour and sales patterns, more and more bakeries are able to draw better judgements about inventory management.

➢ Automation: Implementing automatic systems for managing inventory that minimize human error and optimise inventory levels using real-time sales data.

➢ Demand Forecasting: Using sophisticated demand forecasting methods to predict shifts in customer demand and modify inventory levels appropriately.

➢ Sustainability: As the importance of sustainability grows, bakeries are concentrating on lowering food waste by improving inventory control and manufacturing procedures.

➢ Online Sales: As a result of the expansion of online sales channels, bakeries must modify their inventory management plans to satisfy the needs of online consumers.

Literature review

The bakery industry is experiencing significant changes driven by consumer preferences for healthier, more convenient options. Although refined wheat flour has historically been used, contemporary tastes choose coarse grain flour and legumes for additional fibre and protein. It can be difficult to get the ideal dough and sensory qualities with these alternatives, though. However, the items that are produced provide improved nutrition, addressing the rising concerns around obesity and chronic illnesses. Trends in the bakery industry are also being driven by consumer demand, which is showing a desire for healthier choices including organic, plant-based, vegan, and gluten-free goods. Technology is having a big impact on business processes and customer experiences, which highlights how crucial it is to adopt new developments in order to stay competitive. Maintaining development and competitiveness in the bakery business requires exploiting technical advancements and adjusting to changing consumer demands.

The financial management of the bread industry is another facet that is being examined. Many studies have explored internal controls, management accounting systems, credit sales, and accounts receivable collections and have concluded that credit availability is essential for increasing sales, but delinquent accounts carry hazards. Weaknesses in the collection of accounts receivable point to the necessity of stricter control mechanisms and consumer credit evaluation. Sales planning is employing artificial intelligence, especially machine learning, more and more to estimate sales using variables like prices and promotions. A promising area for machine learning optimisation is the food business, which strives for environmental sustainability while managing short shelf lives. But there are obstacles, including setting up infrastructure and fostering confidence in algorithm performance.

A study conducted by Lianga (2013) proposes a prediction model, Analytic Hierarchy Process (AHP) that combines factor analysis and a prediction tool based on factors such as quantity, frequency, and recency. It was found that Inventory management is important in the food-processing-and-distribution industry because it helps minimize waste, control costs, and ensure the timely delivery of fresh and high-quality food products to customers. (Lianga,2013)

Another study by Kazeem (2023) in Abeokuta, Nigeria, used sales data to optimise forecasting models for the demand for confectionary goods containing starch. The model that minimised mistakes in product demand estimates was the exponential smoothing model, which proved to be the most efficient. Similar difficulties experienced by bakery management were noted in research conducted in Ghaziabad, Uttar Pradesh, and included ingredient prices, labour shortages, competitiveness, and regulatory compliance. The goal of the study was to advance the understanding of bakery management and offer suggestions for solving challenges. (Kazeem, 2023)

It is anticipated that the bakery sector would rise to a GDP of USD 590.54 billion by 2028, propelled by new product developments and shifting customer preferences. In order to improve production planning in the face of seasonal demand swings, the French bakery industry uses machine learning techniques for sales forecasting. The report recommends more research on sales planning with the use of strategic management and machine learning techniques.

In a nutshell, customer tastes and technology improvements are driving huge alterations in the baking business. Businesses must comprehend these trends and obstacles in order to innovate, adapt, and maintain development in this fast-paced industry.

Industry profile

The bakery sector, which includes businesses mostly involved in the production of frozen and fresh bread as well as other bakery goods, is an essential part of the food industry. This business, which provides a wide range of goods such bread, cakes, pastries, and biscuits, is essential to providing the daily nutritional needs of customers around the world. The bread sector is renowned for its wide range of product offerings, which satisfy different customer tastes and nutritional needs with everything from conventional to cutting-edge and specialised goods. Consumer tastes are shifting in the direction of healthier and more commodious food alternatives, which is one of the main drivers propelling the growth of the bakery business in India. Demand for goods like bread made from whole wheat, multigrain cookies, and sugar-free cakes is rising as consumers look for items that are lower in fat, sugar, and chemical additives. The Indian bread business has grown significantly as a result of urbanisation. Convenient food alternatives like packed biscuits, bread, and snacks are in more demand as more people relocate to cities and lead busy lifestyles. In an effort to better serve urban consumers, this tendency has resulted in the growth of bakery chains and the launch of new goods. The Indian bakery market size reached US$ 11.3 Billion in 2022. Looking forward, the analyst expects the market to reach US$ 21.2 Billion by 2028, exhibiting a CAGR of 11.06% during 2022-2028.

There are many small and medium-sized businesses operating in India's highly fragmented bread industry. On the other hand, several large multinational brands and bakery chains are also well-known throughout the nation. Due to the market's variety, competitors are in fierce rivalry with one another on things like product quality, pricing, and distribution routes. The Indian bakery business mostly depends on conventional retail channels, including bakeries, grocery shops, and supermarkets, for distribution. On

the other hand, there is a growing tendency in the direction of online retailing, as more and more customers buy bakery goods through e-commerce sites.

Seasonal and regional variables also have an impact on the bakery business; during different seasons year-round or in particular regions of the world, demand for particular items is stronger. Significant technical developments have occurred in the bread business in recent years, especially in terms of equipment and manufacturing methods. Increased productivity and efficiency in bakeries have been made possible by automated technologies for mixing, baking, and packing, which have improved product quality and uniformity. Furthermore, without sacrificing flavour or texture, bakeries can now produce goods that are healthier and more environmentally friendly because to developments in ingredient and formulation technology. Since inventory management has a direct influence on availability of products, quality, and profitability, it is an essential component of the bread sector. Sustaining ideal stock levels of ingredients, completed goods, and raw materials to fulfil demand while reducing waste and storage expenses is essential to effective inventory management. Bakeries need to keep a close eye on seasonality, sales patterns, and other variables in order to precisely predict demand and manage their inventory. Decisions about inventory management heavily rely on sales trends since they offer important information about customer preferences and demand trends. Bakeries can discover popular items, forecast future trends, and modify their manufacturing and stock levels by analysing sales data. For instance, a bakery could raise output if a certain product is regularly selling well in order to fulfil demand and prevent stockouts.

Problem statement

Growing spending power and changing customer tastes are driving the expansion of the Indian bakery sector. It is difficult to close the gap between inventory management and sales trends, nevertheless. Previous research studies frequently concentrate on international or non-Indian contexts, leaving out important details about the distinctive features of the Indian market. The distribution networks and ingredient availability are different, and Indian customers have unique taste preferences. The majority of bakeries in India are SMBs, or small and medium-sized businesses. They frequently rely on experience-based procedures instead of sophisticated inventory management systems. Demand variations brought on by festivals and seasons make inventory management even more challenging. Although there is a limited level of technology adoption in inventory management, POS systems and data analytics integration might increase productivity. Practices for sustainable inventory management are also essential. Indian bakeries need to investigate ways to reduce waste and extend shelf life to enhance operational effectiveness and conform to worldwide sustainability trends. The problem statement is that "lack of research on how bakeries can optimize their inventory management practices based on unique sales trends and market characteristics hinders bakery profitability, leads to potential stockouts or waste, limits the ability of the new bakery entrepreneurs when it comes to managing inventory"

Research gap

While it is well recognised that sales patterns have a direct impact on inventory requirements, there are currently no thorough studies specifically focused on India especially Karnataka, thus bakery enterprises are left without clear direction on how to efficiently optimise their inventory levels. This reduces the profitability of bakeries and makes it harder for them to effectively satisfy client requests, which raises the risk of stockouts and waste and eventually lowers profitability. For bakery businesses, particularly those just starting out, understanding this interaction is essential since it may help them create plans for more efficient inventory management and better response to changing market conditions.

Objectives of the study

- To analyze the current sales trends in the bakery industry, including factors influencing consumer preferences and purchasing behaviors.

- To identify the existing inventory management practices in the bakery industry and their alignment with sales trends.

- To ascertain the challenges faced by bakery firms in managing their inventory effectively in response to fluctuating sales trends.

- To provide actionable insights and strategic recommendations to bakery owners to improve their inventory management practices based on sales trend analysis.

Scope of the study

The scope of the study "A study on Interplay between Sales Trends and Inventory Management in the Bakery Industry" is to investigate the relationship between sales trends and inventory management practices in the bakery industry. The study will focus on

- Analyzing sales data to identify patterns and trends in customer demand for bakery products

- Examine the inventory management practices employed by bakery businesses.

- Analyze how sales trends influence inventory management decisions, such as determining reorder points, managing stock levels, and predicting demand for different products.

Research methodology and data collection

Data Collection Method

  I.   Primary data – questionnaire

 II.   Secondary data – Journals, Articles, Office books

III.   Sample design

a. Population -Bakery entrepreneurs

b. Sample size - 100

Tools for Data Collection- Questionnaire, journals , office books.

Data Analysis plan

- Data Collection: Gather data on inventory management practices, sales trends, challenges faced in inventory management, and duration of business for bakeries in the study.

- Data Cleaning: Clean the data to remove errors, missing values, and inconsistencies.

- Hypothesis: construct hypothesis

- Chi-Square Test: Use the chi-square test to analyze relationships between variables.

- Interpretation: Evaluate chi-square test results to determine if relationships are significant ($p < 0.05$), indicating an impact of sales trends, inventory management practices, and duration of business on each other.

- Conclusion: Summarize findings based on chi-square tests, descriptive statistics, and graphical analysis to draw conclusions about the relationships between variables in the bakery industry.

Statistical tools for analysis

In our research paper, we employed a combination of graphical analysis and the chi-square test using SPSS software to analyze the relationship between various factors in the bakery industry. Graphs, such as bar charts and line graphs, were used to visually represent the data and provide insights into trends and patterns. These graphical representations were instrumental in identifying potential relationships and guiding further analysis. Additionally, the chi-square test in SPSS was utilized to statistically test the hypotheses regarding the relationships between different variables, such as sales trends, inventory management practices, challenges faced in inventory management, and duration of business. This statistical tool enabled us to determine the significance of these relationships and draw meaningful conclusions from the data. By using both graphical analysis and the chi-square test, we were able to conduct a comprehensive analysis of the data and provide valuable insights into the dynamics of the bakery industry.

Limitation of the study

➢ The study is limited by the availability and quality of data, as access to detailed and current sales and inventory information from bakery businesses is restricted.

➢ Time and resource constraints is a major hinderance to the study's scope, potentially impacting the depth and thoroughness of data collection and analysis.

➢ Responses from bakery owners and managers, which form the basis of the study's conclusions, is subject to bias based on their individual experiences and perspectives.

Data analysis and interpretation.

Hypothesis Testing Using Chi Square Test

Hypothesis 1

Ho: There is no significant relationship between sales trends and inventory management practices in the bakery industry.

HA: There is a significant relationship between sales trends and inventory management practices in the bakery industry.

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	32.950[a]	12	0.001
Likelihood Ratio	35.667	12	0.000
N of Valid Cases	100		

Interpretation

- Degree of freedom – 12

- Significance level – 0.05

- Critical value (table) - 21.026

- Here p<0.05

- Observed value – 32.950

In hypothesis testing, the null hypothesis (Ho) suggests that there is no significant relationship between sales trends and inventory management practices in the bakery industry, while the alternative hypothesis (HA) proposes that there is indeed a significant relationship between these variables.

To evaluate this hypothesis, a chi-square test was conducted with 12 degrees of freedom and a significance level of 0.05. The critical value from the chi-square table for 12 degrees of freedom at a 0.05 significance level is approximately 21.026. However, the observed chi-square value from the test was calculated as 32.950, which exceeds the critical value.Based on these results, the alternative hypothesis (HA) is accepted, and the null hypothesis (Ho) is rejected. This means that there is a significant relationship between sales trends and inventory management practices in the bakery industry.

This finding indicates that bakery owners' management of inventory is influenced by sales trends. For example, during periods of high sales, bakery owners may increase their stock levels to meet demand, whereas during slower sales periods, they may reduce stock levels to minimize waste. Understanding this relationship can help bakery owners make informed decisions about their inventory management practices, potentially leading to more efficient and cost-effective operations.

Hypothesis 2

Ho : There is no significant relationship between inventory management practices and challenges faced in inventory management

HA : There is significant relationship between inventory management practices and challenges faced in inventory management

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.492[a]	9	0.057
Likelihood Ratio	17.765	9	0.038
N of Valid Cases	100		

- Degree of freedom – 9

- Significance level – 0.05

- Critical value (table) - 16.919

- Here p>0.05

- Observed value – 16.492

In hypothesis testing, the null hypothesis (Ho) states that there is no significant relationship between inventory management practices and the challenges faced in inventory management, while the alternative hypothesis (HA) suggests that there is a significant relationship between these variables.

A chi-square test was conducted with 9 degrees of freedom and a significance level of 0.05. The critical value from the chi-square table for 9 degrees of freedom at a 0.05 significance level is approximately 16.919. However, the observed chi-square value from the test was calculated as 16.492, which is less than the critical value.Since the observed chi-square value is less than the critical value and the p-value is greater than 0.05, we fail to reject the null hypothesis (Ho). This means that there is no significant relationship between inventory management practices and the challenges faced in inventory management in the bakery industry.

This result suggests that the way bakeries manage their inventory does not have a significant impact on the challenges they face in managing inventory. Other factors, such as external market conditions, supplier issues, or internal operational inefficiencies, may have a greater influence on these challenges.

Hypothesis 3

Ho: There is no significant relationship between duration of business and inventory management practices

HA: There is significant relationship between duration of business and inventory management practices

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	109.710[a]	12	0.000
Likelihood Ratio	82.564	12	0.000
N of Valid Cases	100		

- Degree of freedom – 12
- Significance level – 0.05
- Critical value (table) - 21.026
- Here $p<0.05$
- Observed value – 109.710

In hypothesis testing, the null hypothesis (Ho) states that there is no significant relationship between the duration of business (i.e., how long a bakery has been operating) and inventory management practices. The alternative hypothesis (HA) suggests that there is a significant relationship between these variables.

A chi-square test was conducted with 12 degrees of freedom and a significance level of 0.05. The critical value from the chi-square table for 12 degrees of freedom at a 0.05 significance level is approximately 21.026. The observed chi-square value from the test was calculated as 109.710, which exceeds the critical value. Since the observed chi-square value is greater than the critical value and the p-value is less than 0.05, we reject the null hypothesis (Ho) and accept the alternative hypothesis (HA). This means that there is a significant relationship between the duration of business and inventory management practices in the bakery industry. This result indicates that the duration of business has a notable impact on how bakeries manage their inventory. It suggests that as a bakery operates for a longer period, its inventory management practices may evolve or change.

Findings

- Most of the bakeries, regardless of their size or tenure, prefer using FIFO (First-In-First-Out) method for inventory management. Some also use LIFO (Last-In-First-Out) or Safety Stock methods.
- While some bakeries still rely on manual tracking or spreadsheet software for inventory management, many have adopted inventory management software to streamline their processes.
- A majority of the bakeries use sales data to make inventory management decisions, indicating a strong reliance on sales trends to manage their inventory levels effectively.
- Nearly all bakeries experience seasonal fluctuations in sales, and they adjust their inventory management strategies accordingly by offering seasonal products, adjusting pricing, and implementing pre-ordering systems.
- Common challenges faced by bakeries include overstocking, understocking and storage constraints. These challenges influence their inventory management decisions.
- On a scale of 1 to 5, most bakeries rated the impact of sales trends on their inventory management practices as 4 or 5, indicating a high influence of sales trends on their inventory decisions.
- Overall, bakeries seem to be somewhat satisfied with their current inventory management practices, with some indicating very high satisfaction, especially those using advanced inventory management software.

Recommendation

Based on the findings of the study regarding impact of sales trend on inventory management practices in the bakery industry, several key recommendations can be made to enhance operational efficiency and address common challenges faced by bakery owners. Few of them are as follows

- Utilize advanced forecasting tools to predict demand and optimize inventory levels. These tools can analyze sales trends and seasonality to ensure optimal stock levels.
- Utilize inventory management software to automate inventory tracking, ordering, and replenishment processes. Look for software that integrates with point-of-sale systems for real-time inventory updates.
- Conduct regular financial analysis to track costs associated with inventory management, including ordering, storage, and waste. Use this data to identify cost-saving opportunities and optimize inventory practices to improve profitability.
- Use barcode scanning technology to track inventory movement accurately. Barcode scanners integrated with inventory management systems can improve efficiency and reduce errors in data entry.
- Implement ABC analysis to categorize inventory based on value and prioritize management efforts. This can help in focusing on high-value items and optimizing their management.

- Implement automated reordering systems that trigger orders when inventory levels reach a certain threshold. This can help in maintaining optimal stock levels without manual intervention.
- Provide regular training to staff on how to use inventory management tools effectively. This can improve accuracy and efficiency in managing inventory.

Conclusion

The study on the impact of sales trends on inventory management in the bakery industry in Karnataka revealed crucial insights for optimizing inventory practices. Seasonal variations in sales, particularly during festivals and special occasions, highlight the importance of aligning inventory levels with demand to avoid stockouts and minimize holding costs. Bakeries that effectively used sales data for inventory decisions demonstrated better performance, emphasizing the need for data-driven strategies. Additionally, the study underscored the role of technology, such as inventory management software, in enhancing inventory practices. Bakeries leveraging technology were better equipped to track sales trends, manage inventory levels efficiently, and respond promptly to changes in demand, improving operational efficiency and competitiveness.

In conclusion, the study emphasizes the significance of aligning inventory management practices with sales trends to improve operational efficiency and customer satisfaction in Karnataka's bakery industry. By leveraging sales data, adopting technology, and implementing effective inventory management strategies, bakery businesses can enhance their competitiveness and adaptability, positioning themselves for long-term success in the dynamic marketplace.

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