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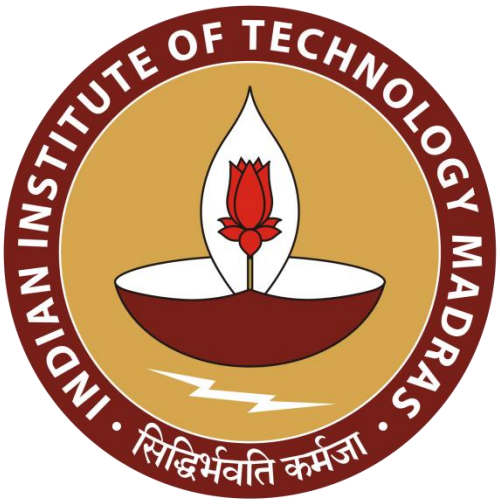

Revenue Optimization and Demand Forecasting

Analysis of a Dairy Firm

BUSINESS DATA MANAGEMENT – CAPSTONE PROJECT

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Declaration Statement

I am working on a Project Titled "**Revenue Optimization and Demand Forecasting Analysis for a Dairy Firm**". I extend my appreciation to SHREE MAA DAIRY, for providing the necessary resources that enabled me to conduct my project.

I hereby assert that the data presented and assessed in this project report is genuine and precise to the outmost extent of my knowledge and capabilities. The data has been gathered from primary sources and carefully analyzed to assure its reliability.

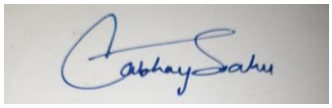
Additionally, I affirm that all procedures employed for the purpose of data collection and analysis have been duly explained in this report. The outcomes and inferences derived from the data are an accurate depiction of the findings acquired through analytical procedures.

I am dedicated to adhering to the principles of academic honesty and integrity, and I am receptive to any additional examination or validation of the data contained in this project report.

I understand that the execution of this project is intended for individual completion and is not to be undertaken collectively. I thus affirm that I am not engaged in any form of collaboration with other individuals, and that all the work undertaken has been solely conducted by me. In the event that plagiarism is detected in the report at any stage of the project's completion, I am fully aware and prepared to accept disciplinary measures imposed by the relevant authority.

I understand that all recommendations made in this project report are within the context of the academic project taken up towards course fulfillment in the BS Degree Program offered by IIT Madras. The institution does not endorse any of the claims or comments.

Signature of Candidate:



Name: Abhay Sahu

Date: July 16, 2025

1. Executive Summary

The project focuses on analyzing sales patterns and optimizing revenue generation for a local dairy firm business operating in the unorganized dairy sector. The business deals with diverse dairy products including fresh milk, packaged milk products, dairy items like dahi, ghee, and cream in various packaging formats serving both B2B and B2C customers.

The key challenges identified through preliminary data analysis include significant monthly revenue fluctuations (ranging from ₹83.6 lakhs to ₹105.3 lakhs across the observed period), unpredictable demand patterns, and lack of systematic approach to production planning and inventory management.

To address these challenges, I plan to analyze three months of comprehensive sales data (November 2024, January 2025, and April 2025) covering over 25 different dairy products. The analysis will focus on identifying revenue drivers, understanding seasonal demand patterns, and developing forecasting models to optimize production planning and reduce wastage.

The project aims to provide data-driven insights for revenue stabilization, product portfolio optimization, and demand forecasting to enhance the dairy firm's operational efficiency and profitability.

2. Organisation Background

Owner Name : Amitabh Nagaria

The project focuses on a traditional unorganized dairy firm, Shree Maa Dairy, located in Yamunotri village, Jhansi district, Uttar Pradesh. Operating for over 25 years, the firm supplies both B2B and B2C customers with fresh milk, packaged milk products, dahi, ghee, and cream. With no digital infrastructure in place, operations are fully manual—covering inventory, sales, and production tracking. The business model is local, operating from a retail shop that also acts as a distribution point. Despite loyal customers and consistent demand, the business lacks data-driven strategies for pricing, inventory management, and forecasting—making it a suitable candidate for analytical transformation.

3. Problem Statement

3.1 Revenue Fluctuation and Stability Management

The dairy farm experiences monthly revenue variations, with sales ranging from ₹83.58 lakhs (April 2025) to ₹105.25 lakhs (January 2025), with November 2024 at ₹95.50 lakhs. While these fluctuations are more moderate than initially observed, understanding the underlying patterns is crucial for optimizing revenue consistency and operational planning.

3.2 Product Portfolio Optimization and Demand Forecasting

With over 25 different dairy products in various packaging formats, the business lacks systematic analysis of product performance, profitability per product category, and optimal product mix. Additionally, the absence of demand forecasting leads to production inefficiencies, potential wastage of perishable products, and missed sales opportunities.

4. Background of the Problem

The challenges faced by the dairy firm stem from the typical characteristics of unorganized sector businesses combined with the perishable nature of dairy products.

The revenue variations observed in the data show January 2025 with the highest sales (₹105.25 lakhs), followed by November 2024 (₹95.50 lakhs), and April 2025 (₹83.58 lakhs). Understanding these patterns and optimizing for consistent performance requires systematic analysis of underlying demand drivers and seasonal factors.

The diverse product portfolio, while providing multiple revenue streams, also presents complexity in inventory management and resource allocation. Products like fresh milk dominate revenue in high-performing months, while packaged products show varying performance patterns. Without systematic analysis, the business cannot optimize production schedules, minimize wastage, or maximize profitability. The lack of data-driven insights also hampers strategic decision-making regarding pricing strategies, customer segmentation, and market expansion opportunities. In the competitive dairy market, these analytical gaps can significantly impact long-term sustainability and growth potential.

5. Problem Solving Approach

5a. Methodology Details with Justification

Quantitative Methods:

Time-Series Analysis: Given the time-dependent nature of sales data across three months, time-series analysis will help identify trends, seasonal patterns, and cyclical variations in revenue and product demand.

Comparative Analysis: Month-over-month and product-wise performance comparison to identify top performers, declining products, and emerging trends.

Statistical Analysis: Descriptive statistics, correlation analysis, and variance analysis to understand data patterns and relationships between different variables.

Demand Forecasting Models: Simple forecasting techniques using moving averages and trend analysis to predict future demand patterns.

Qualitative Methods:

Stakeholder Interviews: In-depth discussions with the dairy farm owner to understand business operations, seasonal factors, customer behavior, and operational challenges.

Market Context Analysis: Understanding local market conditions, festivals, seasonal factors, and external influences affecting dairy consumption patterns.

5b. Data Collection Details with Justification

Primary Data Source: Three months of comprehensive sales data including:

- Product-wise sales quantities and revenues
- Daily/monthly transaction records
- Product categories and pricing information
- Seasonal variation data across November 2024, January 2025, and April 2025

Additional Data Collection:

- Interviews with firm owner regarding operational challenges
- Market context information (local festivals, seasonal factors)
- Cost data for profitability analysis (if available)
- Customer segment information

Justification: The three-month dataset provides sufficient variation to identify patterns while being manageable for comprehensive analysis. The time periods selected (November, January, April) represent different seasonal contexts, enabling robust seasonal analysis.

5c. Analysis Tools and Justification

Analysis Tools:

Microsoft Excel/Google Sheets: For initial data cleaning, basic statistical analysis, and creating fundamental visualizations including trend charts, product performance comparisons, and revenue analysis.

Python with Pandas and Matplotlib/Seaborn libraries: For advanced data manipulation, comprehensive statistical analysis, and sophisticated visualizations to extract deeper insights from the dataset.

Statistical Analysis: Using descriptive statistics, correlation analysis, and forecasting techniques to understand data patterns and predict future trends.

Justification:

Excel/Google Sheets provide accessible tools for fundamental analysis and can be easily shared with stakeholders for practical implementation.

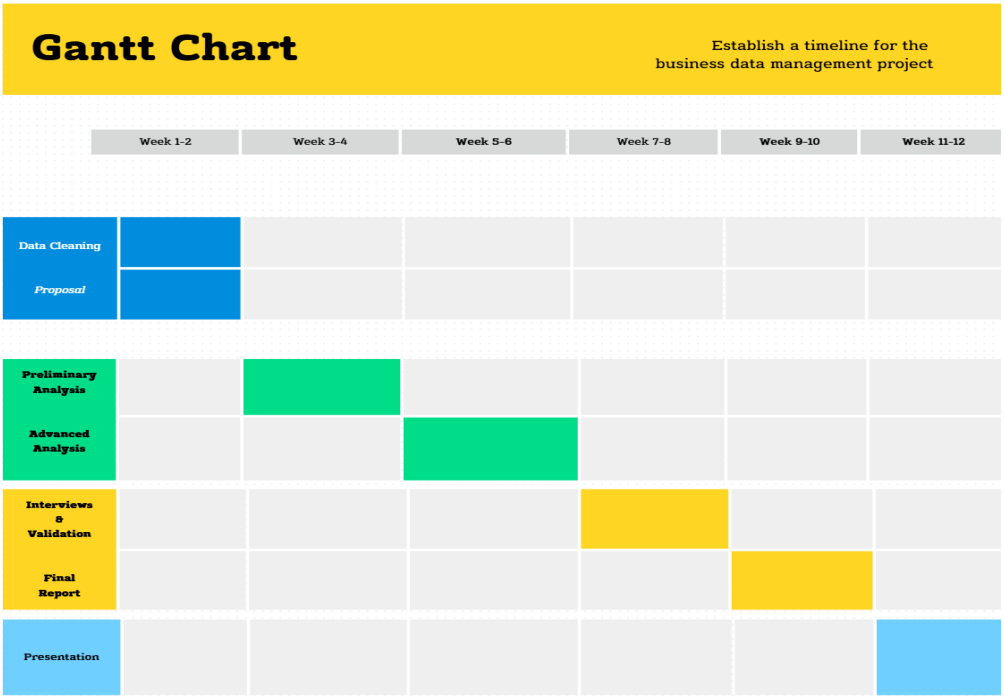
Python enables advanced analytical capabilities including complex data transformations, statistical modeling, and professional-quality visualizations that can uncover hidden patterns in the data.

6. Expected Timeline

6.1 Work Breakdown Structure:

- **Data Collection and Organization:** Completed - Three months of sales data collected and organized
- **Data Cleaning and Processing:** Week 1-2 of project timeline
- **Proposal Submission:** Week 2
- **Preliminary Data Analysis:** Week 3-4
- **Advanced Statistical Analysis:** Week 5-6
- **Stakeholder Interviews and Validation:** Week 6-7
- **Final Analysis and Report Preparation:** Week 8-10
- **Final Submission and Presentation:** Week 11-12

6.2 Gantt Chart



7. Expected Outcome

Revenue Optimization Insights:

- Identify key factors driving revenue fluctuations and develop strategies for stabilization
- Establish optimal pricing strategies for different product categories
- Create actionable recommendations for consistent monthly revenue targets

Product Portfolio Analysis:

- Comprehensive profitability analysis of each product category
- Recommendations for optimal product mix to maximize revenue
- Identification of underperforming products and improvement strategies

Demand Forecasting Model:

- Develop simple yet effective forecasting models for production planning
- Seasonal demand predictions to optimize inventory management
- Reduce wastage through better demand anticipation

Operational Efficiency Improvements:

- Data-driven recommendations for production scheduling
- Customer segmentation insights for targeted marketing
- Implementation roadmap for systematic data management practices

Business Strategy Recommendations:

- Long-term growth strategies based on data insights
- Risk mitigation strategies for revenue fluctuations
- Market expansion opportunities based on product performance analysis

The project will deliver a comprehensive analytical framework that transforms the dairy farm's decision-making process from intuition-based to data-driven, ultimately enhancing profitability, operational efficiency, and long-term sustainability.