

CASE STUDY PROJECT

✅ Inventory Analysis and Optimization - Case Study

Title:

Improving Inventory Efficiency Using Data-Driven Strategies: A Case Study

Institution:

Sandip University, Madhubani

Team Members: Manavi Kumari (Team Leader), Ajay Kumar

1. Background:

This case study focuses on optimizing inventory management for a mid-size retail operation using modern tools like Microsoft Excel, Python, and Power BI. The main goal was to reduce excess stock, avoid shortages, and improve financial efficiency.

2. Objectives:

Improve inventory accuracy

Reduce overstock and low stock problems

Optimize reorder process

Increase profitability

3. Tools and Technologies Used:

Microsoft Excel: For data cleaning, sorting, and pivot analysis

Python: For automation in reorder alerting and data handling

Power BI: For visual dashboards and KPI tracking

4. Data Overview:

The dataset included:

Products, vendors, customers

Purchase and sales transactions

Data analysis was performed on trends, categories, and price margins

5. Key Findings:

📌 Purchase Analysis:

Monthly purchase patterns were uneven

Some vendors had inconsistent delivery

High purchase quantity in some unnecessary items

📌 Sales Analysis:

Top-selling items identified

Major customers contributed significantly to revenue

Certain products had high demand but low stock

📌 Inventory Status:

Low stock alerts for smartwatches and other fast-moving items

Overstocking found in slow-moving products

6. Analytical Techniques:

◆ ABC Classification:

Class A: High value (20% items covering 80% value)

Class B: Medium value

Class C: Low value items

◆ Stock Turnover Ratio:

Calculated to check how quickly inventory is sold and replaced

◆ Reorder Level:

Safety stock levels and reorder quantities were determined

Smartwatches needed immediate restocking

7. Identified Issues:

Overstocking in low demand products

Low availability of high-demand items

Vendor delays affecting timely replenishment

8. Optimization Strategies:

Applied EOQ (Economic Order Quantity) for optimal purchase quantity

Developed Automated Reorder Alerts using Python

Conducted Vendor Performance Reviews for better reliability

9. Dashboard & Visual Insights:

Created Power BI dashboards for:

Sales vs Purchase trends

Stock status

KPIs like turnover rate, low stock alerts

10. Financial Impact:

Better margin tracking using cost vs selling price

Identified cost-saving opportunities by reducing overstock

Enhanced overall profitability

11. Future Enhancements:

Integrate AI-based demand forecasting

Real-time inventory tracking using barcode scanning

12. Conclusion:

This case study demonstrates how data analysis and automation can significantly improve inventory management. With optimized reordering, better vendor management, and real-time insights, the business achieved higher efficiency and customer satisfaction.

 Presented by:

Manavi Kumari (Team Leader)

Ajay Kumar

Sandip University, Madhubani
