

Sales and Profitability Analysis of a US Superstore Using Power BI

Deepshikha Baishnab¹, Vivekananda Biswas²

¹ BA Student, Ramthakur College, Agartala

² Assistant Professor, Department of Business Administration, JIS College of Engineering, Kalyani

Abstract

The present study examines the sales and profitability performance of a US Superstore using Business Intelligence and Data Analytics tools, particularly Microsoft Power BI and Microsoft Excel. The study aims to analyse sales trends, profitability patterns, customer segments, regional performance, shipping modes, and product categories to generate meaningful business insights. Secondary data obtained from the US Superstore Sales Dataset available on Kaggle were used for analysis. Data cleaning, transformation, visualization, and interpretation techniques were applied to identify significant patterns and business opportunities. The findings reveal that the Consumer segment contributes the highest share of sales, while Technology and Furniture are among the most significant revenue-generating product categories. Regional analysis indicates noticeable variations in sales performance across geographical locations, and monthly trend analysis highlights fluctuations in sales and profitability over time. The study demonstrates how Business Intelligence tools can transform large datasets into meaningful visual information that supports strategic decision-making and operational improvement in the retail sector.

Keywords: *Business Intelligence, Power BI, Data Analytics, Retail Analytics, Sales Performance, Profitability Analysis, Data Visualization, Superstore Sales*

1. Introduction

In the contemporary business environment, organizations generate enormous volumes of transactional data through daily operations. Effective analysis of this data enables businesses to understand customer purchasing behaviour, sales trends, product demand, and profitability patterns. As competition intensifies across industries, organizations increasingly rely on data-driven decision-making to improve operational efficiency, customer satisfaction, and overall business performance.

The US Superstore Sales Dataset represents a retail business environment containing information related to sales, profit, customer segments, shipping modes, product categories, and regional performance. Proper analysis of such data helps organizations identify profitable products, high-performing customer segments, and emerging market trends that can support strategic planning.

Retail organizations often face challenges in managing and interpreting large amounts of sales data. Traditional reporting methods may fail to provide comprehensive and interactive insights into business operations. Consequently, organizations may miss opportunities to improve profitability, optimize inventory, and enhance customer relationships. The present study addresses this challenge by transforming raw sales data into meaningful business insights through visualization and analytical techniques.

The significance of this study lies in demonstrating the practical application of Business Intelligence and sales analytics in understanding retail performance. The findings can support organizations in strategic planning, inventory management, marketing decision-making, and

operational improvement. Furthermore, the study highlights the role of visualization tools such as Power BI in converting complex datasets into actionable business information.

2. Literature Review

The growing importance of business analytics and data-driven decision-making has been widely discussed in academic and professional literature. Davenport and Harris (2007) emphasized that organizations using analytical techniques gain a competitive advantage by improving their understanding of customer behaviour, operational performance, and sales trends. Their work highlights the strategic value of analytics in enhancing profitability and organizational effectiveness.

Stephen Few (2013) stressed the significance of dashboards and data visualization in simplifying complex business information. According to the author, visual representations such as charts, graphs, and key performance indicators enable managers to quickly identify trends, patterns, and performance issues, thereby facilitating faster and more informed decision-making.

Sharda, Delen, and Turban (2018) explained that Business Intelligence and analytics systems play a crucial role in reporting, forecasting, and strategic management. They argued that organizations increasingly depend on analytical technologies to improve operational efficiency and support business growth.

Kotler and Keller (2016) highlighted the importance of understanding customer purchasing behaviour and sales patterns in designing effective marketing strategies. Their work emphasizes customer segmentation as a valuable approach for identifying target markets and improving marketing effectiveness.

Laudon and Laudon (2020) discussed the growing role of information systems and analytics in modern organizations. They noted that analytical tools improve decision-making speed, business planning, and operational control by providing timely and relevant information.

The existing literature demonstrates the importance of analytics, visualization, and Business Intelligence in enhancing organizational performance. The present study contributes to this body of knowledge by applying analytical techniques to a retail dataset and generating practical business insights through Power BI dashboards.

3. Objectives of the Study

The major objectives of the study are:

- I. To analyse the overall sales performance of the superstore.
- II. To evaluate profitability trends across different product categories.
- III. To identify the contribution of various customer segments.
- IV. To analyse regional sales performance.
- V. To examine customer preferences regarding shipping modes.
- VI. To create an interactive Power BI dashboard for business visualization.
- VII. To transform raw sales data into meaningful business insights.
- VIII. To understand the practical application of Business Analytics and Data Visualization.

4. Research Methodology

4.1 Research Design

The study follows a descriptive and analytical research design. The objective is to analyze retail sales performance and generate meaningful insights through Business Intelligence tools and dashboard visualization techniques.

4.2 Source of Data

The study is based entirely on secondary data collected from the US Superstore Sales Dataset available on Kaggle. Additional information was obtained from academic books, articles, and references related to Business Analytics and retail performance analysis.

4.3 Data Collection Tool

The dataset was downloaded from Kaggle and processed using Microsoft Excel and Microsoft Power BI. Data cleaning, transformation, and visualization procedures were performed using these tools.

4.4 Sampling Method

The study uses secondary data analysis. The complete dataset available from Kaggle was utilized for analytical purposes.

4.5 Sample Size

The analysis was conducted using the available US Superstore Sales Dataset containing sales transactions, customer segments, regional information, product categories, shipping modes, and profitability records.

4.6 Area of Study

The study focuses on the United States retail market represented through the US Superstore Sales Dataset.

4.7 Tools for Data Analysis

The following tools and techniques were used:

- i. Microsoft Power BI
- ii. Microsoft Excel
- iii. Descriptive Analysis
- iv. Trend Analysis
- v. Comparative Analysis
- vi. Segment Analysis
- vii. Regional Analysis
- viii. Dashboard Visualization Techniques

5. Data Analysis and Interpretation

5.1 Sales Distribution by Customer Segment

Table 1: Sales Distribution by Customer Segment

Customer Segment	Sales Contribution (%)
Consumer	41
Corporate	35
Home Office	23

Table 1 show that the Consumer segment accounts for approximately 41% of total sales, making it the largest contributor to revenue generation. Corporate customers contribute around 35%, while the Home Office segment accounts for approximately 23% of total sales. The findings indicate that individual consumers are the primary drivers of business revenue. While corporate customers also contribute significantly, the Home Office segment represents a comparatively smaller market. Customer retention and personalized marketing initiatives may further strengthen sales performance.

5.2 Year-on-Year Sales and Profit Performance

Table 2: Year-on-Year Business Performance

Year	Sales (Million)	Profit (Million)
2014	0.48	0.05
2017	0.73	0.09



Figure 2: Monthly Profit and Sales Trend by Year

Table 2 and Figure 2 demonstrate sales increased steadily from 0.48 million in 2014 to 0.73 million in 2017. Profit also increased consistently from 0.05 million to 0.09 million during the same period. Shipping activity and order volume grew significantly, indicating increasing

customer transactions and operational expansion. The upward trend in both sales and profitability suggests sustained business growth and improved financial performance. The results indicate effective management practices and growing market demand for the company's products and services.

5.3 Regional and Category-Wise Sales Performance



Figure 3: Regional Sales Performance by Product Category

Figure 3 highlights that the West region demonstrated strong sales performance, particularly in the Furniture category, generating approximately 18K in sales compared to about 10K for Technology products. The Central region displayed balanced performance across categories, with Furniture contributing approximately 89K, Technology 70K, and Office Supplies 57K. The South region showed exceptional performance in Technology products, with sales reaching approximately 112K compared to 45K for Furniture. Regional differences reveal varying customer preferences and demand patterns. The West region presents opportunities for furniture-related expansion, while the South region offers strong potential for technology-focused marketing and product development. Region-specific strategies can improve profitability and customer satisfaction.

5.4 Shipping Mode Analysis

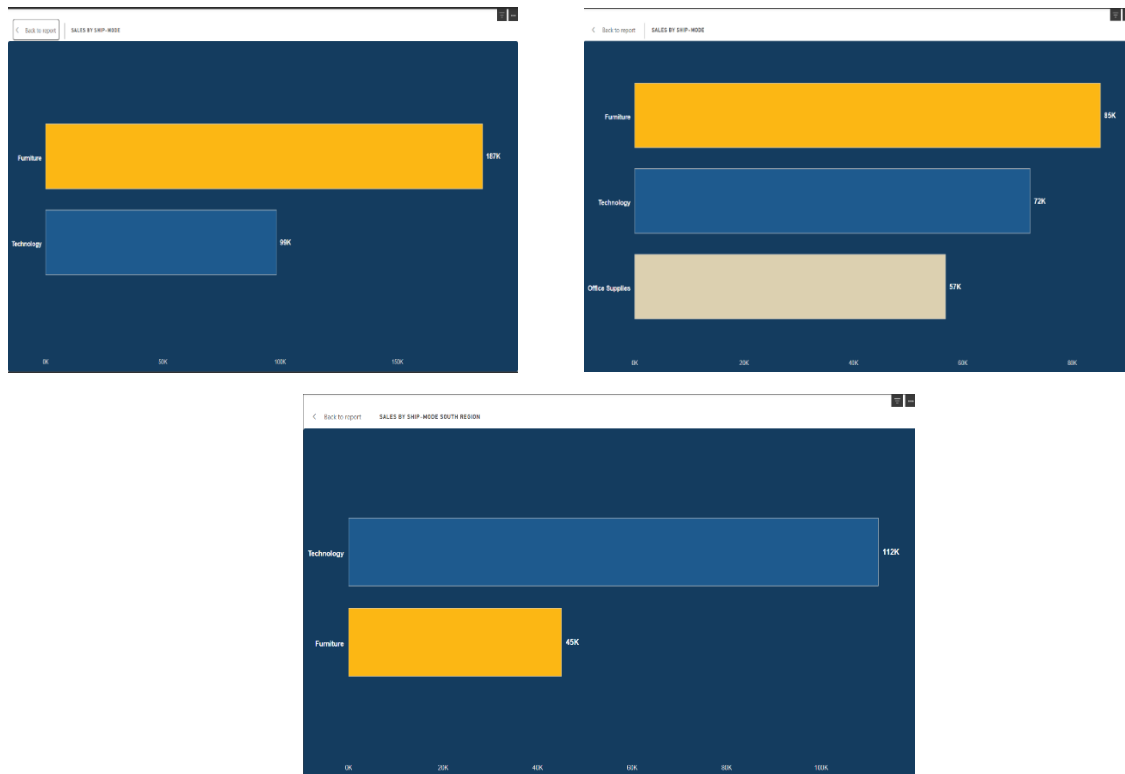


Figure 4: Sales by Shipping Mode

Figure 4 shows that the dashboard indicates increasing shipping activity over time, reflecting growth in customer transactions and business operations. Standard Class shipping emerged as the most preferred shipping method among customers. Customer preference for Standard Class shipping suggests a focus on affordability and value. Improving delivery efficiency and service quality within this shipping mode may contribute to enhanced customer satisfaction and retention.

6. Major Findings of the Study

- I. Sales demonstrated continuous growth from 2014 to 2017.
- II. Profitability increased consistently alongside sales growth.
- III. The Consumer segment contributed the highest share of total sales (approximately 41%).
- IV. Corporate customers represented the second-largest revenue-generating segment.
- V. The West region recorded the highest overall sales contribution.
- VI. The South region showed particularly strong performance in Technology products.
- VII. Technology and Furniture emerged as the most significant product categories.
- VIII. Shipping activity increased substantially over the study period.
- IX. Standard Class shipping was the most preferred shipping mode.
- X. Sales performance improved significantly during the later months of the year, especially November and December.
- XI. Dashboard visualization effectively supported business insight generation and decision-making.

7. Discussion

The findings indicate that customer segmentation plays a critical role in retail business performance. The dominance of the Consumer segment suggests that individual purchasing behaviour significantly influences revenue generation. The strong contribution of corporate customers further highlights the importance of maintaining business-to-business relationships.

Regional differences in sales performance demonstrate the necessity of localized marketing and inventory strategies. Consumer preferences vary across regions, making it essential for organizations to customize product offerings and promotional activities according to regional demand patterns.

The strong performance of Technology and Furniture categories reflects changing customer needs and market trends. Technology products, in particular, exhibited substantial demand in certain regions, suggesting opportunities for product expansion and targeted marketing initiatives.

Seasonal fluctuations in sales and profit emphasize the influence of consumer buying behaviour and promotional activities. Effective seasonal planning can therefore contribute significantly to business profitability and operational efficiency.

Overall, the study demonstrates how Business Intelligence and analytics tools can enhance organizational understanding of customer behaviour, product performance, and operational trends.

8. Conclusion

The study successfully demonstrates the practical application of Business Intelligence and Data Analytics through Microsoft Power BI. By analysing the US Superstore Sales Dataset, important insights were generated regarding sales performance, profitability, customer segmentation, shipping preferences, product categories, and regional business trends.

The findings indicate continuous business growth, increasing profitability, strong performance of the Consumer segment, and significant contributions from Technology and Furniture product categories. Regional variations in sales performance further highlight the importance of targeted business strategies and localized decision-making.

The Power BI dashboard effectively transformed raw business data into meaningful visual information, enabling easier identification of trends, opportunities, and performance challenges. The study reinforces the importance of data visualization and analytical tools in supporting strategic business decisions and improving organizational efficiency.

9. Recommendations

- I. Strengthen business operations in high-performing regions such as the West and South regions.
- II. Increase investment in Technology products due to their strong market demand.
- III. Develop region-specific marketing and promotional strategies.
- IV. Improve the performance of lower-performing product categories through market research and customer feedback analysis.
- V. Enhance customer retention programs for the Consumer segment.
- VI. Introduce personalized marketing initiatives to encourage repeat purchases.

- VII. Optimize shipping operations and improve delivery efficiency.
- VIII. Develop seasonal marketing campaigns to capitalize on peak demand periods.
- IX. Improve inventory planning to meet changing customer preferences.
- X. Continue utilizing Business Intelligence tools for ongoing performance monitoring and decision-making.

10. Limitations of the Study

- I. The study is based entirely on secondary data obtained from Kaggle.
- II. The dataset may not fully represent real-world business conditions.
- III. The analysis is limited to the US Superstore dataset and may not be generalizable to other industries or countries.
- IV. The study focuses primarily on sales, profitability, customer segments, and regional performance.
- V. Advanced analytical techniques such as predictive analytics, machine learning, and forecasting were not employed.
- VI. The dataset covers only the period from 2014 to 2017.
- VII. Long-term market trends and customer behaviours beyond this period were not examined.
- VIII. Findings depend on the quality and completeness of the available dataset.
- IX. Dashboard performance may vary depending on software and system compatibility.

11. Future Scope of the Study

Future studies may expand the scope of analysis by incorporating larger and more recent datasets to capture evolving market trends and customer behaviours. Comparative studies across different countries, industries, or retail sectors may provide broader insights into sales and profitability dynamics.

Researchers may also apply advanced analytical techniques such as predictive analytics, machine learning algorithms, forecasting models, and artificial intelligence-based decision-support systems. Additional variables including customer satisfaction, loyalty, promotional effectiveness, pricing strategies, and competitor analysis can further enrich future investigations.

Expanding the geographical coverage and time horizon of the study would improve the generalizability and practical relevance of findings. Integration of real-time data analytics and automated dashboard systems may also provide valuable opportunities for future research and business applications.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons license unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

References

1. Davenport, T. H., & Harris, J. G. (2007). *Competing on Analytics*. Harvard Business School Press.
2. Few, S. (2013). *Information Dashboard Design*. Analytics Press.

3. Han, J., Kamber, M., & Pei, J. (2011). *Data Mining: Concepts and Techniques*. Morgan Kaufmann Publishers.
4. IBM. What is Business Analytics?
5. Kaggle. US Superstore Sales Dataset.
6. Kotler, P., & Keller, K. L. (2016). *Marketing Management*.
7. Laudon, K. C., & Laudon, J. P. (2020). *Management Information Systems: Managing the Digital Firm*. Pearson Education.
8. Microsoft Excel Support.
9. Microsoft Power BI Official Documentation.
10. Sharda, R., Delen, D., & Turban, E. (2018). *Business Intelligence, Analytics, and Data Science*.
11. Tableau Business Intelligence and Analytics Concepts.
12. Investopedia. Profit and Sales Analysis.