

E-Commerce Orders and Sales Performance Analysis Using Power BI

Aditya Shelke¹ Mrs. Vrushali Shinde²

^{1,2}Master of Computer Applications

^{1,2}PES's Modern College of Engineering, Pune, India

Abstract — In today's digital business environment, e-commerce platforms generate large volumes of transactional data that require efficient analysis for better decision-making. This research paper presents an E-Commerce Orders and Sales Performance Analysis system developed using Microsoft Power BI during an internship at Maestro Intellect. The developed system focuses on transforming raw e-commerce data into meaningful insights through interactive dashboards and visual analytics. The collected e-commerce records contain customer, order, payment, review, and seller-related information. Data preprocessing and transformation were performed using Power Query, while DAX functions were used for KPI calculations. The system provides visual analysis of sales performance, customer behavior, product trends, regional distribution, payment methods, and shipping analysis. The developed dashboards enable businesses to monitor important metrics such as total revenue, total orders, total customers, average review score, products sold, and shipping cost. Interactive charts, slicers, and reports improve business intelligence and support data-driven decision-making. The implemented analytical system highlights how Power BI can support business intelligence operations in e-commerce environments. The system improves reporting efficiency, reduces manual effort, and provides valuable insights for business growth.

Keywords: Power BI, E-Commerce Analytics, Data Visualization, Business Intelligence, Dashboard, DAX, Power Query

I. INTRODUCTION

Modern online shopping platforms continuously generate large volumes of transactional data that require advanced analytical methods for business growth. Online business platforms continuously generate transactional records related to customers, products, payments, and order activities. Proper analysis of this data is essential for improving customer satisfaction, optimizing sales strategies, and increasing profitability.

Traditional methods such as Excel-based reporting are time-consuming and inefficient for handling large datasets. Business organizations require modern business intelligence tools to convert raw data into meaningful insights.

Microsoft Power BI provides interactive visualization and reporting features that help businesses analyze large datasets efficiently. It helps organizations visualize data, identify trends, and make informed business decisions.

This research paper presents the design and implementation of an E-Commerce Orders and Sales Performance Analysis Dashboard using Power BI. The proposed Dashboard was developed to analyze e-commerce datasets and generate interactive visual reports for business analysis.

II. PROBLEM STATEMENT

Before the development of this system, e-commerce data analysis was performed manually using Excel sheets and static reports. The existing system faced several limitations:

- Lack of real-time analysis
- Manual report generation
- Difficulty in handling large datasets
- Limited visualization capabilities
- Increased chances of errors
- Lack of centralized data management

Due to these limitations, businesses faced difficulties in analyzing sales performance, customer behavior, and product trends effectively. Therefore, there was a need for an automated and interactive dashboard system using Power BI.

III. OBJECTIVES OF THE STUDY

The major objectives of the developed system are:

- To perform business analysis on e-commerce sales records through interactive Power BI dashboards. To identify top-performing products and categories
- To analyze customer behavior and purchasing patterns
- To generate interactive dashboards and reports
- To improve decision-making through data visualization
- To automate the reporting process
- To calculate key business metrics using DAX

IV. SCOPE OF THE PROJECT

The developed dashboard system focuses on processing and analyzing e-commerce business data using Power BI. The project covers:

- Data collection from multiple CSV datasets
- Data cleaning and transformation
- Data modeling and relationship creation
- KPI calculation using DAX
- Dashboard and report generation
- Customer, sales, and product analysis
- Visualization using charts and graphs

The project is useful for business analysts, managers, and decision-makers who require quick and accurate insights from e-commerce data.

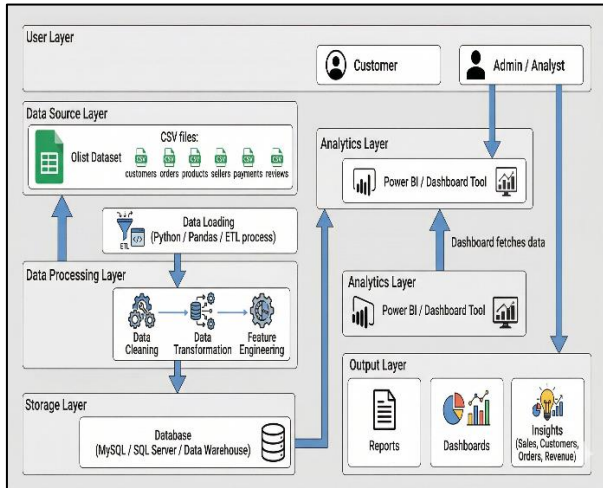
V. LITERATURE REVIEW

Organizations increasingly depend on business intelligence platforms to convert raw operational data into strategic insights. Several analytical studies emphasize the role of business intelligence techniques in enhancing operational efficiency and customer experience.

Several studies have shown that interactive dashboards help organizations monitor KPIs and identify market trends more effectively. Power BI has gained popularity because of its user-friendly interface, integration capabilities, and powerful visualization features.

Previous research in e-commerce analytics mainly focused on sales forecasting, customer segmentation, recommendation systems, and inventory management. This project contributes by developing a practical dashboard-based analytical system for e-commerce sales performance analysis.

VI. METHODOLOGY



A. Data Collection

The dataset used in this project is the Olist e-commerce dataset, which is available in CSV format. It consists of multiple tables such as customers, orders, products, sellers, payments, and reviews. These datasets represent real-world e-commerce transactions and provide detailed information about business operations.

B. Data Cleaning and Transformation

During the development phase, raw e-commerce datasets were refined and standardized to improve data quality and ensure accurate dashboard analysis. In this project, Power Query was used to clean and transform the e-commerce datasets before creating dashboards in Power BI. Duplicate records were removed, missing values were handled, data types were converted, and multiple datasets were merged to ensure accurate and reliable analysis. The transformation process improved data quality and enhanced dashboard performance.

C. Data Modeling

In this project, table relationships were created between datasets to improve report accuracy and dashboard interaction. The dashboard system connected customer, order, payment, product, review, and seller tables through unique identifiers to support accurate analysis and reporting. Proper data modeling helped in generating accurate reports, improving dashboard performance, and enabling efficient KPI calculations using DAX functions.

D. KPI Calculation

Business performance indicators such as revenue, orders, customers, and review scores were calculated using DAX functions in Power BI. In this project, DAX (Data Analysis Expressions) functions in Power BI were used to calculate key performance indicators such as Total Revenue, Total

Orders, Total Customers, Average Review Score, Products Sold, and Shipping Cost. The calculated performance indicators supported detailed evaluation of revenue trends, customer activity, and overall business operations. Accurate KPI calculations improved decision-making and provided meaningful insights through the dashboard.

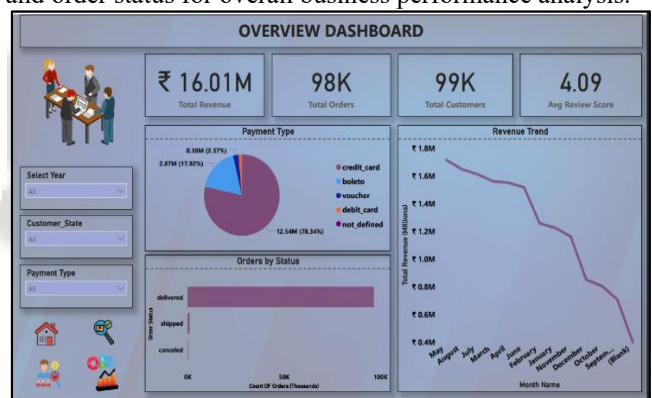
E. Dashboard Development

Power BI visual reports were developed to present business trends, customer analytics, and product insights using dynamic graphical components. In this project, Microsoft Power BI was used to design dashboards such as Overview Dashboard, Customer Insights Dashboard, and Product Analysis Dashboard. Various visual elements including KPI cards, bar charts, line charts, pie charts, donut charts, slicers, and filters were used to present the data in an easy-to-understand format. The dashboards enabled users to interact with data dynamically and perform efficient analysis for better decision-making.

VII. SYSTEM DESIGN

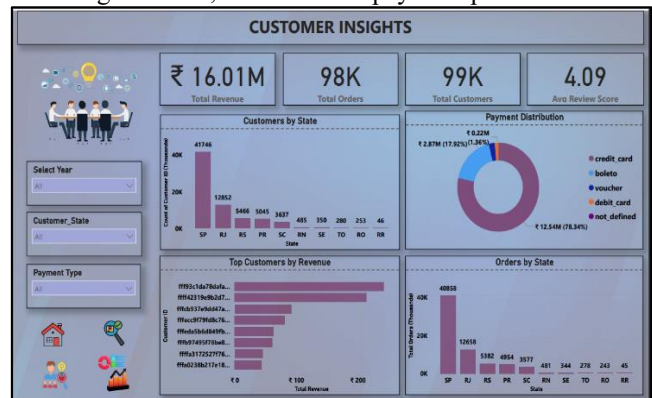
A. Overview Dashboard

The Overview Dashboard displays important business metrics such as total revenue, total orders, total customers, average review score, revenue trends, payment distribution, and order status for overall business performance analysis.



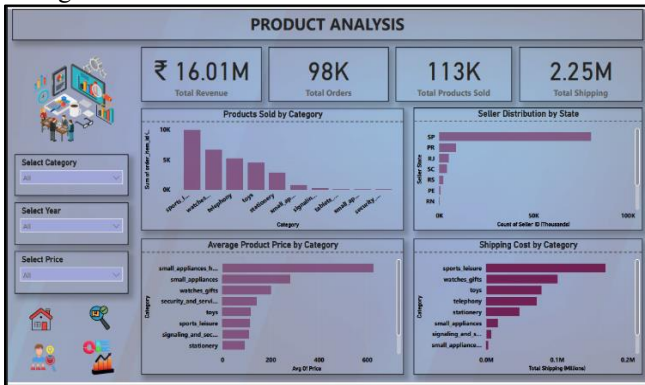
B. Customer Insights Dashboard

The Customer Insights Dashboard provides analysis of customers by state, orders by state, top customers based on revenue generation, and customer payment preferences.



C. Product Analysis Dashboard

The Product Analysis Dashboard helps analyze product category performance, products sold by category, seller distribution, shipping costs, and product price analysis through interactive visualizations.



VIII. RESULTS AND DISCUSSION

The developed system successfully transformed raw e-commerce data into meaningful visual insights. The dashboards enabled efficient monitoring of business performance.

Key findings include:

- Credit card was the most preferred payment method
- Certain product categories generated higher revenue
- Customer distribution varied significantly across states
- Revenue trends changed over different months
- Most orders were successfully delivered

The interactive dashboards improved the speed and efficiency of data analysis compared to manual reporting systems.

IX. TESTING AND VALIDATION

The system was tested to ensure:

- Accurate data import
- Proper table relationships
- Correct KPI calculations
- Working filters and slicers
- Accurate visualizations

Most test cases passed successfully, and the dashboard produced reliable results.

X. LIMITATIONS

- The dataset used is historical and not real-time
- Limited predictive analysis capabilities
- Dashboard performance may reduce with extremely large datasets
- Some advanced analytics features are not included

XI. FUTURE ENHANCEMENTS

- Future improvements can include:
- Real-time data integration
- AI and machine learning-based forecasting
- Mobile dashboard support
- Advanced customer segmentation
- Cloud database integration

- Automated report generation

XII. CONCLUSION

The dashboard developed during the internship focused on analyzing Brazilian e-commerce transaction records using interactive Power BI reports and customized business visualizations. The developed dashboard solution effectively improved analytical reporting and business insight generation for e-commerce operations. The project transformed complex e-commerce datasets into interactive dashboards that support efficient analysis and decision-making.

The system helped analyze sales trends, customer behavior, product performance, payment distribution, and regional sales. The use of Power Query and DAX improved data transformation and KPI calculation.

Overall, the project enhanced reporting efficiency, reduced manual work, and provided meaningful business insights. The study demonstrated how analytical reporting and visualization tools can support decision-making in digital commerce systems.

REFERENCES

- [1] Microsoft Power BI Documentation – <https://learn.microsoft.com/power-bi/>
- [2] Microsoft Learn – DAX Documentation – <https://learn.microsoft.com/dax/>
- [3] Power Query Documentation – <https://learn.microsoft.com/power-query/>
- [4] Power BI Official Website – <https://powerbi.microsoft.com/>
- [5] Research papers and online resources related to Business Intelligence and Data Analytic