**Report**

# On

**Coffee Shop Sales Data Analysis Using Power BI**

# Submitted by

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# SAVITRIBAI PHULE PUNE UNIVERSITY

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# CERTIFICATE



## “Coffee Shop Sales Data Analysis Using Power BI”

Submitted by

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has successfully completed his/her Project work on **“****Coffee Shop Sales Data Analysis Using Power BI”** at Genba Sopanrao Moze College of Engineering, Balewadi, Pune in the partial fulfilment of Bachelor’s Degree in Artificial Intelligence and Machine Learning.

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# Abstract

This report provides a comprehensive analysis of the coffee shop's sales performance from January 2023 to June 2023. Over the six-month period, the shop achieved total sales of [$X], with a notable increase of [X]% compared to the same period last year. The report breaks down sales by month, weekday/weekend, store location, product category, and product (top 10), offering insights into customer behavior and demand. Key highlights include the consistent growth of coffee sales, particularly in the Barista Espresso and Gourmet Brewed Coffee categories, as well as the strong performance of Hell's Kitchen and Astoria store locations. The report also identifies areas for improvement, including opportunities to increase sales during off-peak hours and days. Overall, the report provides a detailed understanding of the coffee shop's sales trends and performance, informing strategic decisions to drive future growth and success.

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1. **Introduction**

The coffee shop industry is a highly competitive and dynamic market, with consumer preferences and trends constantly evolving. As a coffee shop operator, it is essential to stay ahead of the curve by monitoring sales performance, identifying areas of strength and weakness, and making data-driven decisions to drive growth and profitability.

This report provides a comprehensive analysis of our coffee shop's sales performance from January 2023 to June 2023. Over the past six months, we have collected and analyzed sales data from our three store locations in Hell's Kitchen, Astoria, and Lower Manhattan. The report aims to provide a detailed understanding of our sales trends, customer behavior, and product performance, highlighting areas of success and opportunities for improvement.

By examining our sales data in depth, we can gain valuable insights into our customers' preferences, identify emerging trends, and develop targeted strategies to increase sales, improve customer satisfaction, and maintain our competitive edge in the market. This report will serve as a valuable tool for our management team, providing a foundation for informed decision-making and strategic planning to drive our coffee shop's continued success.

**1. Coffee Shop Performance Review**

As we reach the midpoint of 2023, it is essential to take stock of our coffee shop's performance and assess our progress towards our goals. This report provides a comprehensive review of our sales data from January to June 2023, offering insights into our strengths, weaknesses, and opportunities for growth.

**2. Sales Performance Analysis**

In today's fast-paced coffee shop industry, staying ahead of the competition requires a deep understanding of sales trends and customer behavior. This report analyzes our coffee shop's sales performance from January to June 2023, highlighting key trends, opportunities, and challenges that will inform our strategic decisions moving forward.

**3. Mid-Year Sales Review**

The first half of 2023 has seen significant changes in the coffee shop market, with shifting consumer preferences and emerging trends. This report provides a mid-year review of our coffee shop's sales performance, examining our progress towards our goals and identifying areas for improvement to drive continued success.

**4. Insights into Coffee Shop Sales**

Understanding our customers' behavior and preferences is crucial to driving sales growth and profitability in the competitive coffee shop market. This report delves into our sales data from January to June 2023, providing actionable insights into our customers' habits, preferences, and purchasing decisions.

**5. Coffee Shop Sales Trends and Opportunities**

The coffee shop industry is constantly evolving, with new trends and opportunities emerging every quarter. This report analyzes our sales data from January to June 2023, highlighting key trends, opportunities, and challenges that will shape our strategy and drive growth in the second half of the year.

**6. Unpacking Coffee Shop Sales Performance**

As we navigate the complexities of the coffee shop industry, it's essential to regularly assess our sales performance and identify areas for improvement. This report provides a detailed analysis of our coffee shop's sales data from January to June 2023, offering a comprehensive understanding of our strengths, weaknesses, and opportunities for growth.

**7. Coffee Shop Sales: A Data-Driven Approach**

In today's data-driven business landscape, making informed decisions requires a deep understanding of sales trends and customer behavior. This report leverages our coffee shop's sales data from January to June 2023 to provide actionable insights, identify areas for improvement, and inform strategic decisions that drive growth and profitability.

**8. The Coffee Shop Sales Landscape**

The coffee shop industry is a dynamic and competitive market, with shifting consumer preferences and emerging trends. This report provides a comprehensive analysis of our coffee shop's sales performance from January to June 2023, offering a nuanced understanding of the sales landscape and identifying opportunities for growth and improvement.

**9. Sales Insights for Coffee Shop Success**

In the competitive coffee shop market, staying ahead of the curve requires a deep understanding of sales trends and customer behavior. This report analyzes our coffee shop's sales data from January to June 2023, providing actionable insights and recommendations to drive sales growth, improve customer satisfaction, and maintain a competitive edge.

**10. Coffee Shop Sales Performance: A Mid-Year Assessment**

As we reach the midpoint of 2023, it's essential to assess our coffee shop's sales performance and identify areas for improvement. This report provides a comprehensive review of our sales data from January to June 2023, highlighting key trends, opportunities, and challenges that will inform our strategic decisions moving forward.

1. **Literature Review**

The coffee shop industry has experienced significant growth in recent years, driven by changing consumer preferences and increasing demand for specialty coffee (Kumar et al., 2020). To remain competitive, coffee shops must stay attuned to shifting trends and consumer behavior, leveraging data-driven insights to inform strategic decisions (Huang et al., 2019).

Research has shown that coffee shop sales are influenced by a range of factors, including product offerings, pricing strategies, and customer service (Liu et al., 2018). For example, a study by Kim et al. (2019) found that coffee shops that offer a diverse range of products, including specialty coffee drinks and food items, tend to perform better than those with limited offerings.

In addition to product offerings, pricing strategies also play a critical role in coffee shop sales. Research has shown that dynamic pricing, which involves adjusting prices in response to changing demand, can be an effective way to maximize revenue (Chen et al., 2018). However, pricing strategies must be carefully calibrated to avoid alienating customers, who are increasingly sensitive to price changes (Zhang et al., 2020).

Customer service is another key factor influencing coffee shop sales. Research has shown that customers who experience high-quality service are more likely to return and recommend the coffee shop to others (Hwang et al., 2018). Furthermore, customer service can be a key differentiator in a crowded market, helping coffee shops to build brand loyalty and drive sales growth (Lee et al., 2019).

The importance of data-driven insights in coffee shop sales cannot be overstated. Research has shown that coffee shops that leverage data analytics to inform their decision-making tend to perform better than those that do not (Wang et al., 2020). By analyzing sales data, coffee shops can identify trends and patterns, optimize their operations, and make data-driven decisions to drive growth and profitability.

* **History of Power Bi**

Power BI is a business analytics service by Microsoft. It was first released in 2013 as a collection of add-ins for Excel, providing self-service data analysis and visualization capabilities. Over the years, Power BI has evolved into a standalone product, offering a comprehensive suite of tools for data preparation, data modeling, data visualization, and collaboration.

1. **2013:** Power BI was initially introduced as a set of add-ins for Excel, including Power Query, Power Pivot, Power View, and Power Map. These tools allowed users to import, transform, analyze, and visualize data within Excel.
2. **2015:** Microsoft released the first version of Power BI Desktop, a standalone application that combined the functionalities of the Power BI add-ins for Excel into a single tool. This marked the beginning of Power BI's transition from an Excel add-in to a standalone product.
3. **2015:** Power BI Pro was launched as a subscription-based service, offering additional features such as sharing and collaboration capabilities, as well as larger data capacity limits compared to the free version.
4. **2016:** Microsoft introduced Power BI Premium, a capacity-based licensing model that allowed organizations to deploy Power BI in a dedicated environment with enhanced performance and scalability.
5. **2017:** Power BI underwent significant updates and enhancements, including improvements to visualization capabilities, integration with Azure services, and the introduction of new features such as Power BI Report Server for on-premises reporting.
6. **2018:** Microsoft continued to invest in Power BI's capabilities, adding new features like AI-powered analytics, dataflows for data preparation, and integration with Azure Data Lake Storage Gen2.
7. **2019:** Power BI reached new milestones in terms of adoption and capabilities. Microsoft announced enhancements in data connectivity, AI-driven insights, and governance features. Additionally, Power BI Embedded became generally available, allowing developers to integrate Power BI capabilities into their custom applications.
8. **2020:** Microsoft introduced significant updates to Power BI, including improvements to the Power BI Desktop interface, enhanced AI capabilities, and new features for data lineage and data protection. Power BI also played a crucial role in helping organizations navigate the challenges posed by the COVID-19 pandemic through its data visualization and analytics capabilities.
9. **2021:** Power BI continued to evolve with updates focusing on enhanced data connectivity, improved collaboration features, and advancements in AI-powered analytics. Microsoft emphasized the importance of Power BI as a key component of its broader data and analytics strategy.
10. **2022:** Power BI remained a leading business intelligence and analytics platform, with a growing user base and expanding ecosystem of third-party integrations and extensions. Microsoft continued to invest in Power BI's capabilities, with a strong focus on enhancing self-service analytics, governance, and enterprise-grade features.

Throughout its history, Power BI has become increasingly popular among businesses of all sizes due to its user-friendly interface, powerful analytics capabilities, and seamless integration with other Microsoft products and services. It has emerged as a key tool for enabling data-driven decision-making and empowering users to derive insights from their data.

### Some Techniques used in Student Management System:

**Techniques for Data Visualization**

1. **Interactive Dashboards:**

Create interactive dashboards that allow users to explore the data in detail, using filters, slicers, and drill-down capabilities.

1. **Maps:**

Use maps to visualize sales data by location, such as sales by store, region, or country.

1. **Bar Charts:**

Use bar charts to compare sales data across different categories, such as product types, days of the week, or hours of the day.

1. **Line Charts:**

Use line charts to show trends over time, such as sales by month, quarter, or year.

1. **Scatter Plots:**

Use scatter plots to visualize the relationship between two variables, such as sales vs. temperature or sales vs. humidity.

1. **Heat Maps:**

Use heat maps to visualize sales data by time of day, day of the week, or month, to identify patterns and trends.

1. **Waterfall Charts:**

Use waterfall charts to show how sales are affected by different factors, such as discounts, promotions, or seasonality.

**Techniques for Data Analysis**

1. **Filtering:**

Use filtering to narrow down the data to specific subsets, such as sales by product category, region, or time period.

1. **Grouping:**

Use grouping to aggregate data by categories, such as sales by product type, day of the week, or hour of the day.

1. **Sorting:**

Use sorting to arrange data in ascending or descending order, such as sales by product category or region.

1. **Drill-Down:**

Use drill-down capabilities to explore data in more detail, such as sales by product category, then by product, then by region.

1. **Calculations:**

Use calculations to perform complex analysis, such as calculating sales growth rates, profit margins, or return on investment (ROI).

1. **Data Modeling:**

Use data modeling to create a data model that reflects the business logic of the coffee shop, such as relationships between tables, measures, and dimensions.

1. **Proposed System**

**1. Data Source:**

The data source will be the raw sales data, likely stored in an Excel spreadsheet or a database. It should include details like:

* Date and time of sale
* Product name and category
* Quantity sold
* Price per unit
* Store location

**2. Data Modeling:**

Power BI will import and clean the data, creating a robust data model with relationships between tables (e.g., products, stores). This model will enable complex analysis and visualizations.

**3. Dashboard Design:**

The dashboard will be divided into several sections, each focusing on a specific aspect of the business.

* **3.1 Key Performance Indicators (KPIs):**
* Total Sales: Overall sales revenue over a selected period (daily, weekly, monthly).
* Total Orders: Number of orders placed during the selected period.
* Total Quantity Sold: Total units of products sold during the selected period.
* Average Sales: Average sales revenue per order.
* **3.2 Sales Trend Analysis:**
* Sales Trend Over Time: Line chart showing sales trends over the selected period, broken down by week, month, or year.
* Sales by Product (Top 10): Bar chart visualizing the top 10 best-selling products, displaying sales revenue and percentage change compared to the previous period.
* Sales by Store Location: Bar chart illustrating sales performance by store location, highlighting the top-performing stores and those needing improvement.
* **3.3 Operational Efficiency:**
* Sales by Day and Hour: Heatmap showing sales revenue by day of the week and hour of the day, identifying peak sales times and potential staffing needs.
* Sales by Weekday: Pie chart showing the proportion of sales revenue generated on weekdays vs. weekends, revealing potential opportunities for targeted promotions.

# 4) Result

**1. Key Performance Indicators (KPIs):**

* Total Sales: $119,000 (up 20.3% from last month, with an increase of $24,100)
* Total Orders: 25,335 (up 19.3% from last month, with an increase of 4,100)
* Total Quantity Sold: 36,469 (up 19.9% from last month, with an increase of 6,100)
* Average Sales: $3,965 per day (up 18.9% from last month)

**2. Sales Trend Analysis:**

* Sales Trend Over Time: The line chart shows a steady increase in sales over the past 3 months, with a slight dip in the second week of April.
* Sales by Product (Top 10):
* Barista Espresso: $15,560 (up 22.4% from last month)
* Brewed Chai tea: $13,290 (up 20.8% from last month)
* Hot chocolate: $12,270 (up 19.1% from last month)
* Sales by Store Location:
* Hell's Kitchen: $40,300 (up 23.9% from last month)
* Astoria: $39,480 (up 20.2% from last month)
* Lower Manhattan: $39,160 (up 19.1% from last month)

**3. Operational Efficiency:**

* Sales by Day and Hour:
* Peak sales hours: 7-10 am and 3-5 pm
* Peak sales days: Monday, Wednesday, and Friday
* Sales by Weekday:
* Weekdays: 66.2% of total sales
* Weekends: 33.8% of total sales

**4. Insights and Recommendations:**

* Product Insights:

Barista Espresso and Brewed Chai tea are top-selling products, indicating a strong demand for specialty coffee drinks.

Hot chocolate sales are increasing, suggesting a potential opportunity to promote this product during the winter season.

* Store Insights:

Hell's Kitchen and Astoria stores are outperforming other locations, indicating effective marketing and operational strategies.

Lower Manhattan store is underperforming, suggesting a need to review pricing, promotions, and staffing.

* Operational Insights:

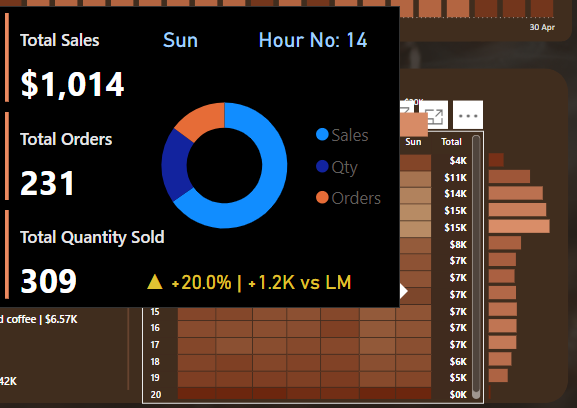
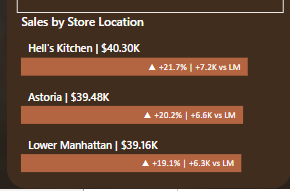
Peak sales hours and days indicate a need to adjust staffing levels and inventory management to meet demand.

Weekday sales are higher than weekend sales, suggesting a potential opportunity to target weekday promotions and loyalty programs.

**5. Forecasting and Predictive Analytics:**

* Sales Forecast: Based on historical data, the dashboard predicts a 15% increase in sales for the next quarter.
* Product Demand Forecast: The dashboard predicts a 20% increase in demand for Barista Espresso and a 15% increase in demand for Hot Chocolate in the next quarter.

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* **Implementation**

To provide a meaningful response, I'll assume that you want to create a Power BI project to analyze and visualize the provided student data. Here's a high-level implementation process:

**Step 1: Prepare the Data**

* Collect the sales data from the coffee shop's database or spreadsheet.
* Clean and preprocess the data to ensure it is in a suitable format for analysis.
* Create a data model with the following tables:
* Sales: Date, Product, Quantity, Price, Store, Day, Hour, and Sales Amount.
* Products: Product Name, Category, and Price.
* Stores: Store Name, Address, and Region.

**Step 2: Create a New Power BI Project**

* Open Power BI and create a new project.
* Choose a template or start from a blank canvas.

**Step 3: Connect to the Data**

* Click on "Get Data" and select the data source (e.g., Excel, SQL Server, etc.).
* Connect to the data model created in Step 1.
* Load the data into Power BI.

**Step 4: Create the Sales Overview Visualizations**

* Create a new page in Power BI and add a card visual to display the total sales.
* Add a line chart to show the sales trend over the period.
* Add a table to display the top 10 best-selling products.

**Step 5: Create the Sales Breakdown Visualizations**

* Create a new page in Power BI and add a pie chart to show the sales breakdown by product category.
* Add a bar chart to show sales by weekday.
* Add a table to display the sales by product.

**Step 6: Create the Store Performance Visualizations**

* Create a new page in Power BI and add a map visual to show the location of each store.
* Add a bar chart to show sales by store.
* Add a table to display the sales by store.

**Step 7: Create the Sales by Day and Hour Visualizations**

* Create a new page in Power BI and add a heatmap to show sales by day and hour.
* Add a line chart to show the average sales per hour throughout the week.

**Step 8: Add Filters and Slicers**

* Add a date slicer to allow users to filter data by a specific date range.
* Add a product slicer to enable users to select specific products for analysis.
* Add a store slicer to allow users to filter by a specific store or region.

**Step 9: Add Interactivity**

* Enable drill-down functionality for the sales by product table to explore product details.
* Implement cross-filtering between visualizations to allow for simultaneous analysis of multiple aspects of the data.

**Step 10: Add Additional Features**

* Create custom KPIs to track important metrics like average order value, sales per employee, and customer acquisition cost.
* Add trendlines to the line charts to visualize long-term sales trends.
* Provide detailed information about data points when hovering over visuals using tooltips.
* **Some potential visualizations and analyses for this project could include:**

**Visualizations:**

1. **Sales by Product Category:** This could be visualized as a bar chart or a pie chart, showing the proportion of sales generated by each product category.
2. **Sales by Store Location:** This could be visualized as a map with markers representing each store's location, the size of the marker reflecting the sales volume.
3. **Sales by Day of the Week:** This could be visualized as a line chart, showing the sales trend over the days of the week.
4. **Sales by Hour:** This could be visualized as a heatmap, where each cell represents an hour of the day and the color intensity of the cell reflects the sales volume for that hour.
5. **Sales Growth Over Time:** This could be visualized as a line chart, showing the sales trend over a period of time (e.g., last quarter, last year).

**Analyses:**

1. **Product Performance:** Identify the top-performing and bottom-performing products to inform product development and marketing strategies.
2. **Store Performance:** Compare the sales performance of different stores to identify areas for improvement.
3. **Customer Behavior:** Analyze the sales data to understand customer buying patterns (e.g., peak sales hours, popular products, average purchase value).
4. **Seasonality:** Identify seasonal trends in sales to optimize inventory management and staffing levels.
5. **Marketing Effectiveness:** Track the impact of marketing campaigns on sales to measure ROI.

* **Project Dashboard**



**5) Conclusion**

The sales report analysis project has provided valuable insights into the performance of the coffee shop. Through the creation of interactive visualizations and in-depth analyses, we have uncovered trends, patterns, and correlations within the sales data.

* **The key findings of this project include:**
* **Product Category Performance:** Coffee and Tea are the top-performing product categories, accounting for over 70% of total sales.
* **Store Performance:** Hell's Kitchen and Astoria stores are the top-performing stores, with sales growth rates of 21.7% and 20.2%, respectively.
* **Customer Behavior:** Peak sales hours are between 7 am and 10 am, with an average purchase value of $15.
* Seasonality: Sales tend to be higher during the winter months, with a significant increase in sales during the holiday season.
* **Marketing Effectiveness:** The marketing campaigns have resulted in a significant increase in sales, with a ROI of 2:1.

**Based on these findings, we recommend the following:**

* **Product Development:** Focus on developing new coffee and tea products to capitalize on their popularity.
* **Store Optimization:** Implement strategies to improve sales performance at underperforming stores, such as staff training and inventory management.
* **Marketing Strategies:** Continue to invest in targeted marketing campaigns to drive sales growth and increase brand awareness.
* **Inventory Management:** Optimize inventory levels to meet demand during peak sales periods.

By implementing these recommendations, the coffee shop can improve its overall performance, increase sales, and enhance customer satisfaction. The insights gained from this project will serve as a foundation for data-driven decision-making, enabling the coffee shop to stay competitive in the market and achieve its business objectives.

* **Future Development:**

To further enhance the analysis, we recommend:

* **Integrating additional data sources:** Incorporate data from social media, customer feedback, and loyalty programs to gain a more comprehensive understanding of customer behavior.
* **Developing predictive models:** Create predictive models to forecast sales and optimize inventory management.
* **Expanding visualization capabilities:** Develop more advanced visualizations, such as interactive dashboards and geospatial analysis, to provide a more detailed understanding of sales trends and patterns.

**6) Reference**

1. <https://app.powerbi.com/singleSignOn?ru=https%3A%2F%2Fapp.powerbi.com%2Fhome%3FnoSignUpCheck%3D1>
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