Sarawak Campus

Assignment Cover Sheet

(for individual and group assignments)

This cover sheet is to be attached to all assignments, both hard copy and electronic format

ASSIGNMENT DETAILS

Unit Code	COS10082	Unit Title	APPLIED ANALYTICS IN BUSINESS
Tutorial/Lab Group	2	Lecturer/Tutor Name	NICHOLAS CHING YUN BONG
Assignment Title	ASSIGNMENT 1		
Due date	25/10/2024	Date Received	

DECLARATION

For both individual and group assignments, in the case of assignment submission on behalf of another student, it is assumed that permission has been given. The University takes no responsibility for any loss, damage, theft, or alteration of the assignment.

To be completed if this is an individual assignment

I declare that this assignment is my individual work. I have not worked collaboratively, nor have I copied from any other student's work or from any other source/s, except where due acknowledgment is made explicitly in the text, nor has any part been written for me by another person.

Student Details	Student ID Number	Student Name	Student Signature
Student 1			

To be completed if this is a group assignment

We declare that this is a group assignment and that no part of this submission has been copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part been written for us by another person.

Student Details	Student ID Number(s)	Student Name(s)	Student Signature (s)
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Student 2	102783277	NATALYN FAITH UMBA ANAK GARRY BELAYONG	
Student 3	102781022	KIMBERLY GEORGE	
Student 4	101226713	BRYAN TSE YEE GOH	
Student 5	102787664	BRANDON BAO QUAN LAI	
Student 6	102774129	ZI YANG LIM	

MARKER'S COMMENTS

Total Mark		Marker's Signature		Date	

EXTENSION CERTIFICATE

This assignment has been given an extension by

Unit Convenor			
Extended due date		Date Received	

APPLIED ANALYTICS IN BUSINESS

COS10082

Assignment 1

Semester 2, 2024

Word Count: 1631 words

Student Name	Student ID
Siti Hajar binti Muhammad Syafiq Lau	102782944
Natalyn Faith Umba Anak Garry Belayong	102783277
Kimberly George	102781022
Bryan Tse Yee GOH	101226713
Brandon Bao Quan LAI	102787664
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Executive Summary

Primo Store, a grocery chain situated in the United States, experiences issues due to scattered data across numerous systems, which limits its capacity to perform complicated product analysis and delays access to operational data. To integrate data, expedite reporting, and facilitate improved decision-making, this research suggests a Data Warehouse and Business Intelligence (BI) solution. Key recommendations include analyzing BI solutions, developing an implementation strategy with resource predictions, and calculating ROI. A Tableau or Power BI data visualization prototype shows the advantages of the system. By using this BI system, Primo Store will become stronger in its marketplace, make better data-driven decisions, and operate more efficiently.

Table of Contents

1.0 Introduction

Primo Store, a privately owned retail company with over 4,000 employees, faces significant challenges in managing its sales transactions and promotional data, which are scattered across multiple systems. The lack of integration makes it difficult to perform detailed product and category performance analysis, which is further complicated by varying levels of granularity, such as store, category, subcategory, and spending levels.

Additionally, the slow process of accessing operational data delays daily decision-making, limiting managers' ability to optimize offerings. To resolve these issues, the company plans to hire a Chief Information Officer (CIO) tasked with implementing a Business Intelligence (BI) solution and a data warehouse.

A BI solution can drive data analysis and help improve decision-making, providing a good return on investment (Tripathi & Bagga 2020). Meanwhile, a data warehouse will centralize data from various systems, improving data management and revealing consumer demand trends, which is particularly beneficial for the retail sector (Gupta n.d.).

This report will explore Primo Store's business challenges and outline the proposed solutions, emphasizing how data-driven decision-making can enhance performance, foster innovation, and provide a competitive advantage.

2.0 Business Case

This section outlines the justification for implementing a Business Intelligence (BI) solution at Primo Store, emphasizing the challenges it will resolve and the key benefits it will deliver to the company's operations.

2.1 Business Case Overview

The business case for implementing a Business Intelligence (BI) solution at Primo Store stems from the company's need to overcome several critical data management challenges. Currently, Primo Store's information is scattered across multiple systems, including Excel spreadsheets, Access databases, and various query reports stored on the company's server.

This fragmentation makes it difficult for the company to efficiently access and integrate data related to sales transactions and promotional activities across its chain of stores. As a result, Primo Store struggles to conduct complex product and category performance analyses, which require the ability to connect data at multiple levels of granularity, such as by store, category, subcategory, and spending levels.

Additionally, the current system delays access to operational data by a week or more, hindering timely decision-making and stifling the company's ability to optimize its offers and respond to market changes.

A BI solution would address these issues by integrating all data sources into a centralized system, allowing for real-time reporting, improved operational efficiency, and more informed decision-making, ultimately driving business growth and innovation.

2.2 Key Benefits of the Business Intelligence Solution

This section discusses the benefits of implementing a BI solution to Primo Store.

2.2.1 Centralized Data Access and Integration

A BI solution would centralize data from various sources, such as Excel, Access, and server-based reports, into a single data warehouse. This would simplify data access, enhance reliability, and reduce errors, ensuring everyone has access to the latest information and supporting a data-driven culture (Why Data Centralization Is Vital for Today's Companies n.d.).

2.2.2 Improved Decision-Making with Real-Time Data

BI provides real-time or near-real-time data on customer behavior and sales trends, allowing for faster, data-driven decisions. Managers can quickly adapt to market changes and optimize in-store operations, enhancing agility and minimizing missed opportunities (Adeyemi 2024).

2.2.3 Enhanced Analytical Capabilities

BI tools enable detailed analysis by store, category, and spending levels, helping managers understand revenue drivers. This supports informed, data-driven decisions that improve operations, resource allocation, and customer engagement (Jiménez-Partearroyo & Medina-López 2024).

2.2.4 Increased Operational Efficiency

By automating data integration and reporting, BI replaces manual processes, reducing errors and freeing employees to focus on strategic tasks. BI also optimizes resource allocation, improving operational efficiency and productivity (Optel 2018).

3.0 Implementation and Discussion

This section details the implementation plan for the proposed BI solution, including a comparison of vendors and tools, the required resources, and the chosen software development methodology, ensuring an efficient and effective rollout.

3.1 Proposed Implementation Plan and BI Tool Selection

To implement an effective BI solution for Primo Store, the strategy focuses on using Tableau for both data integration and visualization. Tableau Prep streamlines data preparation, allowing users to extract, transform, and load data from various sources directly within the Tableau ecosystem. This ensures faster and more efficient data centralization without requiring additional ETL tools (Tableau, 2024).

For visualization, Tableau's drag-and-drop interface and interactive dashboards enable real-time insights into product performance, customer behavior, and store trends, helping managers make quick, data-driven decisions (Kirk, 2019; Few, 2019).

In conclusion, Tableau is the recommended tool for Primo Store's BI needs, providing end-to-end support from data integration to visualization, ultimately enhancing decision-making and operational efficiency (Yau, 2021).

3.2 Monetary and Human Resources Requirements and Return on Investment (ROI) Analysis

The monetary funds needed for a standard user of Tableau in an organization cost 70 USD per month, and since there will be a proposed team of the least, four data analysts to the chief information officer, the minimum funds needed to get software started is 280 USD per month for the business intelligence team (Tableau 2024). The company only hires skilled Tableau analysts. The human resources of BI team consist of a traditional BI manager, BI architect, BI systems administrator, BI project manager, and BI analyst. It is estimated that the BI manager is paid at 70000 USD, BI architect at 116000USD, BI systems administrator at 98000 USD, BI project manager at 96000USD, and BI analyst at 116000 USD a year, based on statistics from various sources (Zippia 2024).

On the other hand, data warehousing can be done by using Oracle SQL server platform with four standard users for free with 0.0255 USD per Gigabyte storage capacity per month (Oracle 2024). The data warehousing team will consist of data engineers, data architects, and data manager (Medium 2024). The average salary for data engineers is 120000 USD, data architects at 150000 USD, and data manager 90000 USD per year (Glassdoor 2024).

It would be impossible to calculate the ROI without knowing the net profit of PRIMO store, and the amount of return of the BI and data warehousing team, as the BI and data warehousing team are present to solve the data issues of the company, and predictions of data analysis made by BI about future income and sales are not fully accurate.

3.3 Recommended Software Development Life Cycle Methodology

We recommend Agile Software Development Life Cycle methodology as it allows developing and delivering solutions in smaller chunks. This is important as we can develop and test different parts of the system separately before integrating. It also allows an iterative process, promoting continuous testing and feedback loops, which helps in overall performance. Most importantly, its flexibility allows our team to adapt to changes within a short time and at a low cost. Additionally, stakeholders can be closely engaged throughout the project as it emphasizes user collaboration so the final product can be ensured to meet their needs.

Steps of the Agile Methodology:

1. **Plan:** To begin, the core requirements for the Data Warehouse and BI system need to be identified by the team collaborating with the stakeholders. The planning should involve understanding data sources, integration requirements and key metrics for reporting. A roadmap is created and the tasks for the first few sprints are prioritized.
2. **Analyse:** The team must discuss specific features and tasks that will be tackled in the upcoming sprint before each sprint. The project is broken down into smaller and manageable tasks, such as data extraction from the sales system, and decides which tasks will be included in the sprint.
3. **Design:** During each sprint, the team creates detailed design specifications pertaining to organizational memory, information integration, insight creation, and presentation capabilities of the Data Warehouse and BI system.
4. **Build:** The team develops small components during each sprint. For example, creating Extract, Transform, Load processes to integrate sales data, setting up data marts and designing dashboards for operational reporting.
5. **Deploy:** Continuous integrations are done, in which the new features are tested and integrated into the existing system. It allows the integrated system to deliver accurate and consistent reports.
6. **Review:** Present completed features to stakeholders for feedback from stakeholders, ensuring the system meets business needs and any changes can be quickly arranged.

4.0 Proposed Visualizations and Insights

The visualizations and insights developed by the team can be found in Appendix E. In total, there are six carefully crafted visualizations, each accompanied by thorough analyses, performance evaluations, and benchmarking of the data from Primo Store. These visualizations are designed to provide a comprehensive understanding of the data and its implications. Additionally, the prototype of the visualizations was demonstrated by the team in the presentation video, showcasing the functionality and relevance of this approach. This presentation not only highlights the findings but also illustrates how these visual tools can enhance decision-making processes within the organization.

5.0 Conclusion

By implementing a comprehensive combination of Business Intelligence (BI) tools and a centralized data warehouse, Primo Store can significantly address the inefficiencies caused by fragmented information systems and unlock better insights for decision-making. The proposed solution involves using Tableau for data visualization and Snowflake as the data warehousing platform, both of which are highly capable of aggregating data from multiple sources and presenting it in actionable formats for management.

This approach will not only streamline the integration and reporting process but also enable managers to make more informed and timely business decisions. The report also includes a cost analysis that highlights the projected return on investment (ROI) from adopting these technologies, supporting the overall feasibility of the solution. To ensure adaptability and responsiveness to changes, the team has recommended adopting the Agile methodology during the software development lifecycle, which will allow for continuous improvements and flexibility in responding to new business needs.

Overall, the implementation of these tools will resolve the current data challenges Primo Store faces, leading to more efficient decision-making processes and improved business performance in the long term.

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7.0 Appendix

Appendix A

COS10082 APPLIED ANALYTICS IN BUSINESS

Meeting Minutes

Meeting No: 1

Group members:	Natalyn Faith Umba Anak Garry Belayong	
	Siti Hajar binti Muhammad Syafiq Lau	
	Kimberly George	
	Bryan Goh Tse Yee	
	Brandon Bao Quan Lai	
	Zi Yang Lim	
Date: 4/10/2024	Time: 8 PM	Venue: Google Meet
Attended:	Natalyn Faith Umba Anak Garry Belayong	
	Siti Hajar binti Muhammad Syafiq Lau	
	Kimberly George	
	Bryan Goh Tse Yee	
	Brandon Bao	

	Zi Yang Lim
Absent without reason:	

Agenda

In this meeting, we will discuss:

- Finding out Primo Store's problem and discussing it
- Who will take the meeting minutes
- Task A Division
    - Executive Summary
    - Introduction
    - Business Case
    - Key Benefits
    - Proposed Implementation Plan and BI Tool Selection
    - Monetary and Human Resources Requirements
    - Recommended Software Development
    - Conclusion

Outcome

The outcome(s) of the meeting is/are:

- Discussed the Primo Store's problem
- Everyone has the same idea of what the problem is.
- Natalyn agreed to do the meeting minutes for the group.
- The tasks are divided into:
    - Executive Summary (Hajar)
    - Introduction (Bryan)
    - Business Case (Hajar)
    - Key Benefits (Natalyn)
    - Proposed Implementation Plan and BI Tool Selection (Kimberly)
    - Monetary and Human Resources Requirements (Brandon)
    - Recommended Software Development (Zi Yang)
    - Conclusion (Bryan)

Appendix B

COS10082 APPLIED ANALYTICS IN BUSINESS

Meeting Minutes

Meeting No: 2

<table>
<tr><td rowspan="6">Group members:</td><td colspan="2">Natalyn Faith Umba Anak Garry Belayong</td></tr>
<tr><td colspan="2">Siti Hajar binti Muhammad Syafiq Lau</td></tr>
<tr><td colspan="2">Kimberly George</td></tr>
<tr><td colspan="2">Bryan Goh Tse Yee</td></tr>
<tr><td colspan="2">Brandon Bao Quan Lai</td></tr>
<tr><td colspan="2">Zi Yang Lim</td></tr>
<tr><td>Date: 11/10/2024</td><td>Time: 8 PM</td><td>Venue: Google Meet</td></tr>
<tr><td rowspan="6">Attended:</td><td colspan="2">Natalyn Faith Umba Anak Garry Belayong</td></tr>
<tr><td colspan="2">Siti Hajar binti Muhammad Syafiq Lau</td></tr>
<tr><td colspan="2">Kimberly George</td></tr>
<tr><td colspan="2">Bryan Goh Tse Yee</td></tr>
<tr><td colspan="2">Brandon Bao</td></tr>
<tr><td colspan="2">Zi Yang Lim</td></tr>
</table>

Absent without reason:	

Agenda

In this meeting, we will discuss:

- Finalizing Task A
- Discussion on the visualizations
- Task B Division:
    - Sales by Product Category and Subcategory
        - Stacked Bar Chart or Sunburst Chart
    - Customer Spending Patterns
        - Line Chart or Area Chart
    - Branch Performance Comparison
        - Geographical Map or Heatmap
    - Customer Segmentation by Purchase Amount
        - Scatter Plot or Clustered Bubble Chart
    - Top-Selling Products
        - Horizontal Bar Chart or Pie Chart
    - Promotional Effectiveness
        - Dual Axis Line Chart or Box Plot

Outcome

The outcome(s) of the meeting is/are:

- Task A was discussed among the group in certain parts that needed to be edited and finalized.
- Everyone agreed to do each of the visualizations
- Task B Division:
    - Sales by Product Category and Subcategory (Hajar)
        - Stacked Bar Chart
    - Customer Spending Patterns (Natalyn)
        - Line Chart or Area Chart
    - Branch Performance Comparison (Kimberly)
        - Geographical Map or Heatmap
    - Customer Segmentation by Purchase Amount (Brandon)
        - Scatter Plot or Clustered Bubble Chart
    - Top-Selling Products (Bryan)
        - Horizontal Bar Chart or Pie Chart
    - Promotional Effectiveness (Zi Yang)
        - Dual Axis Line Chart or Box Plot

Appendix C

COS10082 APPLIED ANALYTICS IN BUSINESS

Meeting Minutes

Meeting No: 3

<table>
<tr><td rowspan="7">Group members:</td><td colspan="2">Natalyn Faith Umba Anak Garry Belayong</td></tr>
<tr><td colspan="2">Siti Hajar binti Muhammad Syafiq Lau</td></tr>
<tr><td colspan="2">Kimberly George</td></tr>
<tr><td colspan="2">Bryan Goh Tse Yee</td></tr>
<tr><td colspan="2">Brandon Bao Quan Lai</td></tr>
<tr><td colspan="2">Zi Yang Lim</td></tr>
<tr><td>Date: 18/10/2024</td><td>Time: 8 PM</td><td>Venue: Google Meet</td></tr>
<tr><td rowspan="6">Attended:</td><td colspan="2">Natalyn Faith Umba Anak Garry Belayong</td></tr>
<tr><td colspan="2">Siti Hajar binti Muhammad Syafiq Lau</td></tr>
<tr><td colspan="2">Kimberly George</td></tr>
<tr><td colspan="2">Bryan Goh Tse Yee</td></tr>
<tr><td colspan="2">Brandon Bao</td></tr>
<tr><td colspan="2">Zi Yang Lim</td></tr>
</table>

Absent without reason:	

Agenda

In this meeting, we will discuss:

- Finalizing Task B and check through each visualization
- Compile each visualization and make it into one dashboard
- Task C (Slides and presentation) division:
    - Introduction to the team
    - Background about the company and the challenges
    - Overview of the business intelligence solution
    - Implementation plan and the discussion
    - Demonstration of the visualization prototype for the dataset in Task B
    - Future work
- Recording for the presentation

Outcome

The outcome(s) of the meeting is/are:

- Everyone agreed with each of the visualizations
- Each visualization will be compiled and made into one dashboard
    - Kimberly will handle the compile
- Task C (Slides and presentation) division:
    - Introduction to the team (Bryan)
    - Background about the company and the challenges (Brandon)
    - Overview of the business intelligence solution (Hajar)
    - Implementation plan and discussion (Natalyn)
    - Demonstration of the visualization prototype for the dataset in Task B (Zi Yang)
    - Conclusion and future work (Kimberly)
- Everyone agreed to do the recording by themselves due to clashing schedules and sending their videos into the group chat before the due date so that one person could compile and edit the videos.

Appendix D

COS10082 APPLIED ANALYTICS IN BUSINESS

Meeting Minutes

Meeting No: 4

<table>
<tr><td rowspan="7">Group members:</td><td colspan="2">Natalyn Faith Umba Anak Garry Belayong</td></tr>
<tr><td colspan="2">Siti Hajar binti Muhammad Syafiq Lau</td></tr>
<tr><td colspan="2">Kimberly George</td></tr>
<tr><td colspan="2">Bryan Goh Tse Yee</td></tr>
<tr><td colspan="2">Brandon Bao Quan Lai</td></tr>
<tr><td colspan="2">Zi Yang Lim</td></tr>
<tr><td>Date: 24/10/2024</td><td>Time: 8 PM</td><td>Venue: WhatsApp</td></tr>
<tr><td rowspan="6">Attended:</td><td colspan="2">Natalyn Faith Umba Anak Garry Belayong</td></tr>
<tr><td colspan="2">Siti Hajar binti Muhammad Syafiq Lau</td></tr>
<tr><td colspan="2">Kimberly George</td></tr>
<tr><td colspan="2">Bryan Goh Tse Yee</td></tr>
<tr><td colspan="2">Brandon Bao</td></tr>
<tr><td colspan="2">Zi Yang Lim</td></tr>
</table>

Absent without reason:	
Agenda	
In this meeting, we will discuss: - Finalizing Task C - Compile video clips of each person and make it into a 5-minute video - Editing and checking through the report	
Outcome	
The outcome(s) of the meeting is/are: - Finalizing Task C - Natalyn agreed to compile video clips of each person and make it into a 5-minute video - Editing and checking are done through the report, and it is ready to be submitted	

Appendix E

Proposed Visualizations and Insights

This section presents our proposed visualizations generated from the data analysis, providing actionable insights and recommendations to optimize product performance, customer behavior strategies, and store operations for Primo Store.

Total Sales by Product Category and Subcategory (in Millions)

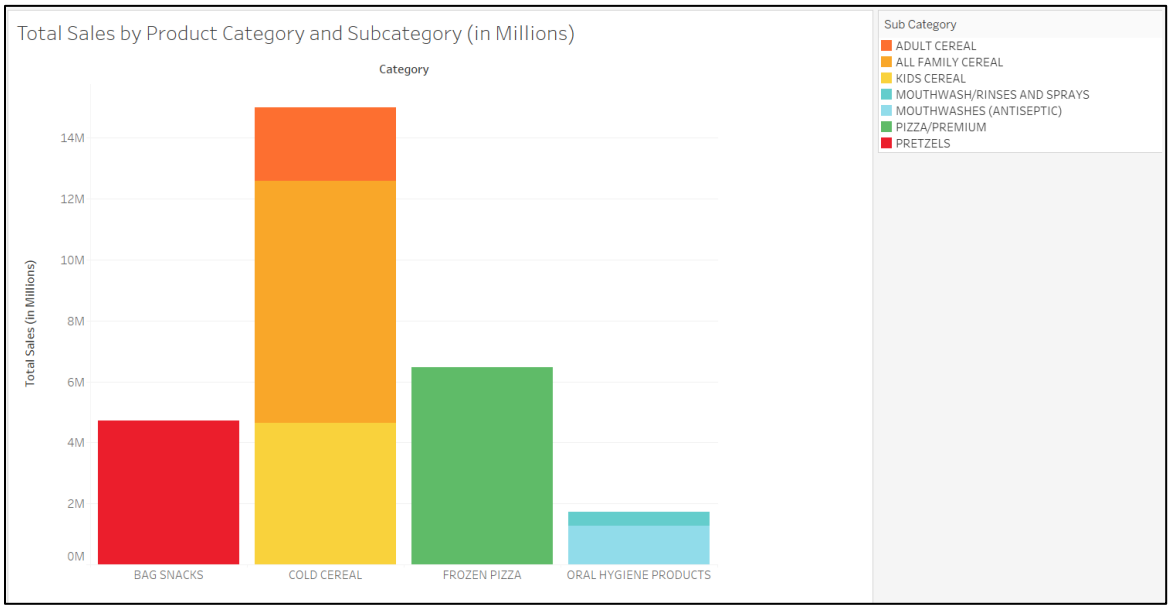

Figure 1: Total Sales by Product Category and Subcategory (in Millions)

Analysis:

This visualization identifies key revenue drivers by analyzing total sales across product categories and subcategories. Significant differences are observed, with strong performance in subcategories like "Cold Cereal" and weaker sales in "Kids Cereal." This breakdown reveals the primary contributors to revenue while highlighting underperforming areas that require attention. The analysis offers actionable insights into where inventory and promotional efforts should be concentrated to optimize overall sales performance.

Recommendation:

Primo Store should enhance promotions for high-performing subcategories, such as Cold Cereal, while revising pricing or bundling strategies for weaker subcategories like Kids Cereal. These adjustments can help maintain optimal stock levels and improve sales for slower-moving items.

Benchmark:

Sales in top categories align with industry trends, but underperformance in certain subcategories suggests potential to better target customer segments, such as families with children.

Customer Spending Patterns in Months

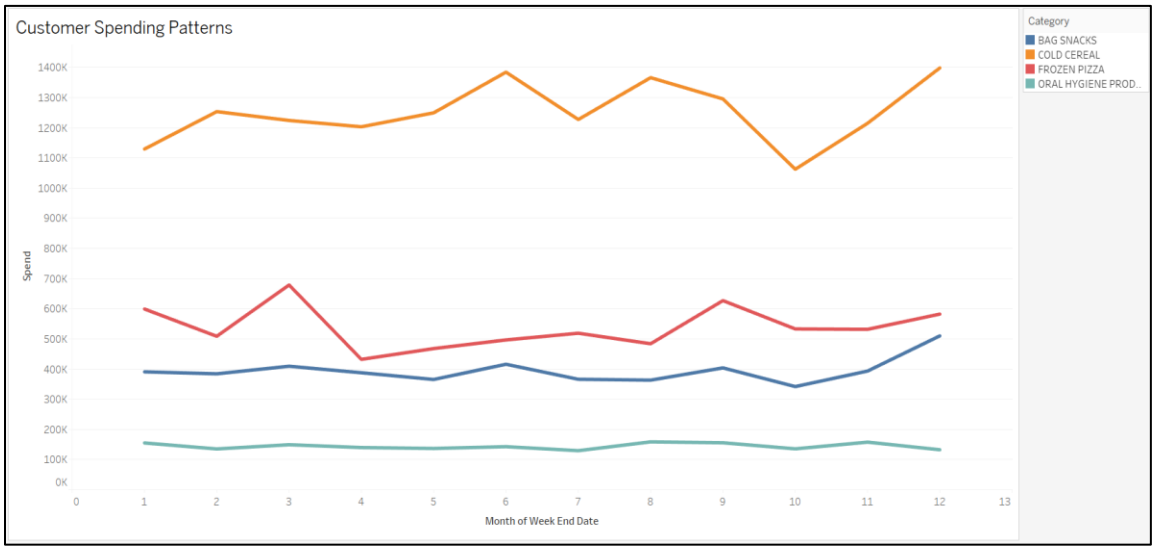

Figure 2: Customer Spending Patterns in Months

Analysis:

Figure 2 shows customer spending trends over time for Bag Snacks, Cold Cereal, Frozen Pizza, and Oral Hygiene Products. Bag Snacks consistently lead in spending, with a rise toward year-end. Frozen Pizza fluctuates, decreasing mid-year then rising. Oral Hygiene remains unchanged, while Cold Cereal steadily increases. Seasonal trends, especially in Bag Snacks and Frozen Pizza, suggest spending spikes tied to special occasions or promotions.

Recommendation:

Primo Store should focus marketing on Bag Snacks during peak spending and ensure enough stock. For Frozen Pizza, use mid-year promotions like discounts or loyalty programs to offset dips. Seasonal planning should prioritize inventory and staffing for high-demand periods to capture more sales.

Benchmark:

Use Cold Cereal's steady spending as a benchmark for Frozen Pizza. Cold Cereal rises consistently, especially towards year-end. To stabilize Frozen Pizza, consider loyalty programs or more frequent promotions, mimicking Cold Cereal’s consistent sales strategy to improve performance year-round.

Branch Performance Comparison

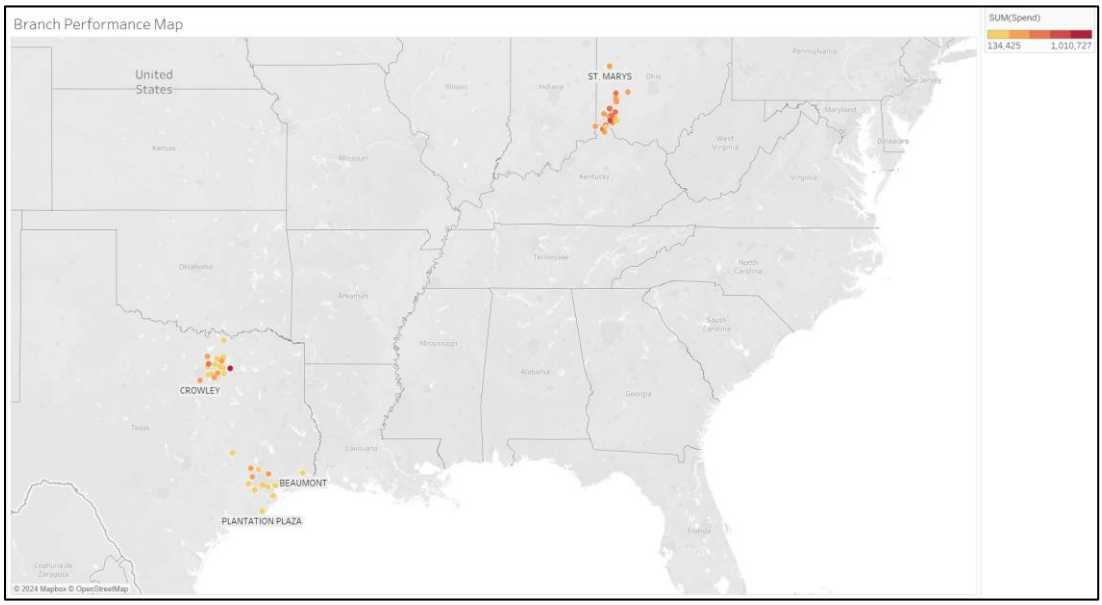

Figure 3: Branch Performance Comparison

Analysis:

This visualization displays the geographical distribution of sales across various branches, with color intensity representing the total sales (SUM(Spend)). The map clearly shows that branches like St. Marys and Crowley are among the top performers, indicated by darker shades. In contrast, branches such as Plantation Plaza and Beaumont show lower sales, represented by lighter colors. The map effectively highlights geographical trends in branch performance, helping to identify areas that are either thriving or underperforming.

Recommendation:

Strengthen Marketing for Low-Performing Branches: For branches with lower sales like Beaumont or Plantation Plaza, consider implementing localized promotions, such as discounts or bundle offers, to attract more customers. Additionally, focus on factors such as staff training, improving customer service, and enhancing product availability to increase sales.

Benchmark:

The Branch Performance Map provides a broad view of sales trends across regions, helping with strategic decisions like resource allocation or expansion planning. In contrast, the branch-level map offers detailed insights at specific stores, making it more suitable for targeted actions like promotions or inventory adjustments.

While the heatmap shows regional performance trends, the branch map identifies individual store performance, making each useful for different levels of strategic focus.

High Priced and Low-Priced Units Sold

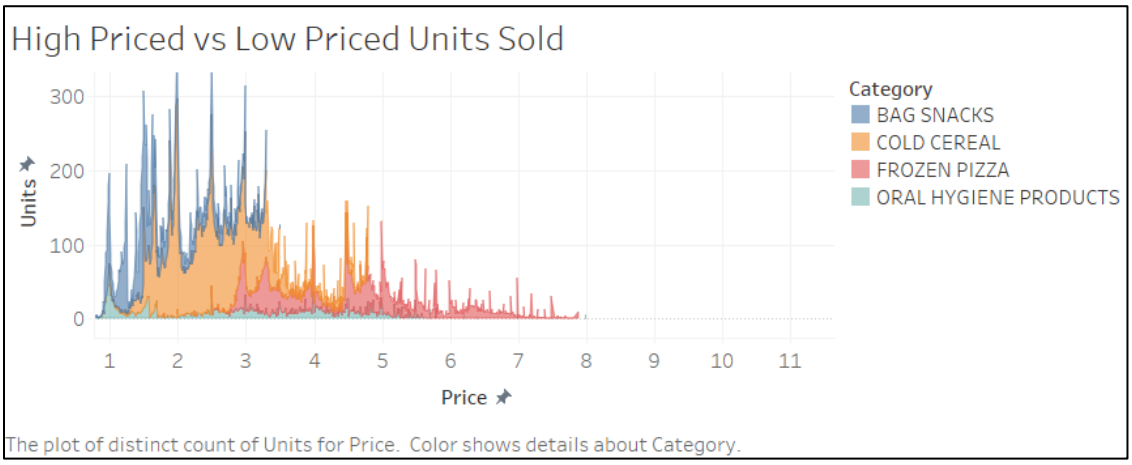

Figure 4: High Priced and Low-Priced Units Sold Trend

Analysis:

This figure shows the colored line graph of the comparison of high priced and low-priced units sold. The lowest price and highest units sold is the bag snacks product category. It spiked to a maximum of 84 distinct units sold for the 2.49 USD bag snack product. On the other hand, the highest price at the end of the graph belongs to the frozen pizza category. It has the lowest of 6 units sold for the 7.99 USD frozen pizza. The second most sold category is the cold cereal category making close performance to the bag snacks category. The oral hygiene products display a low but stable graph for their performance.

Recommendation:

The company could lower the price of the products that were not sold in large quantities of units, this can be done through discounts to catch the customers' attention and show the distinction of prices from before and after discounted. This could also prevent frozen pizzas from being expired or non-edible after not being sold out.

Benchmark:

The other item that relates to frozen pizza is the cold cereal product, since it is also a type of food category that is doing close in terms of price and units sold to frozen pizza. The company could also use the same marketing strategy for cereals for frozen pizza, which could be the alternate solution to the frozen pizza's sales performance.

Total sales Per Year

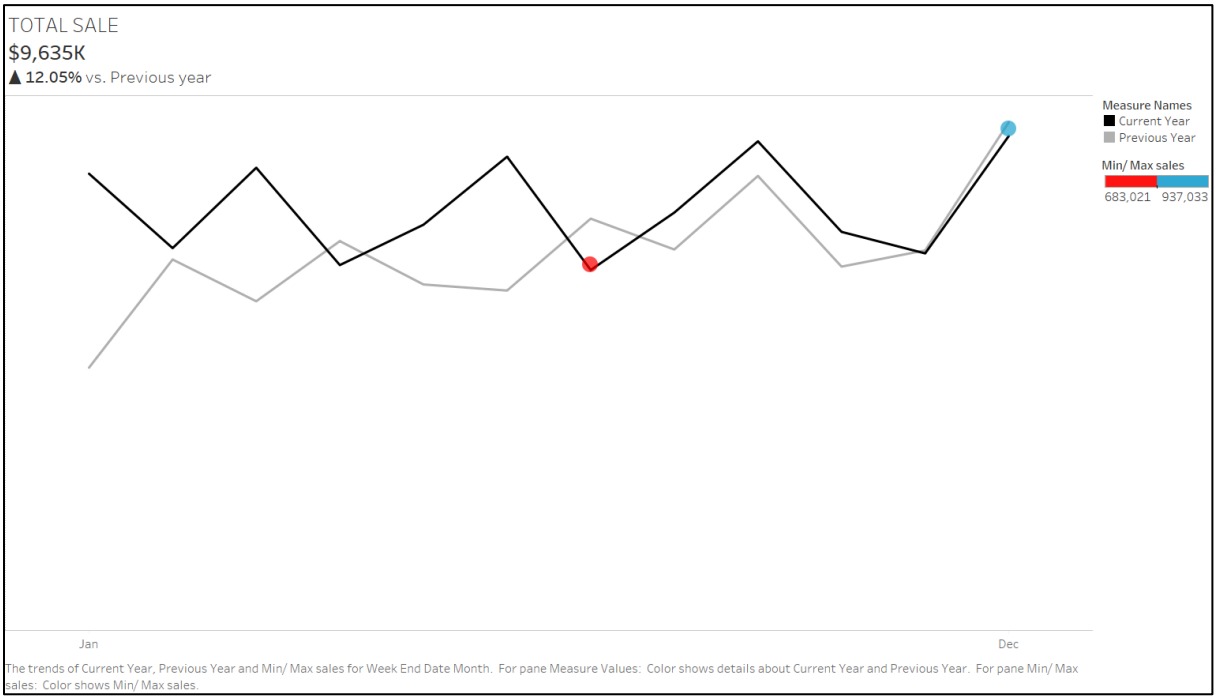

Figure 5: Total sales per year trend

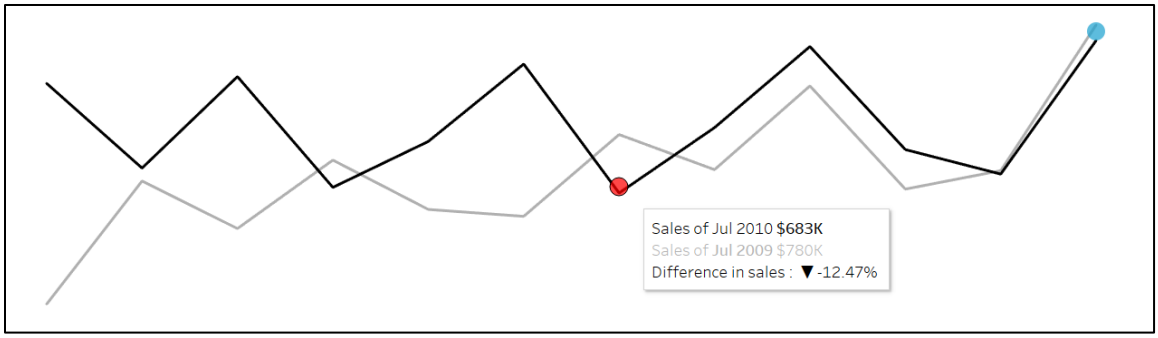

Figure 6: Comment windows in the trend

Analysis:

This visualization compares total sales between the current year (black line) and previous year (grey line), highlighting key trends and differences. Visual markers indicate the highest (blue) and lowest (red) sales months in the current year. A 12.05% increase in sales compared to the previous year is shown in this example, while the interactive graph allows users to view specific monthly performance by hovering over data points. Additionally, a year filter enables analysis of sales from 2009 to 2012, offering a comprehensive view of year-over-year performance.

Recommendation:

From the visualization, a recommended suggestion would be focusing on boosting sales during low-performing months (identified by the red marker) through targeted promotions or adjusting product offerings to address demand gaps. The 12.05% increase in sales compared to the previous year is promising, but maintaining this momentum requires analyzing what factors contributed to the peak months (blue marker) and replicating those strategies elsewhere. Additionally, using historical data from 2009 to 2012 can help identify long-term trends, enabling more informed decisions for future planning and resource allocation.

Benchmark:

By visualizing monthly sales trends, managers can identify patterns to make data-driven decisions. For instance, the chart shows a peak in December, likely due to holiday shopping, and a significant drop in July. This data helps set realistic expectations and strategize for future months, such as preparing promotions or adjusting product availability during slower periods like July. Additionally, a 12.05% year-over-year sales increase provides a performance benchmark. If

December consistently performs well, management can allocate resources to maximize returns while addressing slumps in other months. This analysis offers critical insights for strategic planning based on historical trends and anticipated fluctuations.

Promotional Effectiveness

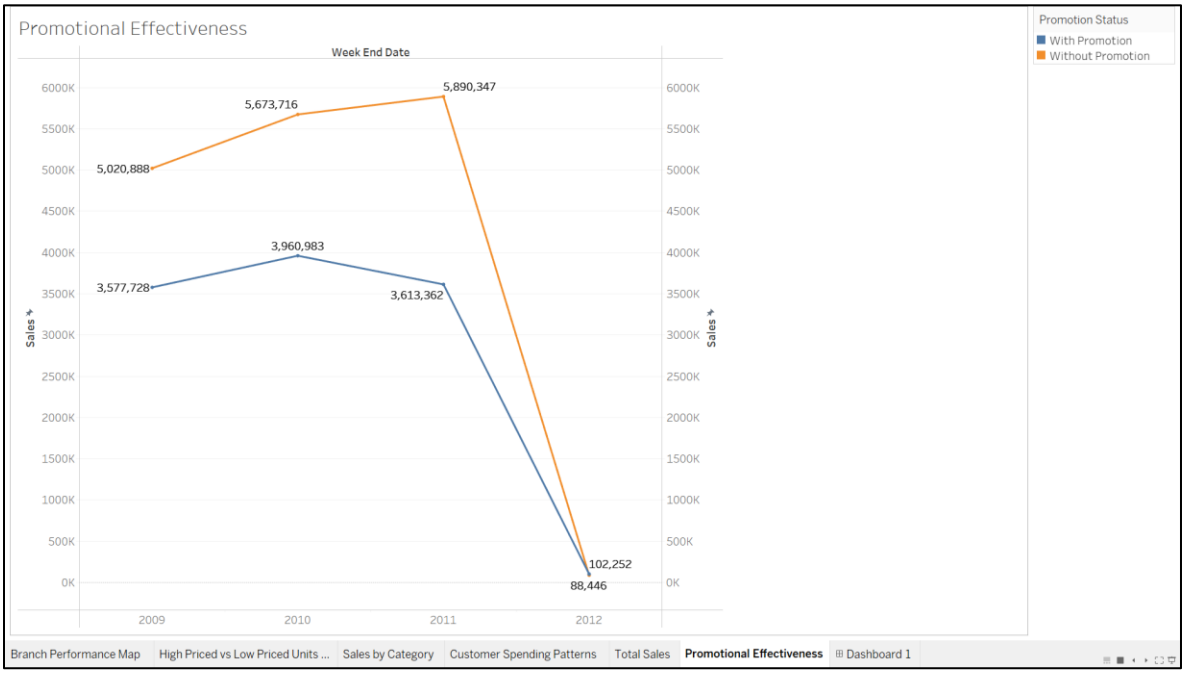

Figure 7: Promotional Effectiveness trend

Analysis:

This figure shows the dual-axis graph of the comparison of the sales during promotion and without promotion. The average spend per transaction is significantly higher during promotional periods compared to non-promotional periods. The average spending without promotion is $29.99 while the average spending with promotion is $69.99. This indicates that promotions effectively encourage customers to buy more or higher-priced items, possibly due to perceived value or discounts.

Recommendation:

Schedule promotions more frequently during known high-traffic times (such as weekends or holiday seasons) when customers are already inclined to shop. This can amplify the effect and

drive even higher sales volumes. Focus on replicating the most effective promotions. For example, if temporary price reductions lead to the biggest sales spikes, consider applying this strategy across more products, particularly those that show the greatest response.

Benchmark:

If sales typically increase by 50% or more during promotions, this can serve as a baseline for future campaigns. For instance, if baseline weekly sales without promotions are $10,000, successful promotions should aim to push sales to $15,000 or more. Promotions that don't achieve at least a 30-40% increase might need to be reconsidered or restructured to be more effective.