



Group Project : 24 Seven Expansion Plan

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Step 1: External Data Integration and Preparation

Dataset 1: Population by postal Code

Description: Provides population counts segmented by postal code areas. This data is crucial for understanding the potential customer base sizes in different geographic areas, which helps in location optimization.

Source: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=9810001901>

Data cleaning /power query steps:

- Removed blank space in stores provinces
- Then add column for a short postal code (first 3 letters) in the stores dataset
- Changed data type of postal code to postal code
- Changed column names and table name

Relationship Mapping:

- PostalCodeShort from Population by Postal Code is related to PostalCodeShort in Customers
- PostalCodeShort from Population by Postal Code is also related to PostalCodeShort in Stores

Dataset 2: Population by gender and province

Description: Offers population distribution data by gender within each province. Useful for demographic segmentation and targeted marketing efforts, as well as for understanding provincial population trends.

Source: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1710000501>

Data cleaning /power query steps:

- Altered the filters on the gov website in order to filter out how I needed
- Download as csv, import in power bi
- Changed data category to Province
- Changed column names and table name

Relationship Mapping:

- Province from Population by Gender and Province is related to Province in Canadian University Enrollment
- Province from Population by Gender and Province is also related to Province in Median Household Income by City
- Province from Population by Gender and Province is related to Province in Number of Dwellings by City
- Province from Population by Gender and Province is related to Province in Population by Age and Province
- Province from Population by Gender and Province is related to Province in University Enrollment by Province

Dataset 3: Population by Age and province

Description: Contains data on the population distribution by age groups across provinces. Helps in demographic targeting and in predicting demand for age-specific products.

Source: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=1710000501>

Data cleaning /power query steps:

- Altered the filters on the gov website in order to filter out how I needed
- Download as csv, import in power bi

- Changed data category to Province
- Changed column names and table name

Relationship Mapping:

- Province from Population by Age and Province is related to Province in Population by Gender and Province

Dataset 4: CoucheTard Canada Locations

Description: Lists the locations of Couche-Tard convenience stores throughout Canada. Provides insights into the competitive landscape and helps in identifying market saturation levels.

Source: <https://www.couche-tard.com/list-canada-stores?lang=en>

Data cleaning /power query steps:

- Downloaded as csv
- Changed data category to Address
- Changed column names and table name

Relationship Mapping:

- None

Dataset 5: Canadian University Enrollment

Description: Enrollment figures for Canadian universities. Assists in understanding the potential market in areas with high student populations for location optimization.

Source: <https://univcan.ca/universities/facts-and-stats/enrolment-by-university/>

Data cleaning /power query steps:

- Downloaded as csv
- Changed - to 0
- Added column in power query called total enrollment
- Added enrollment bins in power query

Relationship Mapping:

- Province from Canadian University Enrollment is related to Province in Population by Gender and Province

Dataset 6: Canadian University Enrollment by province

Description: Aggregated university enrollment data by province. Useful for provincial market analysis and educational demographic targeting.

Source: <https://univcan.ca/universities/facts-and-stats/enrolment-by-university/>

Data cleaning /power query steps:

- Downloaded as csv
- Changed “-” to 0
- Combined all university data by province
- Changed data category to Province
- Added column in power query called total enrollment
- Added enrollment bins in power query

Relationship Mapping:

- Province from University Enrollment by Province is related to Province in Population by Gender and Province

Dataset 7: Number of Dwellings by City

Description: Data on the number of dwellings in each city. Indicates potential customer base and housing market vitality, which can influence store traffic.

Source: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=9810013801>

Data cleaning /power query steps:

- Removed end of city (had city abbreviation)
- Changed data category to City

Relationship Mapping:

- Province from Number of Dwellings by City is related to Province in Population by Gender and Province

Dataset 8: Median Household Income by city

Description: Provides median household income levels by city. Enables socio-economic segmentation and helps predict spending patterns.

Source: <https://www150.statcan.gc.ca/t1/tbl1/en/cv.action?pid=9810005501>

Data cleaning /power query steps:

- Changed data category to City

Relationship Mapping:

- Province from Median Household Income by City is related to Province in Population by Gender and Province

Step 2: Summary Dashboard

In the summary report dashboard for 24 Seven, the wireframe is designed to optimize stakeholder engagement and facilitate data-driven decision-making. The dashboard's layout is segmented into distinct sections, each dedicated to providing specific insights into the company's sales trends, location analysis, and sales volume forecasting. The logo was generated using Dall-e (open ai) based on a prompt about the company. The dashboard colors (teal theme) were selected based on the generated logo.

The filters section on the left side acts as the command center of the dashboard, allowing stakeholders to refine the data presented across the entire report dynamically. Users can adjust the time frame of the data with a date slicer, select specific product categories, and drill down into sales figures by province or city.

The 'Date Refreshed On' feature ensures stakeholders are aware of the data's recency, enhancing the confidence in the information provided. This timestamp is generated programmatically using the `DateTime.Now()` function in Power Query, providing an up-to-date timestamp with each data refresh, ensuring the viewers are looking at the most current data available.

Key metrics are presented in a clear and accessible format, with the main points from the screenshot highlighting critical business insights. For instance, the location analysis identifies potential new cities for expansion by evaluating factors such as population density and market saturation. The report pinpoints Brandon (MT), Rouyn-Noranda (QB), and Prince-George (BC) as prime candidates based on these criteria.

The sales trend analysis provides a snapshot of performance across product categories, with Personal Care emerging as the best-performing category, boasting a total sales volume of \$150.85K. This indicates a strong market preference which can inform inventory and marketing strategies.

Sales volume forecasting analysis reveals that the Snack category is projected to be the top performer in the forecasted period, with a substantial expected sales volume of \$970.61K, matching the scenario sales volume, suggesting a stable market without the need for discounting or demand change strategies. Moreover, Toronto is recognized as the city contributing most to sales, underscoring its significance as a strategic location for potential expansion or focused marketing efforts.

In summary, the 24 Seven Report Summary dashboard serves as a strategic tool, enabling stakeholders to gain valuable insights with just a glance. It balances the granular control of data exploration through slicers with the ease of understanding through well-structured data visualizations and timely data refreshes.

PowerBI Extract 1: Summary Dashboard



Step 3: USE CASE 1 - Location Optimization

Description: The Optimal Location Dashboard is designed to guide 24 Seven in identifying strategic locations for expansion by analyzing multiple data points, including current store locations, median household income, university presence, and competition density. The dashboard provides a comprehensive view of potential cities for new stores, ensuring decisions are based on solid data-driven insights.

KPI 1: Existing Store Distribution

Description: Provides an overview of the current geographical spread of 24 Seven stores, identifying market penetration and potential areas of expansion.

Datasets Used: Store location data from the internal data

How It Was Calculated: A simple COUNT measure in DAX was used to tally stores within each city.

Visualization Used: A tabular display was chosen for its straightforward representation of numerical data, allowing for quick assessment of store distribution.

Slicing/Drilling Down: Provinces and cities filters enable stakeholders to zoom into specific areas of interest.

Strategic Utility: By understanding where current stores are located, the company can avoid market oversaturation and identify new areas with customer demand.

Insights from Dashboard: The spread of stores, with some cities like Toronto having a higher concentration, points to markets where 24 Seven is well-established and others where there is room for growth.

KPI 2: Provincial Economic and Educational Indicators

Description: Assesses the economic viability and educational ecosystem of potential expansion areas by examining median household income and university presence.

Datasets Used: Provincial median household income statistics and university enrollment figures.

How It Was Calculated: Power Query was used to merge and aggregate income data by province, while DAX measures calculated the total number of universities per province.

Visualization Used: Bar charts were utilized for median income to illustrate financial distribution clearly, and a donut chart for universities to provide a percentage-based breakdown.

Slicing/Drilling Down: Province selection allows for a targeted approach to data analysis, focusing on areas with the most promise.

Strategic Utility: Economic and educational data are strong indicators of market potential, with higher income and education levels typically correlating with increased spending power.

Insights from Dashboard: The visualization underscores Ontario, British Columbia, and Quebec as top contenders based on these metrics, guiding strategic decision-making towards these provinces.

KPI 3: Population Density Versus Competition

Description: Maps out regions with high population density and evaluates them against competitor store presence to identify markets with the best potential for new stores.

Datasets Used: Population density figures from census data and competitor store locations (CoucheTard/Circle K) gathered from market research.

How It Was Calculated: Geographic density maps were created using Power BI's mapping capabilities, overlaying population data with competitor locations.

Visualization Used: Heat maps were chosen to depict population density visually, enabling a clear distinction between areas of varying density. Competitor locations were overlaid to give immediate insight into the competitive environment.

Slicing/Drilling Down: Interactive city and province filters to drill down to specific locations of interest.

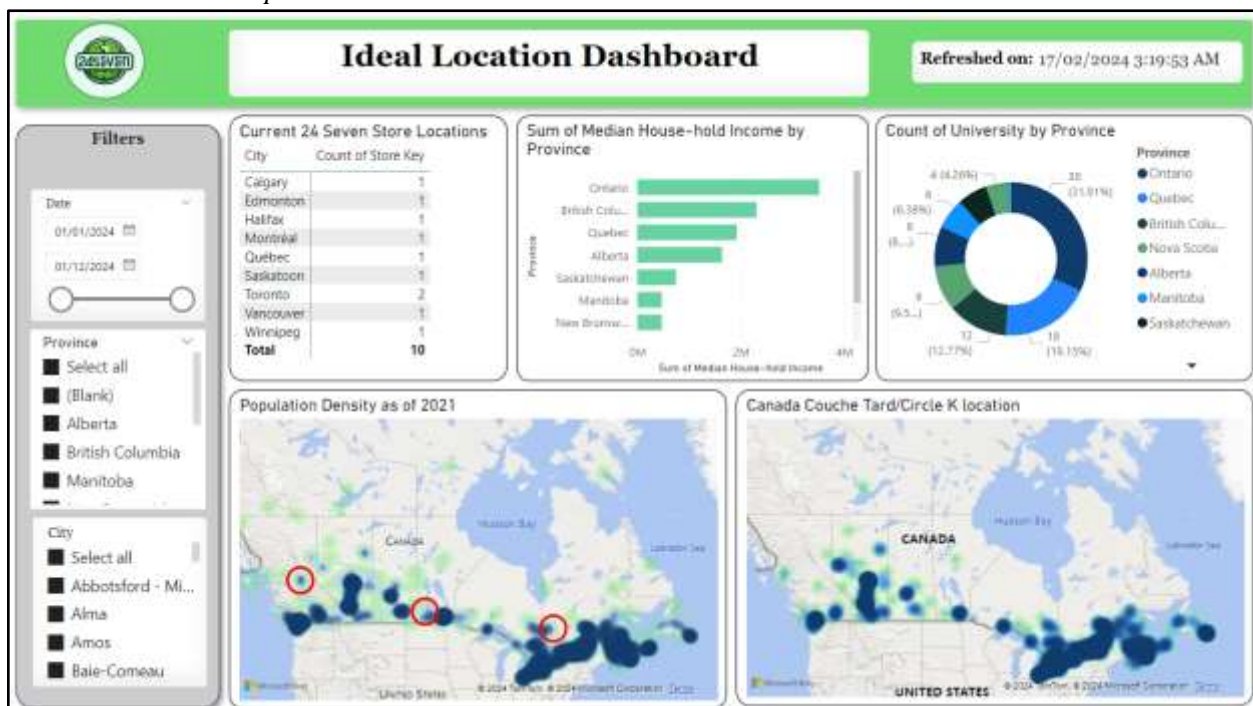
Strategic Utility: Identifying areas with high population but fewer competitors is crucial for entering a market with a ready customer base and less market share contention.

Insights from Dashboard: The heat maps highlight Brandon, Rouyn-Noranda, and Prince-George as high-density, low-competition cities, guiding the focus to these areas.

Final Decision Narrative:

The decision-making process for the next 24 Seven store location was an exercise in eliminating options that did not meet all the strategic criteria. The top three cities were selected based on high population density as well as low competition density. The Manitoba city, despite its population density, was ruled out due to lower economic indicators and educational infrastructure. The city in BC, while in a high-sales province, was also eliminated for not being in the top sales-performing province. This rigorous process of elimination, based on a cross-referenced analysis of economic, educational, and competitive data, led to the selection of Rouyn-Noranda. This city not only has a high population density and less competition but also resides in Quebec - a province which meets the economic and educational criteria and is among the best-performing provinces in terms of sales. The selection of Rouyn-Noranda is a strategic move that aligns with 24 Seven's growth objectives and market presence optimization.

PowerBI Extract 2: Optimal Location Dashboard



Step 4: USE CASE 2 - Sales Trend Analysis

UC 2 Description: The Sales Trend Analysis Dashboard serves as a focal point for understanding 24 Seven's performance over time. It combines historical sales data, customer demographics, and regional sales information to provide a better view of the company's sales dynamics.

KPI 1: Sales Performance Over Time

Description: Tracks the monthly sales trends across different years to identify growth patterns and seasonal fluctuations.

Datasets Used: Historical sales data segmented by month and year.

How It Was Calculated: Time-series analysis using DAX to sum sales per month, with YEAR and MONTH as slicers for dynamic time filtering.

Visualization Used: A clustered column chart was chosen to display monthly sales trends, offering a clear comparison across different years and highlighting seasonal peaks and troughs.

Slicing/Drilling Down: Time filters allow stakeholders to examine specific periods, from year to quarter to month, providing tailored insights.

Strategic Utility: Enables a comprehensive understanding of sales trends, important for inventory planning, marketing campaigns, and financial forecasting.

Insights from Dashboard: The monthly trends reveal consistent sales performance with notable peaks, indicating key periods for strategic sales initiatives.

KPI 2: Customer Engagement by Product Category

Description: Evaluates sales performance across various product categories to determine which areas are driving revenue.

Datasets Used: Sales data categorized by product type.

How It Was Calculated: Aggregated sales figures using DAX to calculate total sales for each category.

Visualization Used: A donut chart was selected for its effectiveness in showing the proportion of total sales each category represents, with color coding for quick recognition.

Slicing/Drilling Down: Product category filter enables a deep dive into individual category performances.

Strategic Utility: Helps in assessing which product categories are most popular and profitable, guiding inventory and marketing focus.

Insights from Dashboard: Personal Care and Snacks emerge as significant contributors to sales, suggesting customer preference and potential areas for expansion.

KPI 3: Demographic Sales Analysis

Description: Breaks down sales data by customer age groups to target marketing and product development effectively.

Datasets Used: Sales transactions linked with customer demographic information.

How It Was Calculated: Sales were segmented by age group using DAX grouping functions to correlate sales data with age demographics.

Visualization Used: A bar graph was utilized for its simplicity in comparing sales across different age groups, enabling a clear understanding of which demographics are driving sales.

Slicing/Drilling Down: Age group filters provide insights into specific customer segments.

Strategic Utility: Vital for tailoring product offerings and marketing strategies to the most profitable age demographics.

Insights from Dashboard: The sales distribution across age groups highlights the importance of the 55-64 and 35-44 segments, indicating where marketing efforts could be most effective. Even though the average customers seem to be of a higher age than university students, we still think it's important to include university data because this is telling of the wealth of the city.

KPI 4: Regional Sales Distribution

Description: Separates sales data by region to pinpoint geographic areas of high performance and potential growth.

Datasets Used: Sales data sorted by province.

How It Was Calculated: Regional sales data were aggregated using DAX, providing a sum of sales per province.

Visualization Used: A treemap was chosen to represent sales by region, effectively illustrating the relative size of markets in a compact and easy-to-understand format.

Slicing/Drilling Down: Province and city filters allow for a granular analysis of sales data.

Strategic Utility: Identifies strong and weak sales regions, informing regional marketing strategies and potential for physical expansion.

Insights from Dashboard: Quebec, Ontario, and Alberta are highlighted as key regions, combining high sales figures with a significant customer base.

PowerBI Extract 3: Sales Trend Analysis Dashboard



Step 5: USE CASE 3 - Sales Forecasting and Scenario Analysis

UC 3 Description: This dashboard is a tool developed to assist 24 Seven in forecasting sales demand and conducting scenario analysis for potential new store openings across Canada. It integrates advanced predictive analytics to estimate demand and allows stakeholders to interactively model various 'what-if' scenarios by adjusting discount rates and demand changes.

Forecasting Model Description:

The forecasting algorithm was created through a multi-step process using a Python script. Initially, data pre-processing merged various demographic and historical sales datasets to create a robust model training dataset. The model training involved evaluating linear regression, decision tree, random forest, and gradient boosting algorithms, with the latter chosen for its superior performance as indicated by the lowest mean squared error. The final step was generating forecasts using the gradient booster to predict monthly sales volume for each city and product category for 2024.

KPI 1: Forecasted Sales Volume

Description: Predicts the total sales volume for the year 2024 under standard conditions without the application of scenarios.

Datasets Used: Historical sales data, demographic data, and city-specific data.

How It Was Calculated: The gradient boosting algorithm forecasted monthly sales volume, which was aggregated to a yearly forecast using DAX measures within Power BI.

Visualization Used: Cards were used to display the forecasted sales volume due to their efficiency in presenting key figures at a glance.

Slicing/Drilling Down: The Date Slicer and Product Category filters allow stakeholders to dissect the forecast by specific time frames and product types. You can also slice by province or city.

Strategic Utility: Provides a baseline forecast against which to measure the impact of scenarios, essential for planning inventory, staffing, and marketing strategies.

Insights from Dashboard: The forecasted sales volume without any scenario adjustments serves as a critical reference point for assessing the potential of new store locations.

KPI 2: Scenario Analysis Impact

Description: Allows stakeholders to visualize the impact on sales volume from applying different discount rates and demand changes.

Datasets Used: Forecasted sales data enhanced with scenario modeling.

How It Was Calculated: Interactive DAX measures recalculated the forecasted sales based on user-selected discount and demand change inputs.

Visualization Used: Sliders and dropdowns enable users to adjust the discounting value and demand change percentage, dynamically updating the scenario sales volume displayed on the cards.

Slicing/Drilling Down: Interactive controls permit a detailed analysis of how various scenarios could affect sales across different regions and product categories.

Strategic Utility: Empowers stakeholders with the ability to conduct on-the-fly analysis of potential business strategies and their impact on sales.

Insights from Dashboard: Scenario adjustments offer valuable insights into the elasticity of demand and the potential effectiveness of various discount strategies. The insights will vary depending on what you put as discount rate and demand change.

KPI 3: Cumulative Sales Volume Comparison

Description: Compares the cumulative sales volume under different scenarios against the original forecast, by product category and city.

Datasets Used: City and product category sales data with applied scenario conditions.

How It Was Calculated: Cumulative figures were computed using DAX measures, aggregating monthly data to visualize the growth trajectory over time.

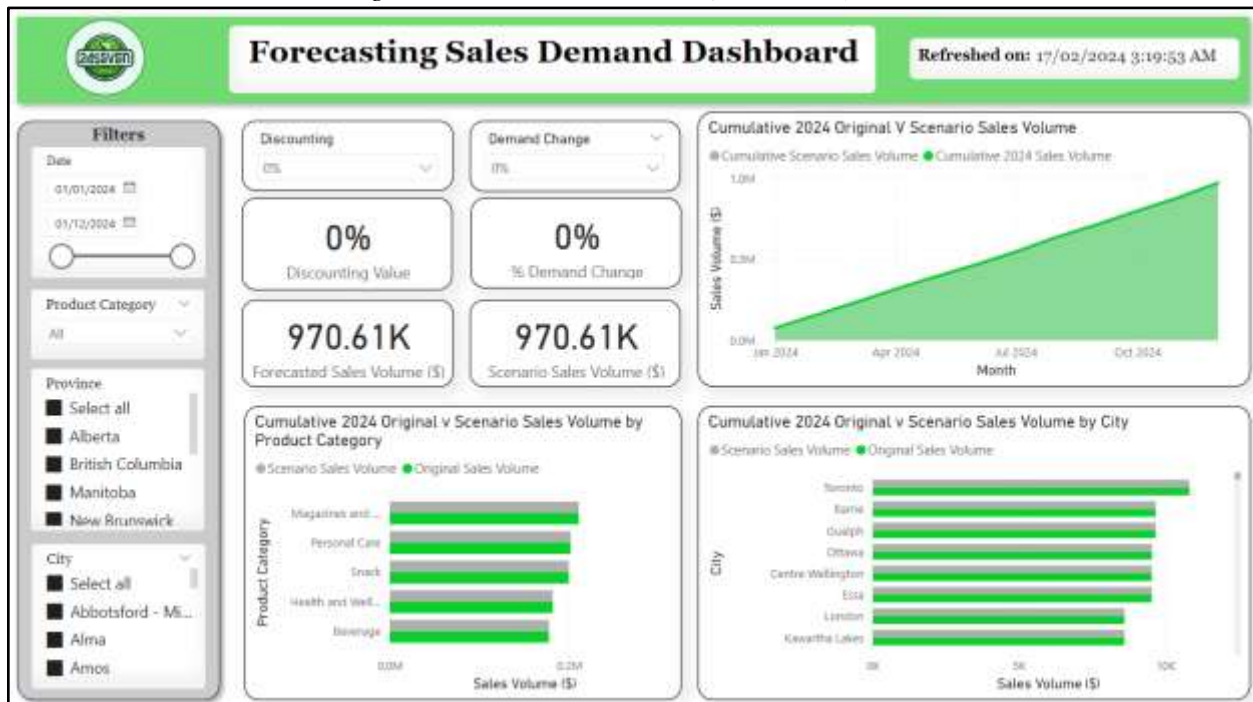
Visualization Used: An area chart and bar charts were selected to provide a visual representation of sales volume trends over time and to compare the impact of scenarios across product categories and cities.

Slicing/Drilling Down: Filters for dates, provinces, and cities allow for granular analysis by location, and product categories enable focused evaluation of specific segments.

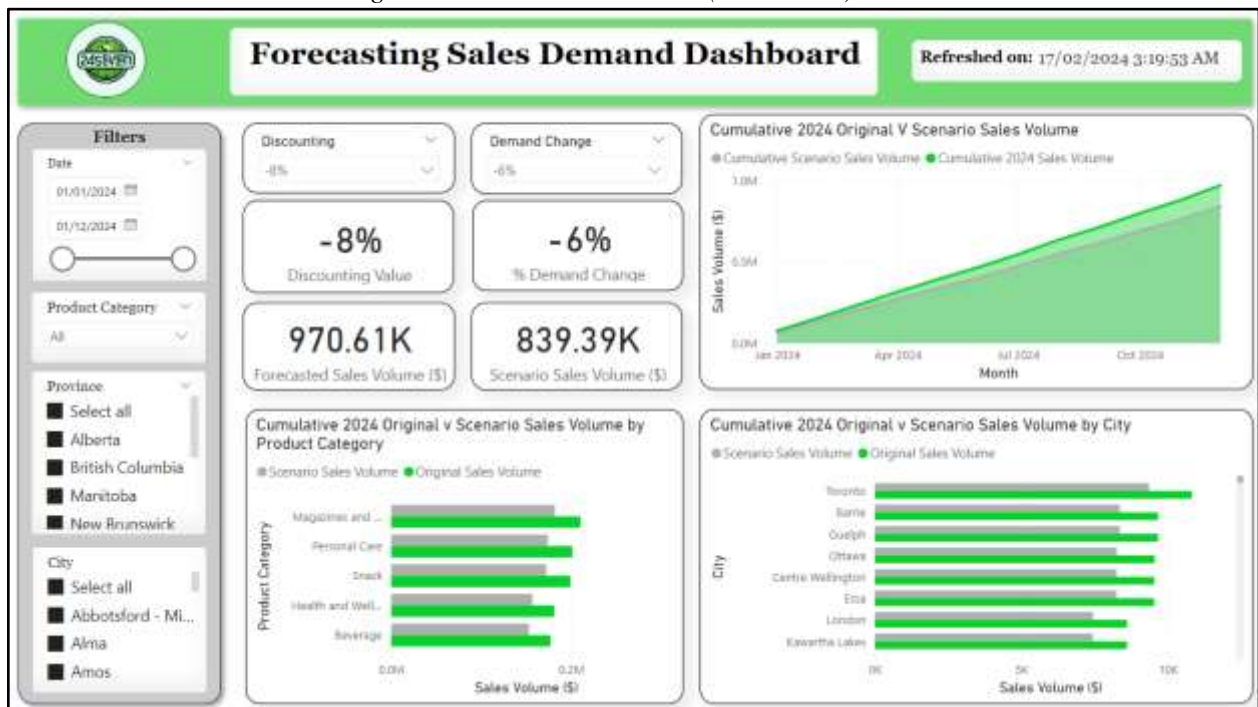
Strategic Utility: The visualization helps in identifying which product categories and cities are most sensitive to changes in demand and discount rates.

Insights from Dashboard: By observing the differences between the original and scenario-based sales volumes, stakeholders can identify which areas have the most significant growth potential and are most likely to benefit from strategic interventions.

PowerBI Extract 4: Forecasting Sales Demand Dashboard (Scenario 1)



PowerBI Extract 5: Forecasting Sales Demand Dashboard (Scenario 2)



References

Alimentation Couche-Tard. (n.d.). Find a store. Retrieved February 12, 2024, from <https://www.couche-tard.com/list-canada-stores?lang=en>

Environment and Climate Change Canada. (n.d.). Canadian Climate Normals. Retrieved February 12, 2024, from https://climate.weather.gc.ca/climate_normals/index_e.html

Statistics Canada. (n.d.). Population estimates on July 1st, by age and sex. Retrieved February 12, 2024, from <https://www150.statcan.gc.ca/t1/tb11/en/cv.action?pid=1710000501>

Statistics Canada. (n.d.). Population and dwelling count highlight tables, 2016 Census. Retrieved February 12, 2024, from <https://www150.statcan.gc.ca/t1/tb11/en/cv.action?pid=9810013801>

Statistics Canada. (n.d.). Table 111-0009 - Family characteristics, median income by family type, annual. Retrieved February 12, 2024, from <https://www150.statcan.gc.ca/t1/tb11/en/cv.action?pid=9810005501>

Statistics Canada. (n.d.). Population estimates on July 1st, by age and sex. Retrieved February 12, 2024, from <https://www150.statcan.gc.ca/t1/tb11/en/cv.action?pid=1710000501>

Universities Canada. (n.d.). Enrolment by university. Retrieved February 12, 2024, from <https://univcan.ca/universities/facts-and-stats/enrolment-by-university/>