# MARYLAND ALCOHOL BEVERAGE SERVICES(ABS) SALES DASHBOARD

MINOR PROJECT REPORT

By

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Under the guidance of

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*In partial fulfilment for the Course*

of

**21CSE421T– BUSINESS INTELLIGENCE AND ANALYTICS**

In

COMPUTER SCIENCE AND ENGINEERING

WITH SPECILIZATION IN BIG DATA ANALYTICS

NOVEMBER 2025



**FACULTY OF ENGINEERING AND TECHNOLOGY**

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# SRM INSTITUTE OF SCIENCE AND TECHNOLOGY

**(Under Section 3 of UGC Act, 1956)**

## BONAFIDE CERTIFICATE

Certified that this minor project report for the course **21CSE421T BUSINESS INTELLIGENCE AND ANALYTICS** entitled in **"MARYLAND ALCOHOL BEVERAGE SERVICES(ABS) SALES DASHBOARD "** is the Bonafide work of **MADHAN RAJ.S(RA2211027010011)** who carried out the work under my supervision.

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# ABSTRACT

This project focuses on developing a **Warehouse and Retail Sales Dashboard** using **Microsoft Power BI** to analyze and visualize business performance data. The dataset, sourced from the *Montgomery County Alcohol Beverage Services (ABS)* open data portal, contains real-time records of warehouse and retail sales between 2017 and 2020. The project aims to transform this raw dataset into meaningful business insights through data cleaning, processing, and interactive visualizations. Using Power BI's data modeling and DAX (Data Analysis Expressions), various key performance indicators (KPIs) such as total retail sales, warehouse sales, and average retail sales were computed. The dashboard provides an overview of yearly sales trends, supplier performance, and item-type distribution, enabling quick decision-making and performance tracking. This study demonstrates the effectiveness of Power BI as a business intelligence tool for analyzing large datasets and converting them into actionable insights that improve sales management and operational efficiency.Furthermore, the project highlights the growing importance of **data visualization and business analytics** in modern enterprises. By consolidating multiple data dimensions into a single, interactive view, the Power BI dashboard allows for dynamic exploration of sales data and comparative analysis between retail and warehouse operations. The inclusion of map visuals, top-selling item analysis, and trend evaluation enhances interpretability and supports strategic decision-making. This practical implementation of Power BI showcases how real-world datasets can be leveraged to create intelligent dashboards that simplify data analysis, foster evidence-based business planning, and strengthen organizational understanding of sales performance dynamics.

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# 1. INTRODUCTION

## 1.1 MOTIVATION

In today's data-driven business environment, organizations rely heavily on analytics tools to gain actionable insights from raw data. Traditional methods of analysing sales figures using spreadsheets or manual summaries are time-consuming and inefficient. With the advent of **Business Intelligence (BI)** platforms like **Microsoft Power BI**, businesses can now easily visualize, monitor, and evaluate their performance metrics in real time. This project was motivated by the need to create an interactive dashboard that allows decision-makers to quickly assess sales performance, supplier contribution, and product category growth within a single view. By using real-world data from the *Montgomery County Alcohol Beverage Services (ABS)*, this project demonstrates how BI tools can improve operational efficiency and support data-informed decisions.

## 1.2 OBJECTIVE

The main objectives of this project are:

- To collect and analyse a real-world **warehouse and retail sales dataset**.

- To clean and prepare the dataset for analysis within **Power BI**.

- To calculate **key performance indicators (KPIs)** using DAX expressions.

- To design an interactive **dashboard** summarizing total sales, item types, supplier performance, and yearly trends.

- To extract **meaningful insights** that support business decision-making and planning.

## 1.3 PROBLEM STATEMENT

Organizations often face challenges in interpreting vast amounts of sales and supplier data. Without effective visualization tools, it becomes difficult to track sales growth, compare product categories, or identify high-performing suppliers. The lack of a centralized system for visual analytics results in delayed insights and inefficient decision-making. Therefore, the problem addressed in this project is the **absence of an integrated visual dashboard** that can present warehouse and retail sales data in a concise and interactive format, providing clear business insights at a glance.

## 1.4 CHALLENGES

During the development of this project, several challenges were encountered:

- Understanding the dataset structure and ensuring accurate **data type assignments** in Power BI.
- Designing clear and **well-aligned visuals** while maintaining readability.
- Creating correct **DAX measures** to calculate totals and averages for various sales categories.
- Ensuring consistent formatting across multiple visuals (cards, charts, maps, etc.).
- Representing multiple sales dimensions (Retail, Warehouse, Transfers) in a single, cohesive dashboard.

# 2. DATA UNDERSTANDING

The dataset used in this project is titled **"Warehouse and Retail Sales"** and was obtained from the **Montgomery County Open Data Portal**. It represents sales transactions from the **Alcohol Beverage Services (ABS)** department, which manages both wholesale (warehouse) and retail operations.

**Dataset Attributes:**

- **ITEM CODE:** Unique identifier for each item.

- **ITEM DESCRIPTION:** Product name or label.

- **ITEM TYPE:** Category of beverage (e.g., Wine, Beer, Spirits).

- **SUPPLIER:** Vendor providing the product.

- **RETAIL SALES:** Total retail sales revenue.

- **RETAIL TRANSFERS:** Quantity/value transferred between retail stores.

- **WAREHOUSE SALES:** Wholesale revenue from warehouse sales.

- **YEAR:** Sales year (2017–2020).

The dataset provides a comprehensive view of sales distribution across suppliers, item types, and years, making it ideal for business performance analysis using Power BI.

| YEAR | SUPPLIER | ITEM CODE | ITEM DESCRIPTION | ITEM TYPE | RETAIL SALES |
|------|----------|-----------|------------------|-----------|--------------|
| 1 | 2020 SANTA MARGHERITA USA INC | 100749 | SANTA MARGHERITA P/GRIG ALTO - 375ML | WINE | |
| 2 | 2020 INTERNATIONAL CELLARS LLC | 101117 | KSARA CAB - 750ML | WINE | |
| 3 | 2020 THE COUNTRY VINTNER, LLC DBA WINEBOW | 101532 | HATSUMAGO SAKE JUN MAI SHU - 720ML | WINE | |
| 4 | 2020 STE MICHELLE WINE ESTATES | 101974 | CH ST MICH P/GRIS - 750ML | WINE | |
| 5 | 2020 SALVETO IMPORTS LLC | 10245 | CRICOVA ORIGINAL WH - 750ML | WINE | |
| 6 | 2020 YOUNG WON TRADING INC | 10346 | KLOUD - 330/24 NR | BEER | |
| 7 | 2020 DIONYSOS IMPORTS INC | 104060 | LES CHAILLOUX SANCERRE CHERRIE - 750ML | WINE | |
| 8 | 2020 JACKSON FAMILY ENTERPRISES INC | 10413 | MURPHY GOODE CHARD - 750ML | WINE | |
| 9 | 2020 BUCK DISTRIBUTING COMPANY INC | 10430 | STONE IPA 4/6 NR - 12OZ | BEER | |
| 10 | 2020 VICTORY BREWING COMPANY LLC | 10431 | VICTORY GOLDEN MONKEY 4/6 NR | BEER | |
| 11 | 2020 LEGENDS LTD | 10434 | LAGUNITAS IPA 4/6 NR - 12OZ | BEER | |
| 12 | 2020 LEGENDS LTD | 10435 | LAGUNITAS SUMPIN SUMPIN 4/6 NR - 12OZ | BEER | |
| 13 | 2020 LEGENDS LTD | 10436 | OSKAR BLUES DALES PALE ALE 12.OZ 4/6 CAN | BEER | |

# 3. DATA PREPARATION

The **data preparation** phase was performed entirely within **Microsoft Power BI Desktop**, focusing on importing, cleaning, and modelling data.

**Steps Performed:**

1. **Importing Data:**

   The dataset "Warehouse_and_Retail_Sales.csv" was imported into Power BI Desktop.

2. **Checking Data Types:**

   Each column was verified for correct data types — numerical for sales, text for descriptions, and integers for years.

3. **Handling Missing Values:**

   The dataset contained few or no missing entries; validation ensured data completeness.

4. **Creating DAX Measures:**

   Key performance indicators (KPIs) were created using the following Data **Analysis Expressions (DAX):**

   - Total Retail Sales = SUM('Warehouse_and_Retail_Sales'[RETAIL SALES])

   - Total Warehouse Sales = SUM('Warehouse_and_Retail_Sales'[WAREHOUSE SALES])

   - Total Retail Transfers = SUM('Warehouse_and_Retail_Sales'[RETAIL TRANSFERS])

   - Average Retail Sales = AVERAGE('Warehouse_and_Retail_Sales'[RETAIL SALES])

5. Model Validation:

   Relationships and data consistency were checked to ensure accurate calculations.

# 4. DASHBOARD DESIGN

The Power BI dashboard was designed to provide a **comprehensive overview** of sales performance through a structured layout.
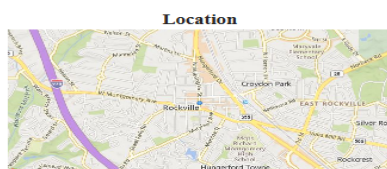
**Dashboard Components:**

- **KPI Cards:** Display Total Retail Sales, Warehouse Sales, Transfers, and Average Sales.

- **Line Chart:** Shows year-wise sales trend for both retail and warehouse channels.

- **Pie Chart:** Represents the proportion of Retail vs Warehouse Sales.

- **Bar Chart:** Displays Top 5 Item Types based on total sales.

- **Map Visual:** Highlights the company's operational region (Montgomery County, Maryland).

- **Table:** Lists detailed data including item code, supplier, and sales value.
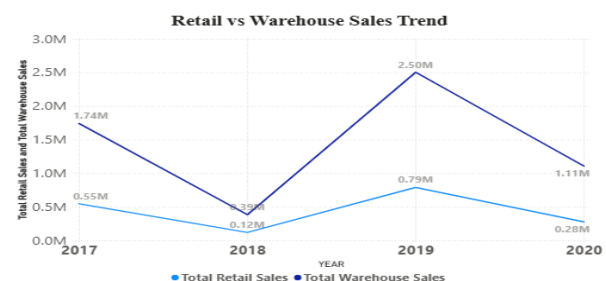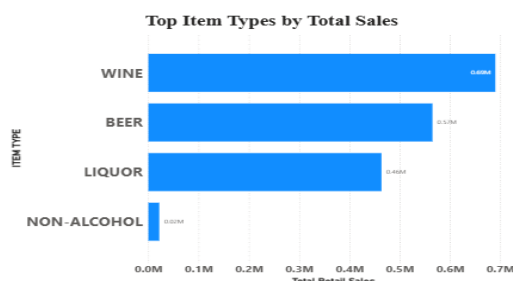
**Layout and Formatting:**

- Cards arranged at the top for quick KPI overview.

- Charts placed symmetrically for clear analysis.

- Consistent colour scheme (blue and orange tones) for professional appearance.

- Filters (Slicers) added for Year, Supplier, and Item Type for interactivity.

# 5. RESULTS AND DISCUSSION

The Power BI dashboard successfully visualizes all critical aspects of the business dataset.

**Key Insights:**

- **Warehouse Sales** contribute the majority of total revenue, exceeding retail sales consistently.

- **Top Item Types:** Wine and Beer are the highest-selling product categories.

- **Yearly Trend:** Sales show steady growth from 2017 to 2019, with minor decline in 2020.

- **Supplier Analysis:** A few suppliers dominate the market share, suggesting a need for diversification.

- **Geographical Insight:** The map visual confirms the company's operational base in Montgomery County, Maryland.

- **Statistical Summary:** Mean, median, and maximum sales values highlight business scale and variation.

The dashboard provides a one-page interactive interface that allows stakeholders to understand sales trends, compare categories, and make strategic decisions efficiently.

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# 7. CONCLUSION

The **Warehouse and Retail Sales Dashboard** demonstrate how **Microsoft Power BI** can effectively transform large-scale, raw business data into meaningful, interactive visual insights. The project successfully integrates multiple aspects of data analysis—collection, preparation, modelling, and visualization—into a single, coherent workflow. By leveraging the features of Power BI and the DAX (Data Analysis Expressions) language, it was possible to convert a complex dataset into an intuitive dashboard that allows users to explore and interpret information effortlessly. This dashboard provides a comprehensive understanding of sales patterns, supplier performance, and item-type distribution, offering clear visibility into both **retail and warehouse operations**. The analysis highlights key business indicators such as total sales, transfers, and growth trends across multiple years, helping to identify top-performing products and suppliers. These insights can guide organizations in making **data-driven strategic decisions**, optimizing inventory management, and improving overall sales performance. In conclusion, this project not only meets its primary objectives but also illustrates the **transformative potential of Power BI** in the field of data analytics. It bridges the gap between raw data and strategic insight, empowering decision-makers to act swiftly and confidently based on factual evidence and real-time data visualization.

# 8. REFERENCES

1. Montgomery County Open Data Portal – *Warehouse and Retail Sales Dataset*.

2. Microsoft Power BI Documentation – https://learn.microsoft.com/power-bi.

3. Data.gov – *Business and Retail Sales Datasets*.

4. Research Paper: *Applications of Business Intelligence Tools in Retail Analytics*, IEEE 2022.