Tech Saksham

Case Study Report

Data Analytics with Power BI

“Supply Chain Analysis of Inventories”

“Arulmigu Kalasalingam College Of Arts and Science, Krishnankoil”

NM ID	NAME
8C41BED7B5ED5BB90B1456B8E68AB91D	JENIFER SANTHIYA J A

Trainer Name: R.UMAMAHESWARI

Master Trainer: R.UMAMAHESWARI

ABSTRACT

The project "Supply Chain Analysis of Inventories" focuses on using Data Analytics with Power BI to analyze and optimize inventory management in the supply chain. It involves leveraging Power BI's features to gain insights into inventory levels, demand patterns, and supply chain performance. By utilizing data visualization and interactive dashboards, this project aims to improve decision-making and enhance efficiency in inventory management. It's a fascinating topic that combines data analytics and supply chain optimization. Supply chain analysis is all about understanding and optimizing the flow of goods and services from the supplier to the customer. It involves analyzing various factors like inventory management, transportation, and logistics to identify areas for improvement and cost savings. It's a valuable tool for businesses to enhance efficiency and meet customer demands effectively.

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

The problem statement of the project "Supply Chain Analysis of Inventories" is to optimize inventory management within the supply chain using data analytics with Power BI. The goal is to address challenges such as excessive inventory, stockouts, and inefficient supply chain processes. By leveraging Power BI's capabilities, we aim to analyze inventory data, identify patterns, and make data-driven decisions to improve inventory levels, reduce costs, and enhance overall supply chain efficiency. It's an exciting project that aims to tackle real-world inventory management challenges using the power of data analytics.

1.2 Proposed Solution

The proposed solution for the "Supply Chain Analysis of Inventories" project involves using Power BI's data analytics capabilities to optimize inventory management in the supply chain. By analyzing inventory data, demand patterns, and supply chain performance, we can identify areas for improvement and make data-driven decisions. This could include implementing demand forecasting models, setting optimal reorder points, and streamlining inventory replenishment processes. The goal is to achieve better inventory control, reduce costs, and improve overall supply chain efficiency. It's an exciting approach that combines data analytics with supply chain optimization techniques.

1.3 Feature:

some key features of Power BI that make it a powerful tool for supply chain analysis:

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1. **Data Visualization:** Power BI allows you to create interactive and visually appealing dashboards and reports to visualize inventory data, demand patterns, and supply chain performance.
2. **Data Integration:** Power BI integrates with a wide range of data sources, including databases, spreadsheets, and cloud services.
3. **Advanced Analytics:** Power BI offers advanced analytics capabilities, such as forecasting, clustering, and regression analysis. These features enable you to uncover hidden patterns, identify trends, and make accurate predictions about future inventory needs.
4. **Collaboration and Sharing:** Power BI allows you to collaborate with team members by sharing dashboards and reports. You can also set up automatic data refresh and distribute reports via email or other channels, ensuring that everyone has access to the latest information.

1.4 Advantages

Power BI offers several advantages for supply chain analysis:

- **Data-driven Decision Making**: With Power BI, you can analyze inventory data and supply chain metrics in real-time, enabling you to make data-driven decisions. This helps optimize inventory levels, reduce costs, and improve overall supply chain efficiency.

- **Visual Insights**: Power BI's visualizations allow you to create interactive dashboards and reports that make it easy to understand complex supply chain data. Visual representations help identify trends, patterns, and outliers, enabling you to gain valuable insights at a glance.

- **Integration with Multiple Data Sources**: Power BI integrates with various data sources, including databases, spreadsheets, and cloud services. This enables you to bring together data from different systems and create a unified view of your supply chain, facilitating comprehensive analysis.

- **Collaboration and Sharing**: Power BI enables collaboration by allowing you to share dashboards and reports with team members. This fosters better communication and alignment across the supply chain, promoting collaborative decision-making.

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- **Scalability and Flexibility**: Power BI is a scalable tool that can handle large volumes of data. It also offers flexibility in terms of data modelling and analysis, allowing you to adapt to changing business needs and evolving supply chain dynamics.

- **Real-time Monitoring**: With Power BI's real-time data refresh capabilities, you can monitor inventory levels, demand patterns, and supply chain performance in real-time. This helps you stay proactive and respond quickly to any supply chain disruptions or changes..

1.5 Scope

The scope of Power BI is quite extensive. It can be used for various purposes such as data visualization, business intelligence, and analytics. With Power BI, you can analyze and gain insights from a wide range of data sources, including databases, spreadsheets, and cloud services. It's a versatile tool that can be applied to different industries and functions, including supply chain analysis, sales and marketing, finance, and more.

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CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Collection and Storage Services**: Some commonly used services with Power BI include SQL Server, Azure SQL Database, Excel, SharePoint, Dynamics 365, and Salesforce. These integrations allow you to pull data from different sources and create comprehensive dashboards and reports in Power BI

- **Data Processing Services**: Services like SQL Server Management Studio (SSMS) to manage your SQL databases, Excel for data preparation and cleaning, and SharePoint for collaborative sharing of Power BI reports. Data Analytics can be used to process the real-time data.

- **Machine Learning Services**: Power BI is available additionally to power pivot and power query for machine learning services.

2.2 Tools and Software used

Tools:

- **PowerBI**: The main tool for this project is PowerBI, which will be used to create interactive dashboards for real-time data visualization.

- **Power Query**: This is a data connection technology that enables you to discover, connect, combine, and refine data across a wide variety of sources.

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Software Requirements:

- **PowerBI Desktop**: This is a Windows application that you can use to create reports and publish them to PowerBI.

- **PowerBI Service**: This is an online SaaS (Software as a Service) service that you use to publish reports, create new dashboards, and share insights.

- **PowerBI Mobile**: This is a mobile application that you can use to access your reports and dashboards on the go.

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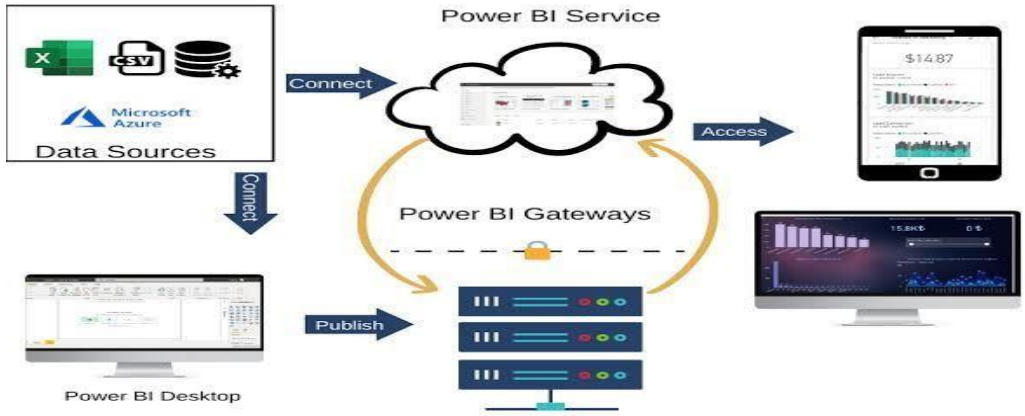
CHAPTER 3

PROJECT ARCHITECTURE

3.1 Architecture



Here's a high-level architecture for the project:

1. **Data Collection**: data is collected from various sources like customer category, customer interactions , product name etc. This could be achieved using services like Excel.
2. **Data Storage**: The collected data is stored in a database for processing . Excel can be used for this purpose.
3. **Data Processing**: The stored data is processed in supply chain using services like Excel or SQL Data Analytics.
4. **Machine Learning**: Predictive models are built based on processed data using Excel workbook. These models can help in predicting customer behavior, detecting fraud, etc.
5. **Data Visualization**: The processed data and the results from the predictive models are visualized in supply chain using PowerBI. PowerBI allows you to create interactive dashboards that can provide valuable insights into the data.
6. **Data Access**: The dashboards created in PowerBI can be accessed through PowerBI Desktop, PowerBI Service (online), and PowerBI Mobile.

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This architecture provides a comprehensive solution for supply chain analysis of inventories. However, it's important to note that the specific architecture may vary depending on the customer name, product name, total amount etc... It's also important to ensure that all tools and services comply with relevant data privacy and security regulations. Power BI is a technology-driven business intelligence tool provided by Microsoft for analyzing and visualizing raw data to present actionable information. It combines business analytics, data visualization, and best practices that help an organization to make data-driven decisions.

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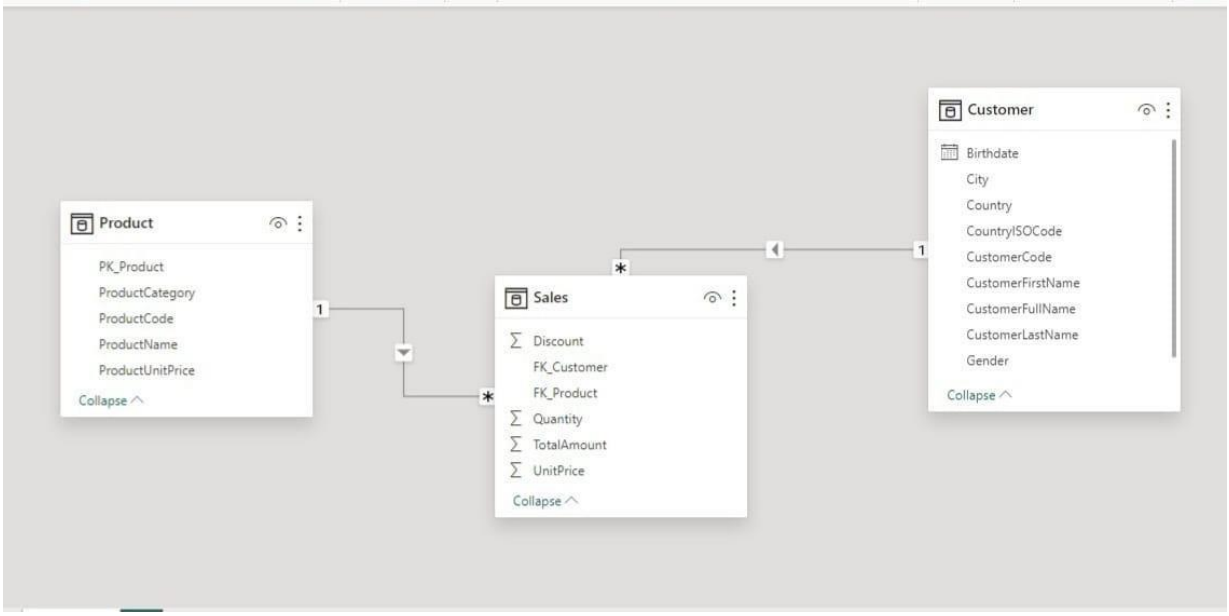
CHAPTER 4

MODELING AND RESULT

Manage relationship

The ‘‘Sales’’ file will be used as the main connector as it contains most key total amount,sum of discount etc..The ‘‘product’’ file is used to measure the customers category.



Manage Relationships:

To get data from the dataset excel file

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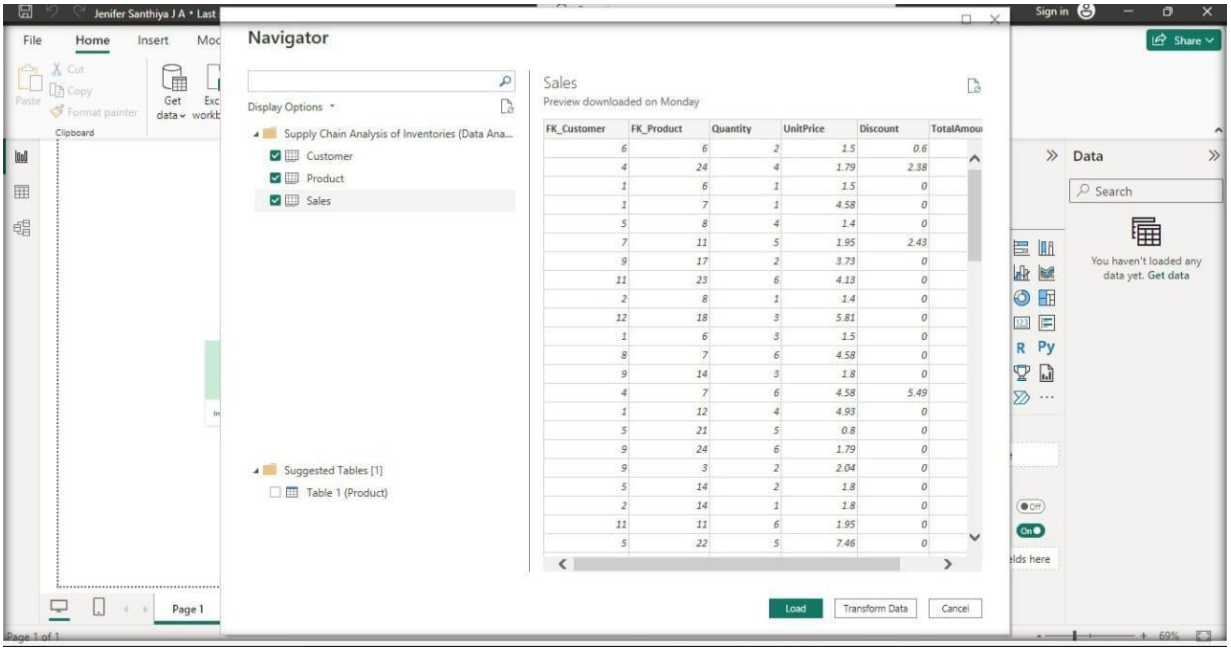
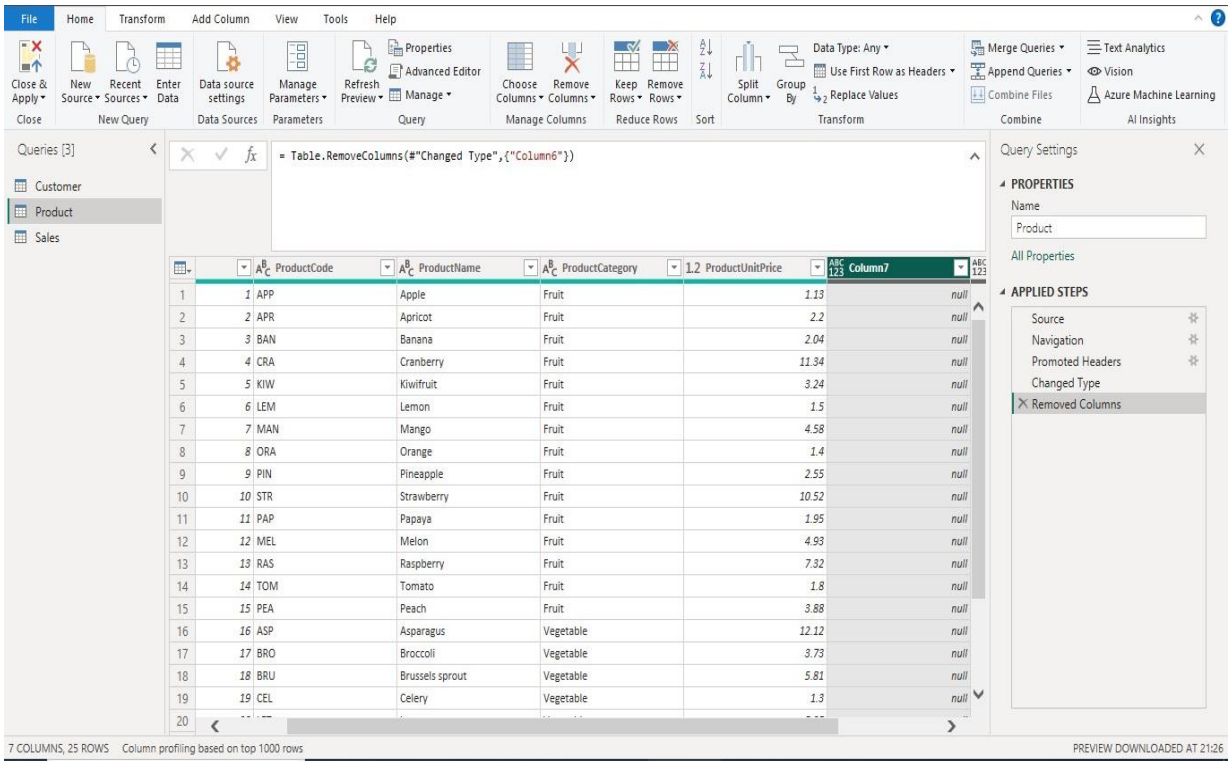


Remove columns:

Remove the three null columns(Column 6,Column7,Column8)



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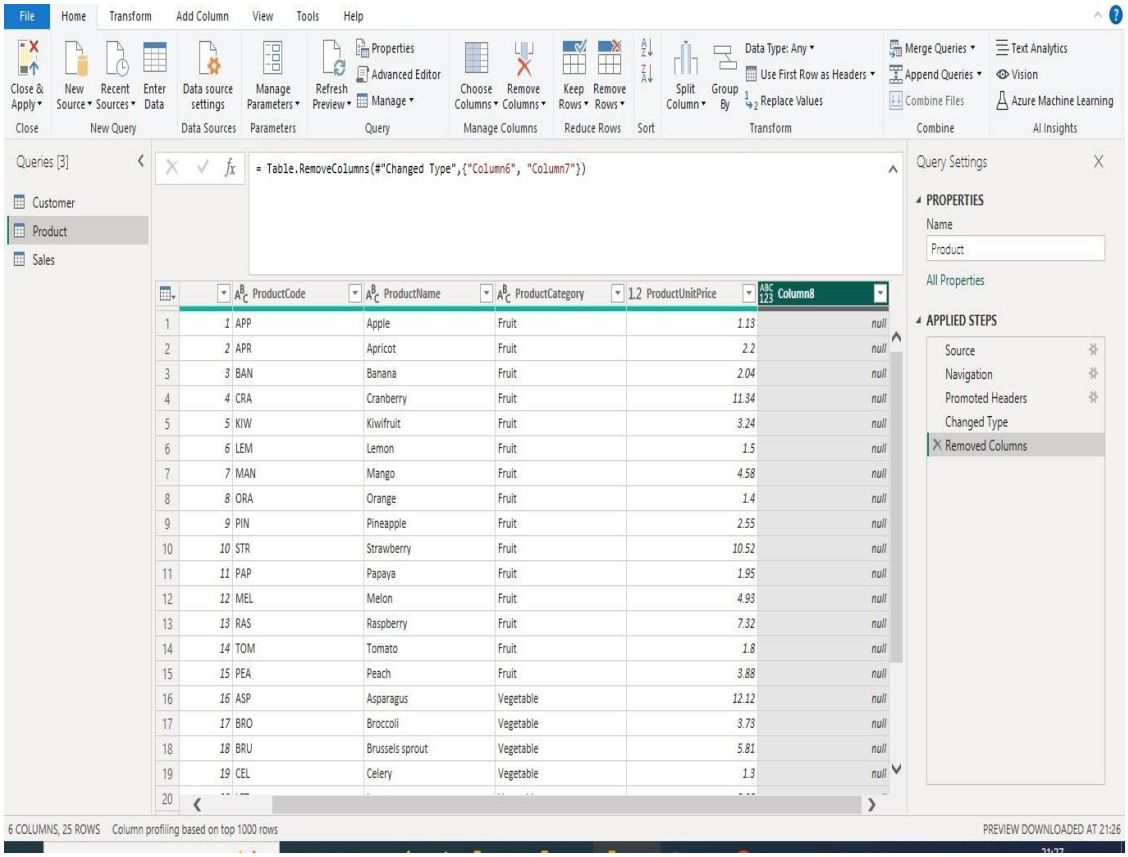

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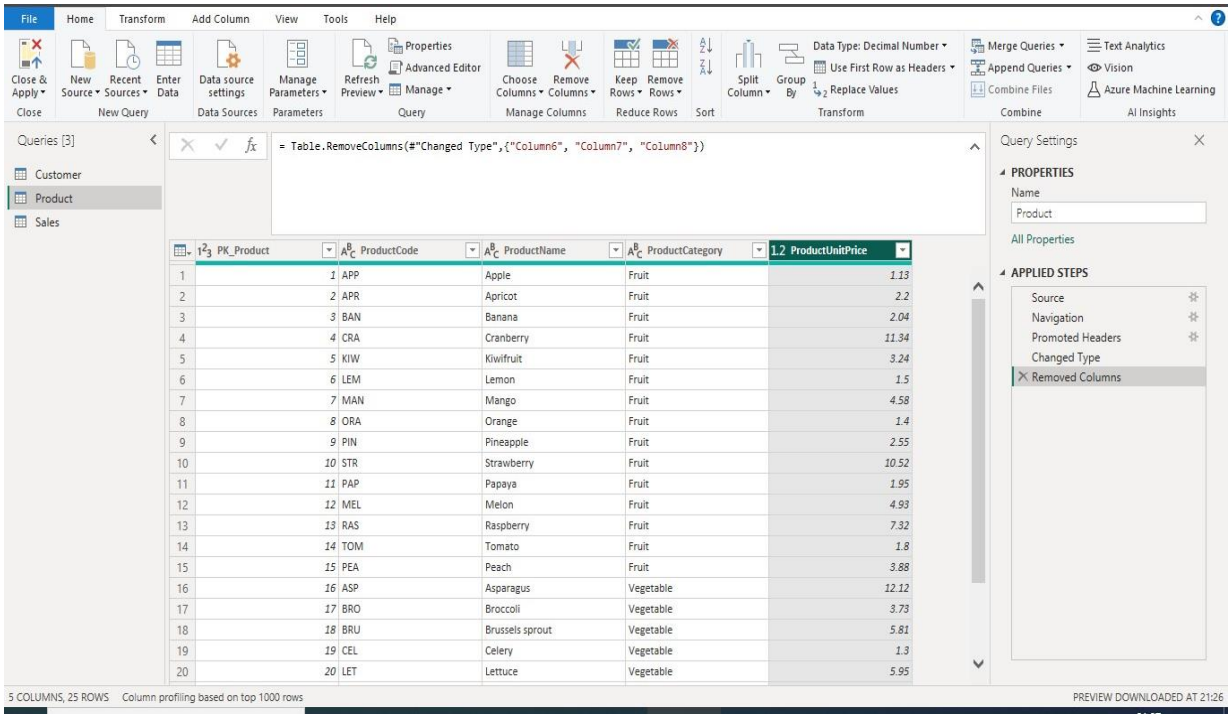

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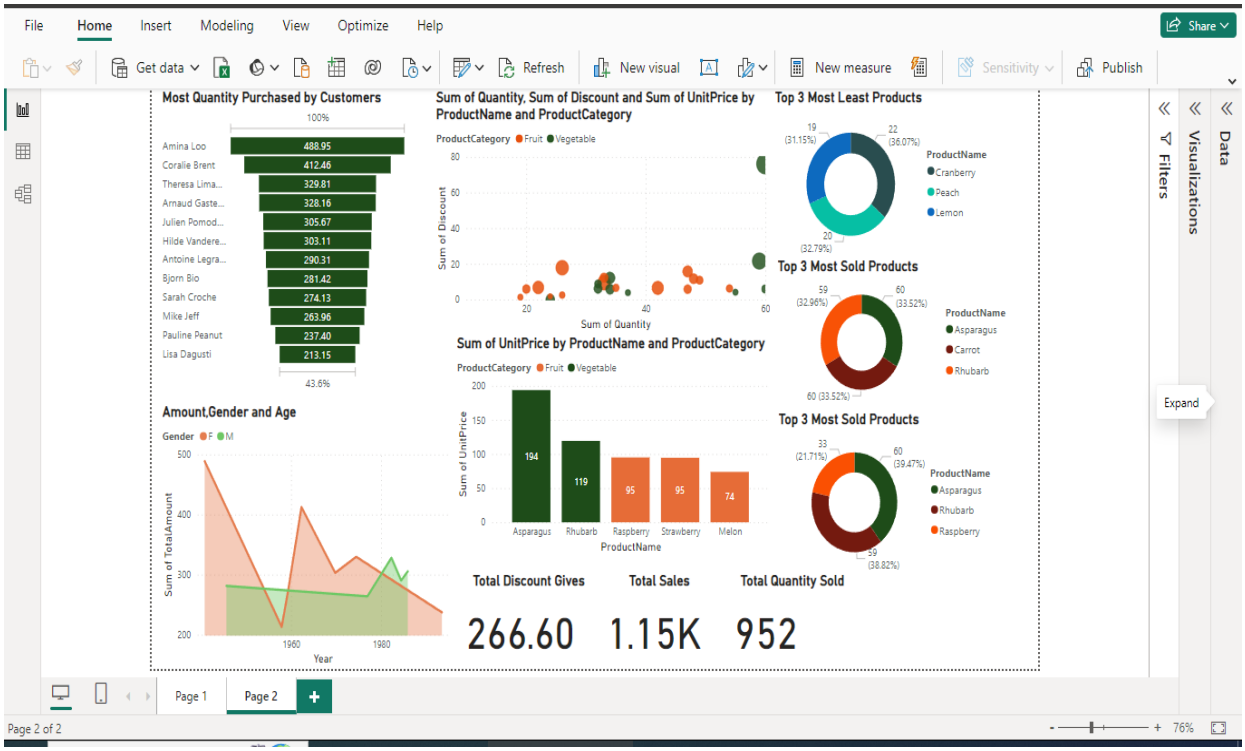
DASHBOARD



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CONCLUSION

The project ‘‘Supply Chain Analysis of Inventories ’’using Power BI has successfully demonstrated the potential of data analytics in the inventories. The supply chain analysis of customer data has provided valuable insights. Based on the data conclusion is based on the dashboard and datasets. The interactive dashboards and reports have offered a comprehensive view to customer data, product name, and correlations. The project has also highlighted the importance of data visualization in making appealing and easy to understand format,thereby aiding in better decision-making.

FUTURE SCOPE

The future scope of this project is vast. With the advent of advanced analytics and machine learning, PowerBI can be leveraged to predict future trends based on historical data. One area could be implementeing advanced analytics techniques like predictive modeling to forecast demand and optimize inventory levels even further. Another avenue to explore could be leveraging IoT devices and sensors to track inventories in real time, enabling better visibility and control throughout the supply chain. As the world moves swiftly into a digitised future, Supply Chain Management is on the cusp of a transformative leap. Modern advanced technologies like Machine Learning, Artificial Intelligence, and blockchain will likely become more widespread, enhancing efficiency, visibility, and resilience within Supply Chains. Additionally, with increasing customer expectations for

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speedy delivery and real-time updates, SCM will further leverage technology for predictive analytics and proactive decision-making.

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REFERENCES

https://medium.com/@tulasiraj61/supply-chain-analysis-of-inventories-abstract-the-project-830566b9492d

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