Tech Saksham

Case Study Report

Data Analytics with Power BI

"Supply Chain Analysis of Inventories"

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ABSTRACT

Supply chain management plays a critical role in the success and sustainability of businesses in today's competitive landscape. Within this realm, inventory management stands as a pivotal component, directly impacting operational efficiency, customer satisfaction, and overall profitability. This abstract delves into the essence of supply chain analysis of inventories, aiming to provide a concise overview of its significance, methodologies, and implications. Ultimately, supply chain analysis of inventories is imperative for businesses seeking to achieve agility, resilience, and competitiveness in dynamic markets. By continuously evaluating and refining inventory management practices, organizations can enhance operational efficiency, reduce costs, and elevate customer satisfaction, thereby unlocking new opportunities for growth and sustainability in an increasingly interconnected global economy.

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CHAPTER 1

INTRODUCTION

1.1 Problem Statement

To optimize our supply chain operations and enhance efficiency, we aim to conduct a comprehensive analysis of our inventory management. This involves identifying trends, patterns, and areas for improvement within our supply chain processes. By leveraging Power BI's data visualization capabilities, we seek to gain actionable insights into inventory levels, demand forecasting, supplier performance, lead times, and overall inventory optimization strategies. The goal is to streamline inventory management, reduce costs, minimize stockouts, and improve customer satisfaction

1.2 Proposed Solution

The proposed system for supply chain analysis of inventories using Power BI aims to streamline inventory management processes and enhance supply chain efficiency. It involves collecting data from various sources including ERP systems, inventory databases, and sales records, followed by data preparation and modeling to ensure accuracy and consistency. Interactive dashboards and reports will be developed in Power BI to visualize key inventory metrics such as turnover, stock levels, and supplier performance. Demand forecasting techniques will be employed to predict future demand, while inventory optimization strategies will be implemented to reduce excess stock and minimize stockouts. Supplier analysis and root cause analysis will provide insights into supplier performance and inventory issues, enabling data-driven decision-making. Collaboration and reporting features will facilitate communication and alignment

across stakeholders, ultimately leading to improved inventory management and overall supply chain performance.

1.3 Feature

- **Data visualizations**

  Data visualizations are used by analysts to represent raw datasets in an easy-to-grasp, visual format. For example, bar charts, histograms, and line graphs are all examples of visualizations that you can create to show how different parts of a supply chain are operating.

- **Security**

  Supply chains consist of sensitive operational data about a business. Therefore, it's important to use industry-standard security practices and ensure your data is access controlled.

- **Comprehensive analysis**

  Supply chains aren't just about the raw materials and shipping providers. Any data-producing element of the process should be integrated to ensure that analyses calculate all relationships and correlations that ultimately impact strategic business decisions.

- **Digital modeling of the supply chain**

  The physical supply chain processes should be replicated in a digital modeling system—often referred to as the "digital twin"—so analysts can easily iterate on and experiment before the business makes material investments in adjusting the physical systems.

- **Internal and external data integration**

  In addition to internal integrations that pull data from things like inventory management systems, analysts should pull information from external sources that affect their supply chain, such as public weather datasets or feeds from social media APIs.

- **Intuitive, collaborative access**

  While data needs to be secured and access controlled, it should also be easy to share amongst analysts to help with the collaborative and iterative process of improving models and visualizations. In addition to increasing creativity, it'll reduce the duplication of efforts, particularly with data pipelines that are often generalizable.

1.4 Advantages

- **Visual Insights:** Power BI's visual dashboards offer quick comprehension of inventory metrics and trends.
- **Efficiency Boost:** Predictive analytics and optimization techniques enhance inventory management, reducing costs and improving resource allocation.
- **Data-Driven Decisions:** Real-time data analysis enables informed decision-making, leading to agile and proactive supply chain operations.
- **Improved Supplier Relations:** Monitoring supplier performance fosters better relationships and ensures timely deliveries, further enhancing overall efficiency.

1.5 Scope

The scope of the supply chain analysis of inventories using Power BI encompasses the collection, preparation, and modeling of data from diverse sources including ERP systems, inventory databases, and sales records. It involves the development of interactive dashboards and reports to visualize crucial inventory metrics such as turnover, stock levels, fill rates, and supplier performance. Additionally, demand forecasting and inventory optimization techniques are employed to identify opportunities for efficiency improvements, reduce stockouts, and minimize carrying costs. Supplier analysis and root cause analysis further enhance the understanding of inventory dynamics, while

collaboration and reporting facilitate data-driven decision-making across the organization. Continuous monitoring and feedback mechanisms ensure ongoing optimization of inventory management processes.

CHAPTER 2

SERVICES AND TOOLS REQUIRED

2.1 Services Used

- **Data Collection and Storage Services**: Supplier need to collect and store customer data.Data collection and storage services facilitate efficient handling and organization of inventorAy-related information, ensuring streamlined inventory management and optimized supply chain operations..

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.

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.

CHAPTER 3

PROJECT ARCHITECTURE

3.1 Architecture

Excel Sheet

Data Analysis → Reporting and Visualization

Data Collection → Data preprocessing

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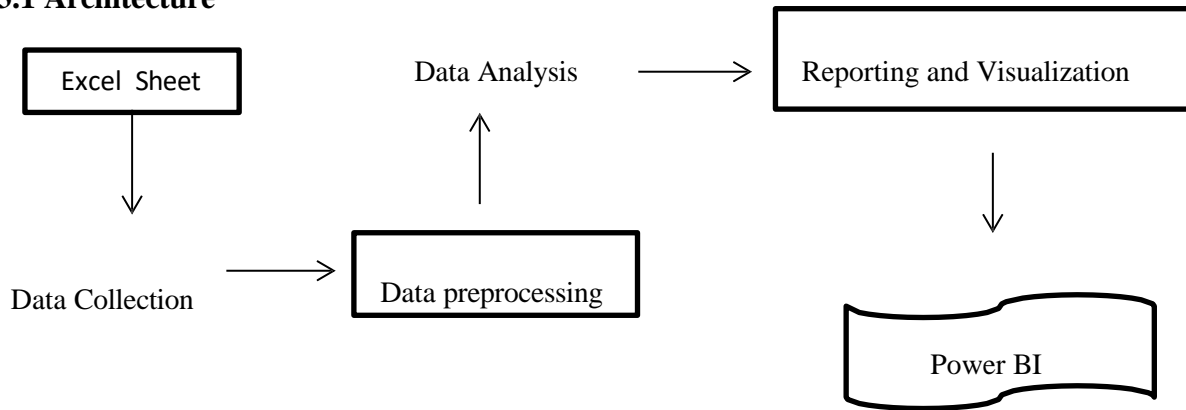
Here's a high-level architecture for the project:

1. **Data collection and storage:** SCA requires access to a large amount of data from across the supply chain. This data can be collected from a variety of sources, including ERP systems, CRM systems, and transportation management systems. The data is then stored in a data warehouse or data lake.

2. **Data preparation and cleaning:** Once the data has been collected, it needs to be prepared for analysis. This may involve cleaning the data, removing errors, and transforming it into a format that can be easily analyzed.

3. **Data analysis**: The prepared data is then analyzed using a variety of tools and techniques, such as statistical analysis, machine learning, and artificial intelligence. This analysis is used to identify trends, patterns, and relationships in the data.

4. **Reporting and visualization:** The results of the data analysis are then presented in reports and visualizations. These reports and visualizations are used to communicate the findings to stakeholders and to guide decision-making.
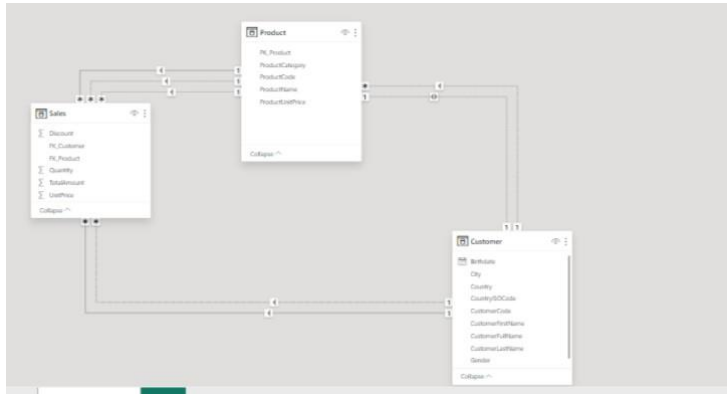
The architecture of supply chain inventory analysis is pivotal for businesses to optimize operations, reduce costs, and enhance customer satisfaction through data-driven decision-making and technological integrations

CHAPTER 4

MODELING AND RESULT

Manage relationship

The "sales" file will be used as the main connector as it contains most key identifier

(PK_customer,PK_product,FK_Customer,FK_Product) which can be use to relates the 3 data files together.

Manage relationship

Edit relationship

Dashboard

SUPPLY CHAIN ANALYSIS OF INVENTORIES
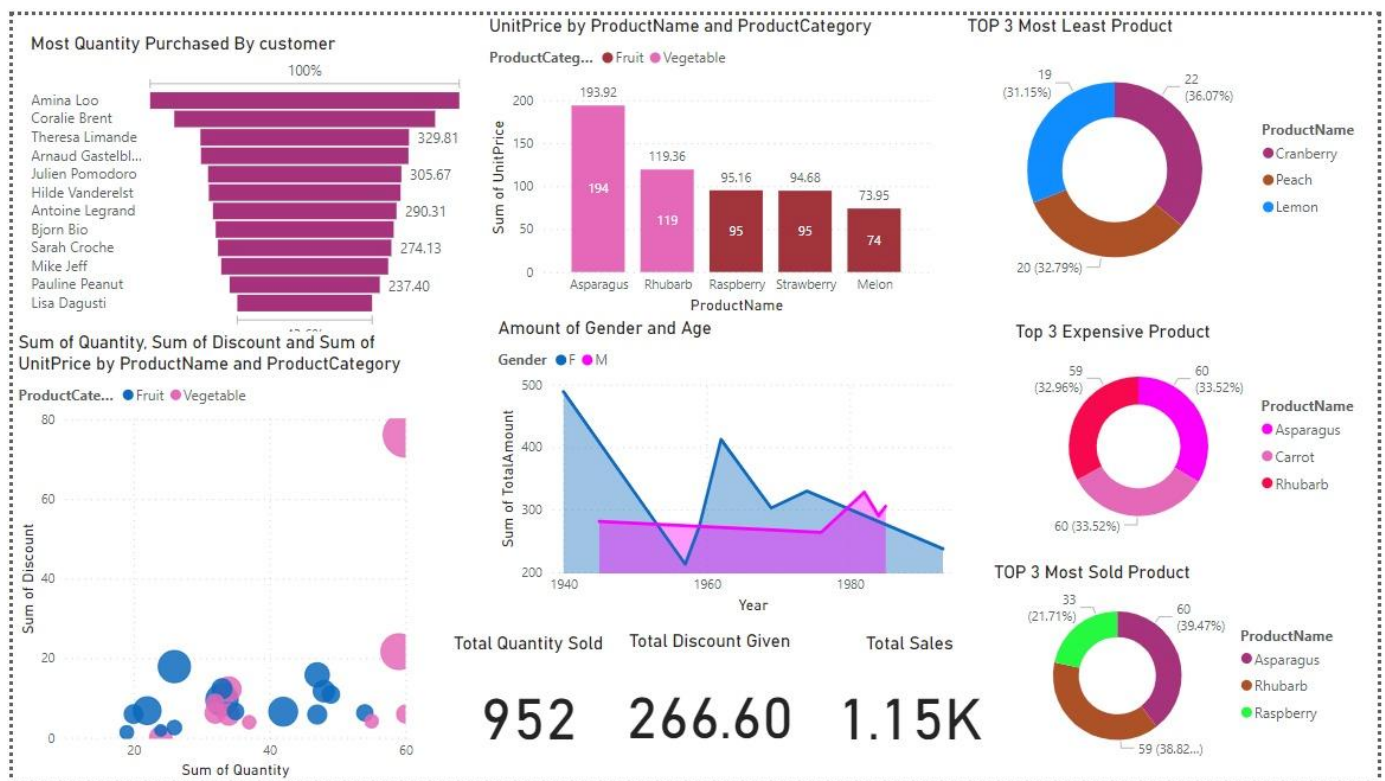
CONCLUSION

In conclusion, the supply chain analysis of inventories has provided valuable insights into the management practices and performance of inventory within the supply chain. Through a thorough examination of inventory levels, turnover rates, carrying costs, and stockout risks, key areas for improvement have been identified. By leveraging effective demand forecasting methods and inventory planning techniques, opportunities exist to optimize costs, minimize stockouts, and enhance overall supply chain performance. Recommendations for streamlining inventory management processes and addressing potential bottlenecks are crucial for achieving these objectives, ultimately contributing to increased efficiency and competitiveness within the supply chain ecosystem.

FUTURE SCOPE

The future scope of supply chain inventory analysis involves harnessing emerging technologies like AI, blockchain, and IoT to drive efficiency, sustainability, and resilience while fostering greater collaboration across interconnected supply chain networks

REFERENCES

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LINK

https://github.com/Rajachidambaram/Case-study