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From Data To Decision: A Data Analytics Approach to Sales Optimization

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ABSTRACT: The increased demand for intelligent systems which turn raw data into actionable information is attributable to an exponential increase in organizational data. The first two components of a Business Intelligence (BI) framework created using Microsoft Power BI are to develop a system for preprocessing the data, then model it in a structured way (for example, within an OLAP cube) and finally use techniques for creating data visualizations to enhance the decision-making process. The framework will allow users to create dynamic dashboards that display key performance indicators for total sales, profit margins and contributions by region. The results of this research demonstrate that data visualization tools provide a straightforward method for visualizing complex data and facilitate improved strategic decision-making.
KEYWORDS: Business Intelligence, Power BI, Data Analytics, Sales Optimization, Dashboard, Decision Support System

I. INTRODUCTION

In today's digital era, organizations continuously generate large volumes of data through their operational activities & finding meaningful insights from this data can still be a challenge. Most reporting systems today are more static than flexible or detailed enough for appropriate assessment. Fortunately for organizations, they can utilize BI tools to provide a single-repository option that integrates, transforms and visualizes data, thus allowing for greater flexibility in obtaining relevant and accurate results. Power BI is perhaps the most widely used and fastest growing BI solution due to its excellent scalability, real-time analysis and ease of use [1].

The purpose of this study was to create a robust reporting tool that will allow users to develop a dashboard system that can be used for analyzing sales and profit data. The dashboard will help organizations analyze their sales and profits at a high-level by helping them to make data driven decisions and analyze their performance over time in relation to sales trends.

II. RELATED WORK / LITERATURE SURVEY

A key part of data visualization is to bring order out of chaos by enabling more accurate decisions through the use of visual formats for difficult-to-analyze datasets. According to a study conducted by Lee et al. [2], dashboards are an effective way of displaying relevant data, which in turn helps with faster completion of performance measurements.

Sharda et al. [3] show that business intelligence (BI) systems allow organisations to manage and analyse their data, which can help to improve performance overall. Their research has demonstrated that when organisations use business intelligence tools, they are able to make better predictions and do their work more efficiently.

Chen et al. [5] have provided evidence that interactive visualisations lead to better decision-making accuracy compared to conventional means of presenting data through reporting systems. Reports from the industry indicate that Power BI is a dominant player in analytics, largely due to its versatility and ability to integrate into existing data environments [4].

III. PROPOSED METHODOLOGY AND DISCUSSION

A. Collection of Data

The type of data used to support this study is sales data from retail stores with information stored in an Excel spreadsheet and other applications; this data contains information such as order information, customer segmentation, product classifications, sales amounts, profit amount, and regional attributes.

B. Preprocessing of Data

Data preprocessing was accomplished through the use of the Power BI Power Query editor program. Several key preprocessing steps were taken and consist of:

- Removals of all missing or inconsistent data
- Convert data to correct data types and appropriate normalized format
- Calculated Fields & Measures created (calculated columns) to use as inputs for data analysis
- Aggregated data (summarized) to use as input for analysis

C. Modeling of Data

A relational data model was built for linking together various piece of data stored in the database structure. The following data analysis d.expressions (dax) were created as a result of this modeling effort and used for calculating key business metrics:

- Total Sales = sum(sales)
- Total Profit = sum(profit)
- Profit Margin = Profit/Sales

D. System Workflows

The system is designed with a repetitive sequence or process of data collection, preprocessing, modeling and ultimately visualizing data with the objective of ensuring that raw data is converted into an actionable insight efficiently.

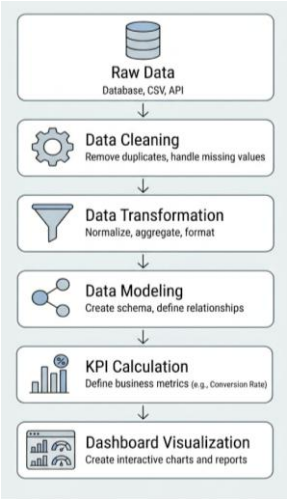

Fig. 1. Workflow of Data Processing Pipeline

E. Summary of Findings

The proposed system allows users to effectively interact with data on their terms and through filtering and drill-down capabilities. Thus enhancing the users' analytical capabilities and decision support through a more effective manner. Some of the identified system limitations are that it requires quality data and there is no real-time data integration. In the future, improvements to the system to support its limitations can be made through including more advanced methods.

IV. EXPERIMENTAL RESULTS

By using the Dashboard Tool, the following insights can be made about the data:

- Some geographic areas are key contributors to total sales performance
- Just because there are high sales volume doesn't mean they'll generate high profit
- Certain product types are generating little to no profit
- There is a lot of seasonal variance in sales

This supports the use of visual display techniques for discovering trends and supporting managerial decisions [2], [5].

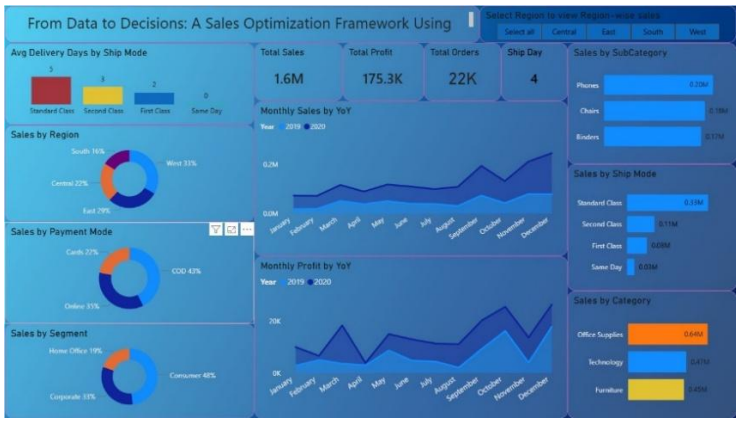

Fig. 2. Dashboard Layout Structure

V. CONCLUSIONS

An overview of the proposed BI tool is an advanced framework to allow for the analysis of sales data using Power BI. The proposed system uses the dashboard-style user interface to transform raw data into actionable analysis. The results indicate that BI tools provide decision makers with timely decision making, simplify the analysis process, and support the development of business strategies. The results provide additional evidence that visualization-based analytics are crucial for organizations focused on making data-centric decisions.

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