Power BI Dashboard for Data Analytics of Sales Data

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ABSTRACT

All businesses want growth, and this can be achieved by identifying new opportunities and potential areas for growth in addition to the areas in which the business is lagging. Data analytics is the process by which the data is processed and various important insights are extracted from it that are crucial for the growth of an organization.

The process of understanding the value of a data set through a visual context is known as data visualization," and it is a component of data analytics that is carried out after data correction. These days, analytics and business intelligence are more dependent on visualisation.

Datasets can be visualised using a variety of methodologies and in a variety of interactive or dynamic ways, as well as through several sorts of visual insights.

This paper focuses on the process model, Microsoft Power BI operations, types of data sources available in Tool, and its various related types of visual insights or context. It deals with the interactive visualisation of educational institution databases using Microsoft Power BI Tool with different modules.

KEYWORDS: Data Analysis, Data Visualization, Power BI, Business Intelligence

INTRODUCTION

Data visualization is the graphical representation of data and information in a visual format, such as charts, graphs, maps, and infographics. Data visualisation is to convey complicated data in a straightforward, understandable, and analytically sound manner. It is possible to spot patterns, correlations, and trends by transforming data into visual representations that can be challenging to spot in raw data. For data analytics, corporate intelligence, and decision-making processes, a data visualisation is a crucial tool that enables users to draw meaningful conclusions and takeable insights from the data. Numerous sectors, including banking, healthcare, marketing, and education, use it extensively.

Because it provides a range of visualisation options, including bar charts, pie charts, maps, tables, and more, Power BI is a strong tool for data visualisation. Users of the tool can produce interactive reports and dashboards that can be distributed throughout an organisation. The visuals can be altered to meet the user's demands and the requirements of the data being examined. Users of Power BI can also delve deeper into the data to acquire more information and spot patterns or trends. Overall, Power BI data visualisation aids users in making better decisions by presenting information in a clear and understandable manner.

The Process Model of Power BI refers to the steps involved in creating a data model within Power BI. The data model is the foundation of any Power BI report or dashboard, and it is created using the Power Query Editor and the Power Pivot Editor.

The process model involves four main steps:

1. Data Acquisition: This involves connecting to the data sources, selecting the tables or files to use, and applying any necessary transformations to the data using the Power Query Editor.
2. Data Transformation: In this step, the data is cleaned, filtered, sorted, and otherwise transformed to make it ready for analysis using the Power Query Editor.
3. Data Modeling: Once the data is transformed, it is loaded into the Power Pivot Editor, where relationships between tables are established, and calculated columns and measures are created to support the analysis.
4. Report Creation: Finally, the data model is used to create reports and visualizations using the Power BI Report Builder, where users can create interactive dashboards and reports.

Overall, the process model of Power BI helps users to create a robust data model that supports effective analysis and visualization of data.

Types of Visuals in Power BI

You can utilise Microsoft Power BI visuals to augment Power BI by getting high-quality data visualisations. More than 20 different types of visual contexts, a framework for running them,

and testing infrastructure are all included in Microsoft Power BI, allowing you to create high-quality visualisations. All the interfaces required for complete integration with Power BI's selection, filtering, and other UI experiences are provided by the framework. Because the code is written in Typescript, building and debugging are made simpler. Everything runs in current web browsers and compiles to JavaScript. Although D3 was used to create the graphics, you can also use your preferred technology, such as Canvas, SVG, or Web GL. You now have all the tools necessary to create unique Power BI visualisations.

There are two types of visuals in Power BI. 1) Microsoft Visuals, 2) Custom Visuals.

Microsoft Visuals

These are the official Microsoft visualizations, some of which were already included in the Power BI installation package.

The Microsoft-approved visuals listed below, which are secure in nature, include stacked bar charts, line charts, waterfall charts, area charts, clustered bar charts, slicers, tables, and matrixes, among others.

Custom Visuals

These visual contexts are created by third parties or end users, such as developers, and are distributed among users via websites like Office Store and git Hub. They are unsecured in nature, and the custom graphics listed below were supplied by Microsoft representatives and third parties, including a dot plot, route map, flow map, journey chart, scroller, etc.

DATA SOURCES

DATA FORMAT	DATA SOURCES
Files	MS Excel, Text/CSV
Online Services	Power BI Service, Power Query editor, Google Analytics, Github
Other	Web, MS Powerpoint

LITERATURE REVIEW

Marija Blagojevic et al.'s study on web-based intelligent reports of e-learning systems using the technique of data mining and its discussion of the PDCA method (Plan, Do Check, Act) for improving the web-based intelligent reports of e-learning systems by means of data mining techniques came to the conclusion that their proposed system has an improvement since it predicts behaviour patterns, which results in an increase in the number of participants. Their study, also proved that their proposed system is better. Additionally, the creation and introduction of new modules

The accessibility reach for data-driven decision support systems is open source software, new hardware, web technologies, etc. Daniel J. Power studied the data-driven decision support system and it deals with the data-driven decision support system and its advantages at Business Intelligence and came to the conclusion that mainframe-based decision support systems would need to be updated or replaced by web-based or web-enabled systems.

Business intelligence was neglected in many healthcare information technology programs, but both the industry and academia have realised the importance of business intelligence, according to research by Guangzhi Zheng et al. on the subject. Their paper deals with the preliminary analysis of the integration of business intelligence with healthcare information technology.

Michelle Hoda Wilkerson and colleagues conducted research on youth reasoning with interactive data visualization, which focuses on how young people understand data through interactive data visualisation. They came to the conclusion that helping learners coordinate any resources they decide to use is more likely to be beneficial than encouraging them to follow a specific approach or sequence of resource use.

With the use of learning analytics, Yuri Vanessa Nieto et al. has created an academic decision-making model for higher education institutions. They came to the conclusion that the proposed software architecture has the advantage of integrating learning analytics

indicators and supporting decision-making in universities. It deals with the modelling and development of software architecture for developing and categorising indicators.

METHODOLOGY

The procedure of cleansing the data is crucial to the data analysis process. To make ensuring the data is accurate and reliable, it entails locating and fixing flaws, inconsistencies, and inaccuracies in the data. We will go over the data cleaning procedure we used in this section to get the data ready for Power BI analysis.

To start the data cleaning process, duplicate or unnecessary data had to be found and eliminated. To get rid of duplicate data and filter out any extraneous information, we used Power Query Editor, a data transformation and cleaning tool within Power BI. By taking this step, we made sure the information we used for analysis was correct and pertinent.

Dealing with any incomplete or missing data came as the second phase. To deal with missing data, we applied a number of approaches, including imputation and deletion. With imputation, missing values were filled in utilising statistical techniques like mean imputation or regression imputation. When records had too many missing pieces of information or were thought to be inconsequential, they were deleted.

The conflicting data was addressed in the third stage. By comparing data from various sources or by looking at data from a single source, we were able to spot irregularities. To handle data inconsistencies, we employed a number of strategies, including standardization, categorisation, and normalisation. To maintain consistency throughout the data set, for instance, we standardised date and time formats.

Verifying data integrity and accuracy was the last stage. We checked the information to see if there were any mistakes or inaccuracies, such as improper data types or values outside of the anticipated range. We found and fixed any mistakes or inaccuracies in the data using validation techniques including cross-validation and outlier detection.

In conclusion, the process of data analysis must start with data cleaning. It guarantees the accuracy, dependability, and consistency of the data used for analysis. We transformed and cleaned the data for our analysis using Power BI's data transformation and cleansing features.

RELATIONSHIP BETWEEN ALL TABLES
CREATING A REPORT OR A DASHBOARD

Dashboards and reports are built based on the requirements. After that, the dashboard is designed based on what the organization genuinely wants to search for and what is more vital to the company. There are many different ways to make a dashboard. In general, the dashboard should be simple to comprehend and use.

A. OVERVIEW OF SECTIONS IN THE DASHBOARD
B. HOMEPAGE

The homepage of the project is a crucial entry point for users to interact with the data and glean insights. It is designed with user experience and ease of navigation in mind. The homepage provides a high-level overview of the project and the data being analyzed, while also allowing users to drill down into specific details as needed. The use of visually appealing graphics with hyperlinks on each of them is used for smooth navigation into details.

C. CUSTOMER ANALYSIS

The customer analysis page displays the transaction details of a company, providing insights into customer behaviour and preferences. The page typically includes visualizations such as a bar chart showing customer retargeting information. These visualizations can help identify patterns and trends in customer behaviour and purchasing potential, which can inform marketing and sales strategies, product development, and customer service initiatives. With Power BI's interactive capabilities, we can drill down into specific customer segments or time periods to gain even deeper insights into customer behaviour.

D. PRODUCT ANALYSIS

The Power BI project's product analysis page is a critical component of business intelligence that enables organisations to learn more about the performance of their products. Analytics and visualisations about each product's sales, profit, and consumer behaviour are available on this page. This section is super beneficial for product comparisons and their future scope of

sales. We can analyse trends, spot patterns, and decide how to improve product performance by utilising interactive filters and drill-down features. Overall, this page is a crucial tool for companies looking to acquire a competitive edge through the analysis of product performance and decision-making based on data.

E. SALES TEAM ANALYSIS

This page is a crucial tool for businesses to measure and evaluate the performance of their sales team. This page is designed to display key performance indicators (KPIs) such as the revenue generated, gross profit, deals closed, and total transactions etc, among others. It provides an overview of the sales team's performance over time, enabling businesses to identify trends and make data-driven decisions to optimize sales strategies. With Power BI's powerful data visualization capabilities, the sales team analysis page can also display performance metrics by sorting sales teams based on profit generated, allowing businesses to identify areas for improvement in other teams by having a deep dive into the strategies used by top companies and make informed decisions to drive sales growth.

F. LOCATIONS ANALYSIS - This page offers insights into the performance of several store locations on the basis of profits in sales done by them. Visualizations that aid in determining which store locations are performing well and which ones are underperforming are included on this page. The ability to track key performance indicators over time, including revenue, profit margin, and sales growth, enables a deeper comprehension of trends and patterns. The geographical map is added to the page to identify potential regions for additional marketing efforts and to demonstrate where sales are highest. Businesses can optimize their store placement strategy and boost their revenue and profitability by using the sales store location analysis page.

CONCLUSION - Overall, the objectives of this research were met. Data analysis helps to understand concepts a lot better than just raw spreadsheet data by visualizing them. While there are a number of other technologies available for conducting corporate data analysis, the Power BI visualization technique is the most widely used for understanding the fundamentals of data analysis. Data representation and interpretation can be done quickly and simply with the aid of the visualization technique. This approach can be extremely beneficial for stronger conceptual design.

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