

Masters in Applied Computing

Advanced Database Topics- COMP 8157

Under guidance by: Dr Shafaq khan

**Analysing Sustainable and Non-Sustainable Sales Data with Data Visualization Tool: Unveiling Insights and Driving Intelligent Decision-Making through KPIs**

Submitted by

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Table of Contents

[I. ABSTRACT 3](#_Toc136204071)

[II. PROBLEM DESCRIPTION 3](#_Toc136204072)

[III. MOTIVATION FOR THE PROBLEM 3](#_Toc136204073)

[IV. SOLUTION STATEMENT/TECHNOLOGY 4](#_Toc136204074)

[V. REFERENCES: 5](#_Toc136204075)

# ABSTRACT

Over the past years, environmental issues have become critical, with unsustainable patterns of consumption and production being root causes of climate change, biodiversity loss, and pollution [1]. However, there has been a growing awareness of the need for sustainable products, with a 71% rise in popularity of searches for sustainable goods over the past five years [2][3]. Because sustainable products can significantly impact our environment by reducing waste, energy, and chemicals [4].

This has created a challenge, which is to compare the performance, price, and behaviour of their sustainable products against those of non-sustainable items [5].

To solve the above problem, we will perform various data analytics methods to process and refine the data and extracting important information and then present that information using the user-friendly Tableau dashboard, enabling stakeholders to access actionable insights and drive informed decision-making for improved sales performance and sustainability strategies.

# PROBLEM DESCRIPTION

With rise of sustainable development across the globe and government of almost all nations realising its dire need, most of the big fortune 500 companies are being obliged to incorporate sustainability factor in their business. Even the United Nations also introduces sustainable development goals to specifically involve private sector in this initiative so the impact can be created in all businesses and the awareness can be spread across the world [6].

Because of this we can currently see the multiple such products launched in the industry over the last two decades [7]. But with more products in their catalogue, it gets difficult for the companies to manage their portfolio and at the same time promote their products which are manufactured or developed in consideration with sustainable policies. There is a lot of data that companies have about the products which can be put into use. This is related to their non sustainable and sustainable version of the same product. It can be the sales data over various categories, sales and revenue in multiple regions, product data, environment impact data, time-series data etc.

Furthermore, the current landscape of data analytics often involves using disparate tools and solutions depending on the nature of the data. Some prefer Excel for its functions, while others use relational databases with procedures and triggers. For big data, solutions like Spark, Storm, or Snowflake are utilized whereas some prefers to use non-relational database due to flexible schema database. When a company relies on various data analytics tools, decision-makers face several challenges. They encounter fragmented insights, as data is scattered across different tools. This leads to delays and inefficiencies in fetching and compiling data for decision-making. Additionally, there is limited standardization, making it difficult to compare and analyse information consistently. Senior leadership also lack self-service capabilities, relying on others to fetch and present data, which can result in delays and hinder their agility in making informed decisions.

# MOTIVATION FOR THE PROBLEM

Well, there are several data visualization tools but Tableau has helped the World Economic Forum shape global, regional, and industry agendas by reducing the volume of reporting dashboards by 75% and accelerating decision-making with insights [8]. By, creating a dashboard that promotes sustainable products, companies can contribute to shaping global, regional, and industry agendas and demonstrate their leadership in sustainability.

Creating a Tableau dashboard to promote sustainable products can help companies achieve economic growth. The data visualization process will be greatly streamlined and intuitive compared to existing industry norms, where most analytics are performed using conventional methods like spreadsheets or software and then included into business presentations. The Tableau dashboard will do away with this procedure, save a great deal of time, and deliver results that are much more intuitive and can be presented right away to the appropriate stakeholder. It also could fetch data on its own, and users can interact with the dashboard by altering various parameters.

Furthermore, instead of creating separate reports for each product and distributing them through emails, which leads to electronic waste generation, the unified dashboard allows for simultaneous analysis of multiple products. Moreover, it offers the flexibility to grant access to any desired number of individuals, facilitating collaboration and information sharing.

# SOLUTION STATEMENT/TECHNOLOGY

To provide valuable insights into sales performance, we are developing a Tableau dashboard that analyses the sales data of sustainable and non-sustainable alternatives within the same product category, produced by a company. Since the sales and product data are confidential, finding open-source data was not feasible. Therefore, we will leverage a tool called 'Mockaroo' to create synthetic data that closely resembles real-life data. Moreover, this tool can generate in many forms like csv, sql, xml, json, and many more.

Furthermore, once data is created, we will be saving in the database for further processing. In addition to this, different features of database will be used like for MySQL, we can use SQL query, triggers, stored procedures, and views. In this way, we will be utilizing the capabilities of database tools to present the wide features of database that most of times undermined by the database associates.

Then, Application Programming Interfaces (APIs) will be used to fetch the data from the database and perform Machine Learning Methods for handling missing and removing outliers. To elaborate, for ensuring accurate analysis, we will begin by detecting and addressing outliers in the product data using statistical techniques such as Z-Score, Interquartile Range (IQR), and Mahalanobis Distance. Once the outlier-treated data is obtained, we will process it to enhance its quality and reliability.

Moreover, we will be posting processing the data, to refine and further analyse the data to extract meaningful insights, perform calculations for Key Performance Indicators (KPIs), and facilitate dynamic data visualization. The dashboard will offer flexible visualization options, allowing users to view data on a quarterly, half-yearly, or yearly basis. Additionally, it will support various other visualizations to accommodate specific analysis needs.

A screenshot of a computer

Description automatically generated

*Figure: Proposed solution for analysing sustainable and non-sustainable sales data with Data Visualization Tool*

By leveraging this dashboard, the company will gain a comprehensive understanding of their sales trends, identify areas of improvement, and make data-driven decisions.

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