Platforms for Data Analytics Continuous Assessment 1

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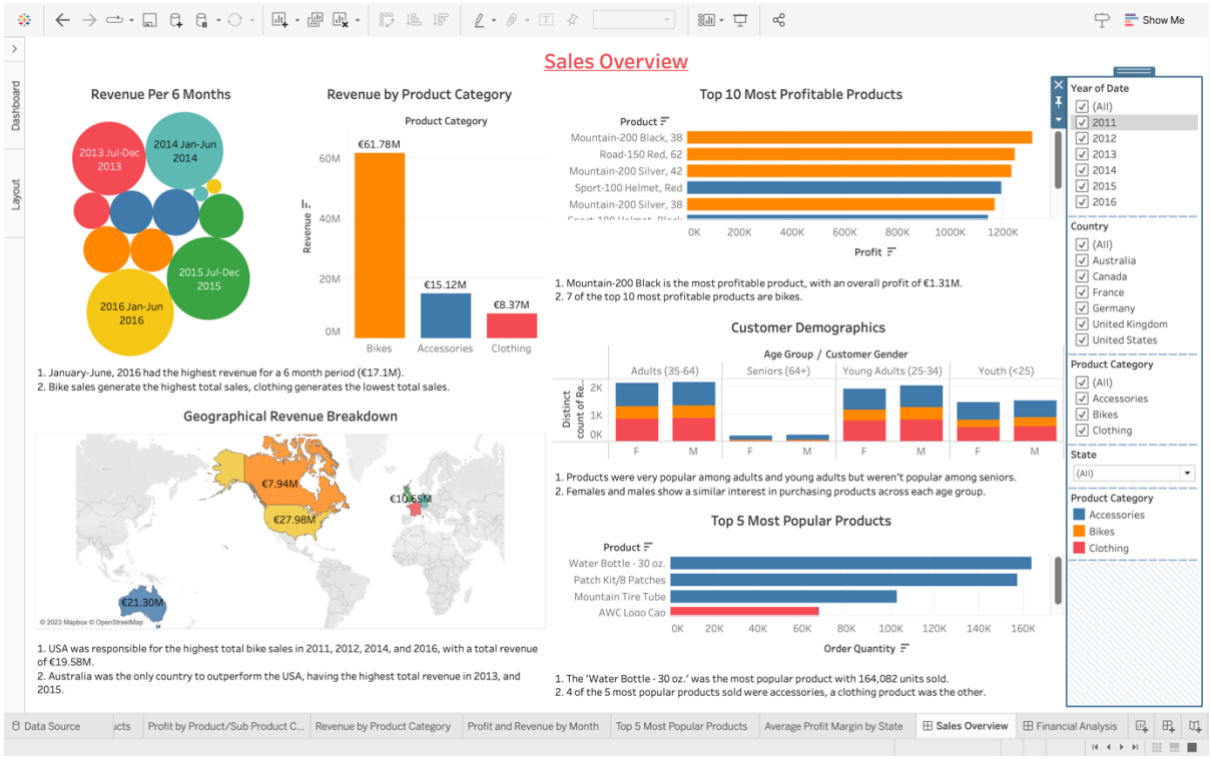
Introduction

The aim of this assignment was to demonstrate an application of core course concepts and achieve the course learning outcomes. Tableau was employed as the primary tool for both visualisation and analysis. The dataset used, titled ‘Bike Sales in Europe’ (Shah, n.d.) was chosen as it was from a real-world context and was based on sales. This dataset belongs to a company that sells biking products in Australia, France, Germany, Canada, USA, and UK. Once the dataset was chosen it was imported into Tableau so that visualisations could be created tailored to the theme of each dashboard. Each dashboard’s emphasis was to ensure that the resulting insights were helpful and accessible in an interactive manner.

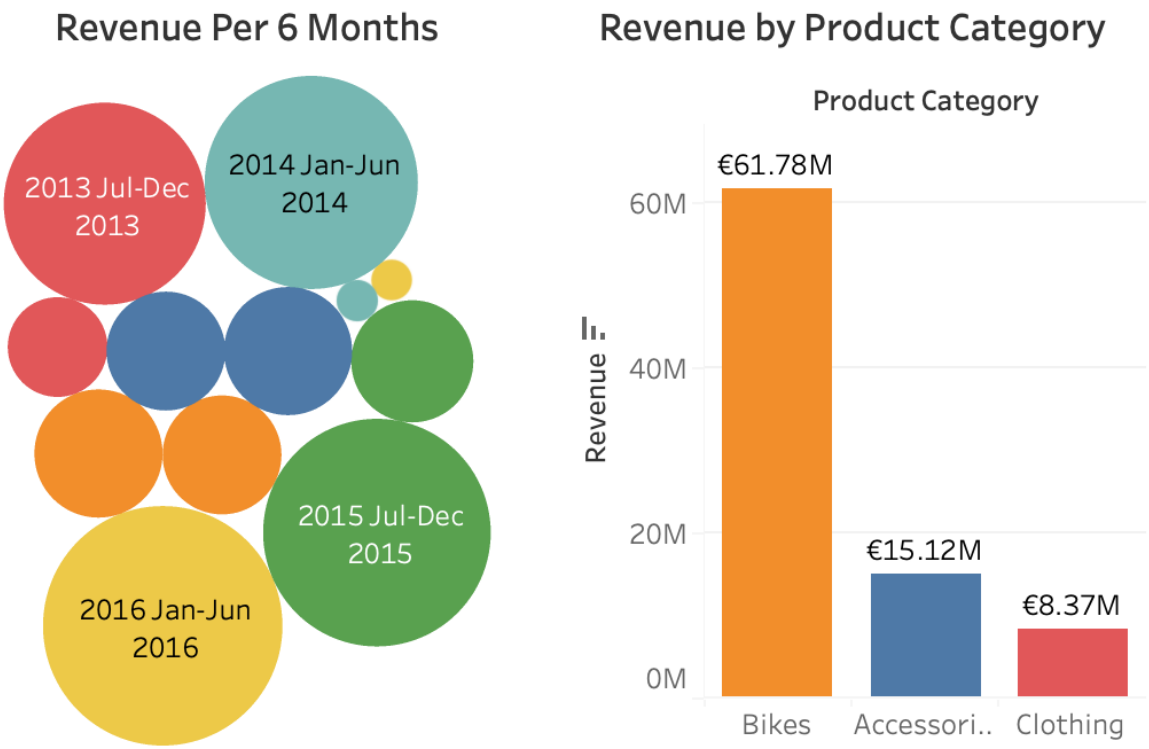
Dashboard Descriptions

Dashboard 1: Sales Overview

This dashboard gives a snapshot of the business's sales performance. The insights gained and their explanations are offered below under the relevant graph, chart, or map.



Revenue Per 6 Months/Revenue by Product Category

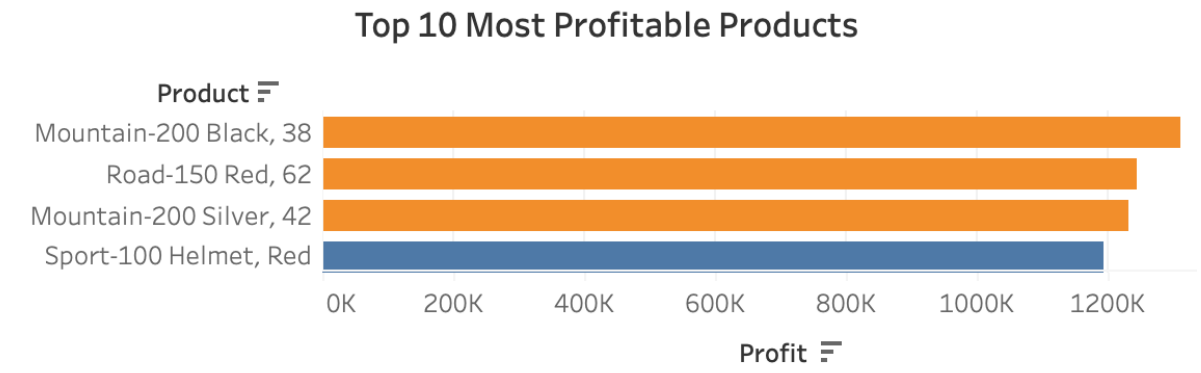


1. January-June, 2016 had the highest revenue for a 6 month period (€17.1M).
2. Bike sales generate the highest total sales, clothing generates the lowest total sales.

Packed bubbles: Illustrate the monthly revenue. Revenue peaks in June 2016 at €17.1M, highlighting the highest 6-month period.

Bar chart: Visualises total sales composition, emphasising bikes (highest) and clothing (lowest) contributions.

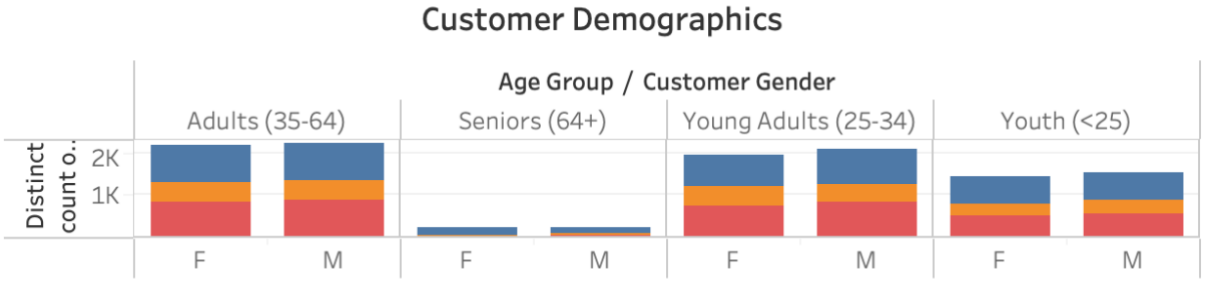
Top 10 Most Profitable Products



1. Mountain-200 Black is the most profitable product, with an overall profit of €1.31M.
2. 7 of the top 10 most profitable products are bikes.

Horizontal bar chart: Displays Mountain-200 Black as the most profitable product (€1.31M) and emphasises bikes' dominance in top profits.

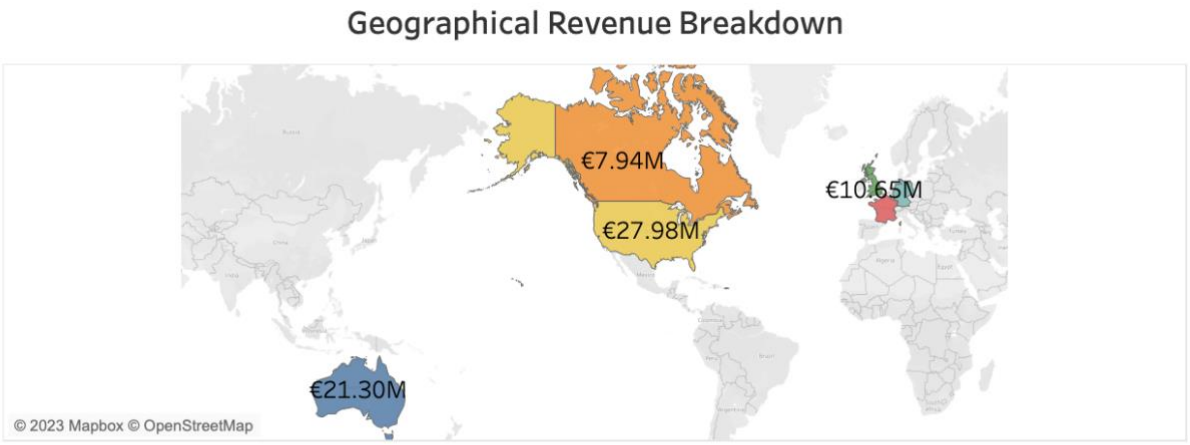
Customer Demographics



1. Products were very popular among adults and young adults but weren't popular among seniors.
2. Females and males show a similar interest in purchasing products across each age group.

Side-by-side bars: Highlight products' age-based popularity (adults/young adults) and consistent gender interest, with limited appeal among seniors.

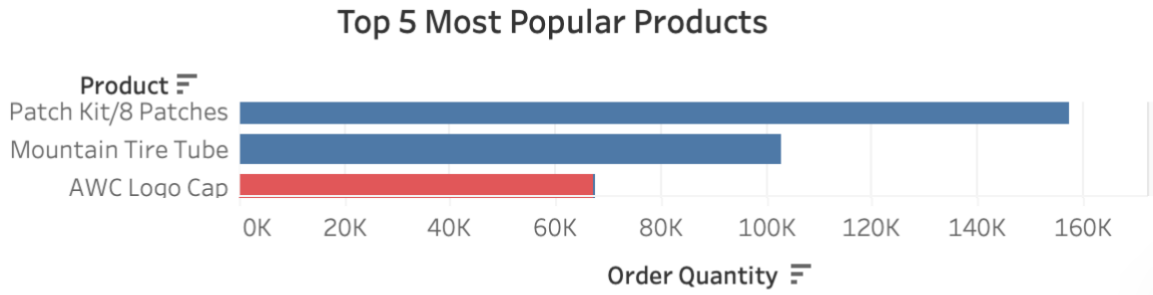
Geographical Revenue Breakdown



1. USA was responsible for the highest total bike sales in 2011, 2012, 2014, and 2016, with a total revenue of €19.58M.
2. Australia was the only country to outperform the USA, having the highest total revenue in 2013, and 2015.

Map: Displays total bike sales, showcasing the USA's dominance in 2011, 2012, 2014, and 2016, and Australia's exceptional performance in 2013 and 2015.

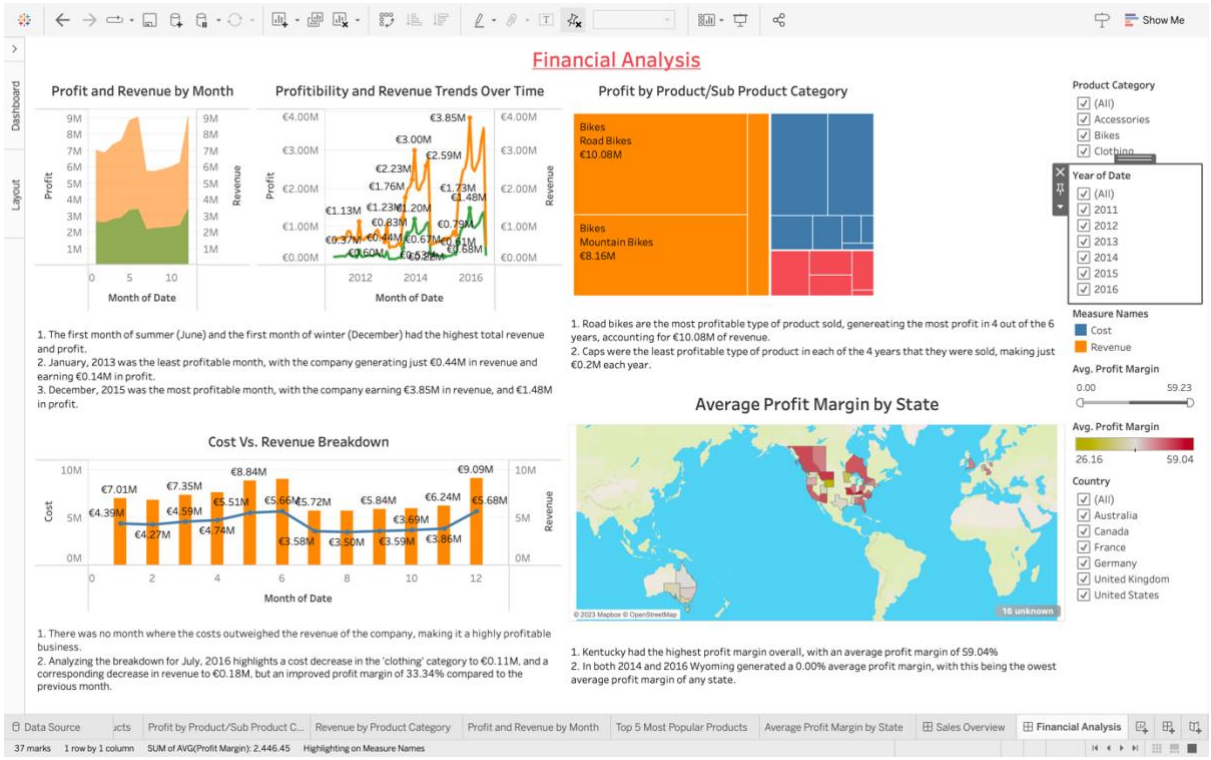
Top 5 Most Popular Products



1. The 'Water Bottle - 30 oz.' was the most popular product with 164,082 units sold.
2. 4 of the 5 most popular products sold were accessories, a clothing product was the other.

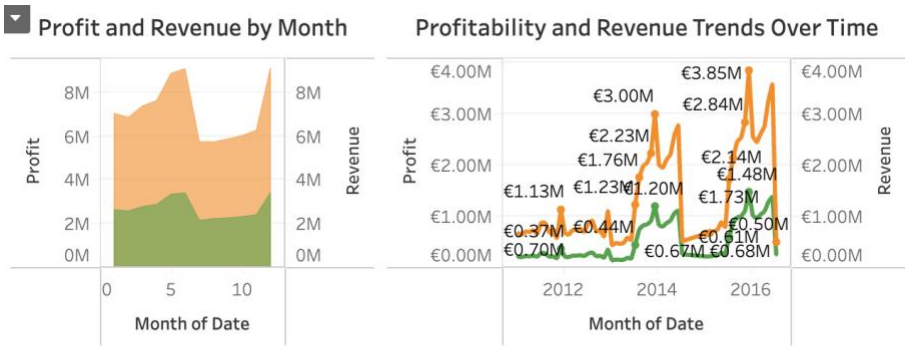
Horizontal bar chart: Highlights 'Water Bottle - 30 oz.' as the top-selling product with 164,082 units, noting that 4 of the 5 most popular products are accessories.

Dashboard 2: Financial Analysis



This dashboard provides a comprehensive overview of the business's financial performance. The insights gained from the dashboard and their explanations are offered below under the relevant graph, chart, or map.

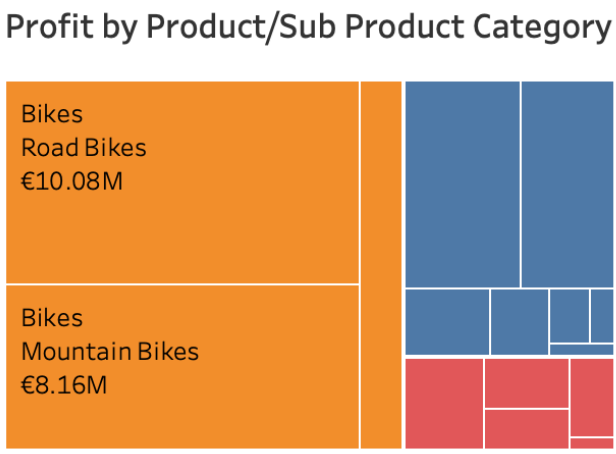
Profit and Revenue by Month/Profitability and Revenue Trends Over Time



1. The first month of summer (June) and the first month of winter (December) had the highest total revenue and profit.
2. January, 2013 was the least profitable month, with the company generating just €0.44M in revenue and earning €0.14M in profit.
3. December, 2015 was the most profitable month, with the company earning €3.85M in revenue, and €1.48M in profit.

Area charts and dual line charts: Reveal June and December as peak months in total revenue and profit, while January 2013 marks lowest profitability.

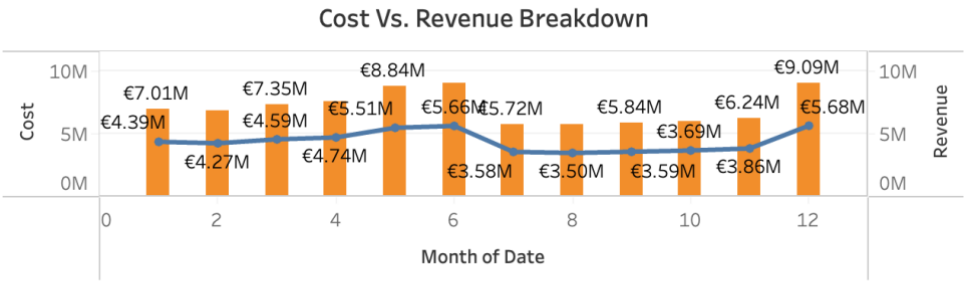
Profit by Product/Sub Product Category



1. Road bikes are the most profitable type of product sold, generating the most profit in 4 out of the 6 years, accounting for €10.08M of revenue.
2. Caps were the least profitable type of product in each of the 4 years that they were sold, making just €0.2M each year.

Treemap: Outlines road bikes as consistently most profitable, contributing €10.08M revenue; contrasts caps as consistently least profitable at €0.2M yearly.

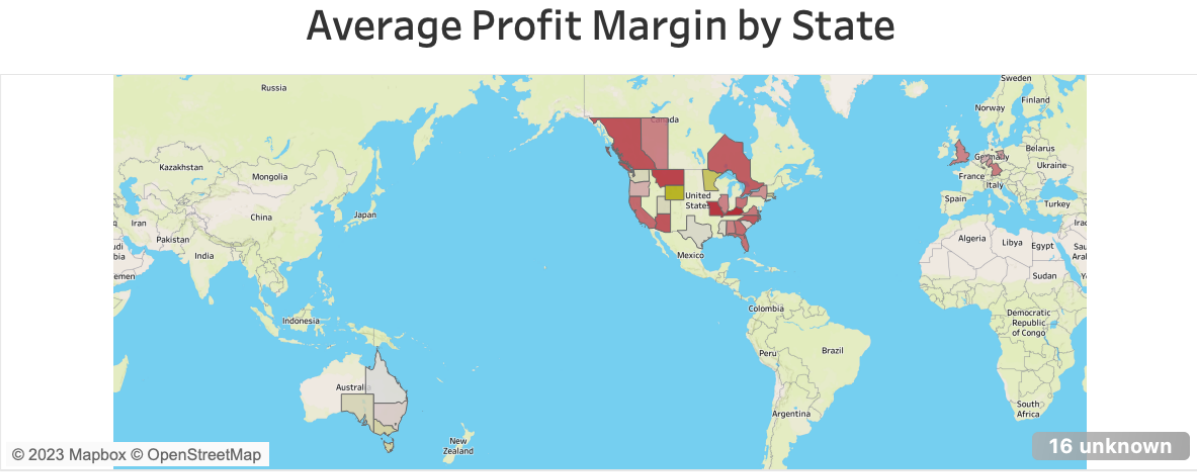
Cost Vs. Revenue Breakdown



1. There was no month where the costs outweighed the revenue of the company, making it a highly profitable business.
2. Analysing the breakdown for July, 2016 highlights a cost decrease in the 'clothing' category to €0.11M, and a corresponding decrease in revenue to €0.18M, but an improved profit margin of 33.34% compared to the previous month.

Dual combination graph: Sustained high profitability as costs never surpassed revenue. July, 2016 showcased improved profit margins despite lower revenue and costs.

Average Profit Margin by State



1. Kentucky had the highest profit margin overall, with an average profit margin of 59.04%
2. In both 2014 and 2016 Wyoming generated a 0.00% average profit margin, with this being the lowest average profit margin of any state.

Map: Kentucky consistently led with a 59.04% average, while Wyoming recorded the lowest, 0.00% in 2014 and 2016.

Report

This section of the report gives an overview of the insights derived from the two dashboards created in relation to the 'Bike Sales in Europe' dataset and how they relate to the learning outcomes of the assignment.

Data Clean-up: A significant amount of time is spent on data cleaning while doing data analysis (McKinney, 2022, p. 203). There were no missing values in any column from the data which minimised the need for data cleaning. There were however, two six months periods (July-December, 2014, and July-December, 2016) omitted from the data which was taken into account when creating visualisations and generating insights.

Basic Statistical Concepts: Categorising a dataset and applying an aggregation function to each group can be a critical component of a data analysis (McKinney, 2022, p. 319). The data was aggregated using the functions SUM, AVG, and COUNT to create the correct measures.

Tableau: The effective use of Tableau is evident in the creation of each chart, graph, map and dashboard. The dashboards created were planned with the theme of each dashboard at the centre of the planning of each visualisation so they could clearly communicate complex data insights.

Effective Communication: The visualisations and insights pictured on each dashboard help to convey a story in an interactive manner. This ensures that the insights derived from the data are communicated clearly to the user.

Data Modelling and Importing: The profit margin of the company and the 6 month period had to be calculated which highlights the application of data modelling. The dashboards could not have been created without the 'Bike Sales in Europe' dataset being imported to Tableau.

Conclusion

As per Kimball & Ross (2013, p. 32-33) one should focus on a single business process per project. Using this logic, using Tableau, a ‘Sales Overview’ dashboard was created with a heavy emphasis on revenue and a ‘Financial Analysis’ dashboard was created to provide an overview on the performance of the business. It was important to create interactive dashboards so the user could gain their own insights from the visualisations. It was also imperative that the data was represented in a diverse way, using different graphs, maps, and charts to give the user an enhanced understanding of the dataset.

References

Kimball, R. & Ross, M. (2013). *The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling, 3rd Edition.* Available at: *https://www.vlebooks.com/Product/Index/1027730?page=0&startBookmarkId=-1* (Accessed 21st November 2023)

McKinney, W. *Python for Data Analysis*. Available at: http://ebookcentral.proquest.com/lib/dbsie/detail.action?docID=29441847 (Accessed: 21st November 2023)

Shah, S. (n.d.). *Bike Sales in Europe* [Dataset]. Available at: https://www.kaggle.com/datasets/sadiqshah/bike-sales-in-europe (Accessed: 1st November 2023).