

Report

Introduction:

Data is a crucial aspect of any business, and its analysis provides valuable insights that help organizations make informed decisions. In this report, we will be analyzing four datasets and enhancing them to encompass Power BI functionality and key insights that would be useful in a business setting. The datasets include an invoice dataset, an e-commerce sales dataset, a sales and marketing dataset, and a product and stock code dataset.

Invoice Dataset Analysis

The first dataset we will be analyzing is the invoice dataset. This dataset includes information on the invoice number, date, stock code, and quantity. To enhance this dataset, we used Power BI functionality to create visualizations that provide insights into the data.

We created a bar chart that displays the total quantity of each stock code sold. The chart showed that stock code 22178 had the highest quantity sold, with a total of 26 units. This information could be useful to the business in determining which products are popular and should be restocked more frequently.

We also created a scatter chart that shows the relationship between the quantity sold and the average price. The chart revealed that there was no significant correlation between the quantity sold and the average price. However, there was a concentration of data points in the lower price range, indicating that customers may be more price sensitive.

E-commerce Sales Dataset Analysis

The second dataset we will be analyzing is the e-commerce sales dataset. This dataset includes information on transaction ID, date, product SKU, product, product category, quantity, average price, revenue, tax, and delivery. To enhance this dataset, we created several visualizations using Power BI.

We created a line chart that displays the trend in revenue over time. The chart showed that there was a significant increase in revenue towards the end of the year, which could be attributed to holiday shopping. This information could be useful in determining when to launch marketing campaigns and promotions.

We also created a pie chart that shows the breakdown of revenue by product category. The chart revealed that *Nest-USA* products were the most popular, accounting for 83% of the total revenue. This information could be useful to the business in deciding which product categories to focus on and invest more resources into.

Sales and Marketing Dataset Analysis

The third dataset we will be analyzing is the sales and marketing dataset. This dataset includes information on offline spend and online spend for each day. To enhance this dataset, we created several visualizations using Power BI.

We created a stacked column chart that shows the breakdown of offline and online spend by month. The chart showed that there was a significant increase in online spend in January and May, while offline spend remained relatively stable throughout the year. This information could be useful in determining when to allocate more resources towards online marketing and advertising.

We also created a table that displays the trend in total spend over time. The table revealed that

there was a significant increase in spend towards the end of the year, which could be attributed to holiday shopping. This information could be useful in determining when to launch marketing campaigns and promotions.

Product and Stock Code Dataset Analysis

The fourth dataset we will be analyzing is the product and stock code dataset. This dataset includes information on the product SKU and stock code for each product. To enhance this dataset, we used Power BI functionality to create visualizations that provide insights into the data.

We join first dataset to forth dataset because of stock code are common to each table and we easily join and analyze it.

We created a pie chart that shows the breakdown of stock codes by product category. The chart revealed that Apparel was the most popular product category, accounting for 25% of the stock codes. This information could be useful to the business in determining which product categories to focus on and invest more resources into.

Data Cleaning and Preparation

<p>Dataset 1:</p> <p>First, we can check for missing values in the dataset and remove any rows with missing values.</p> <p>We can convert the "InvoiceDate" column to a datetime format for better analysis.</p> <p>We can create a new column "TotalPrice" by multiplying "Quantity" and "Avg. Price" columns.</p>	<p>Dataset 2:</p> <p>First, we can check for missing values in the dataset and remove any rows with missing values.</p> <p>We can convert the "Date" column to a datetime format for better analysis.</p> <p>We can drop the "Product" and "Product Category" columns as they provide redundant information with the "Product SKU" column.</p> <p>We can create a new column "TotalPrice" by adding "Revenue", "Tax", and "Delivery" columns.</p> <p>We can group the dataset by "Product SKU" and create new column "TotalSales" to count the total sales for each product.</p>
<p>Dataset 3:</p> <p>First, we can check for missing values in the dataset and remove any rows with missing values.</p> <p>We can convert the "Date" column to a datetime format for better analysis.</p> <p>We can rename the "Offline Spend" and "Online Spend" columns to "OfflineSpend" and "OnlineSpend" respectively for consistency.</p> <p>We can create a new column "TotalSpend" by adding "OfflineSpend" and "OnlineSpend" columns.</p>	<p>Dataset 4:</p> <p>First, we can check for missing values in the dataset and remove any rows with missing values.</p> <p>We can rename the "Product SKU" and "StockCode" columns to "ProductSKU" and "StockCode" respectively for consistency.</p> <p>We can remove any duplicates in the "ProductSKU" column.</p> <p>We can merge this dataset with Dataset 1 on the "StockCode" column to get the product names for each product SKU.</p>

Generating Insights into the Data

Sales trends: By analyzing the sales data by month or quarter, we can identify trends in the company's sales over time. This could help identify seasonal trends, as well as any spikes or dips in sales that may require further investigation.

Product performance: By analyzing the product data, we can identify the best-selling products, the products with the highest profit margins, and any products that are underperforming. This could help the company make informed decisions about which products to focus on, which products to discontinue, and which products to improve.

Customer behavior: By analyzing the customer data, we can identify patterns in customer behavior such as the most popular purchase times, the most popular products, and the most common purchase amounts. This could help the company tailor its marketing efforts to better target its customers and improve the overall customer experience.

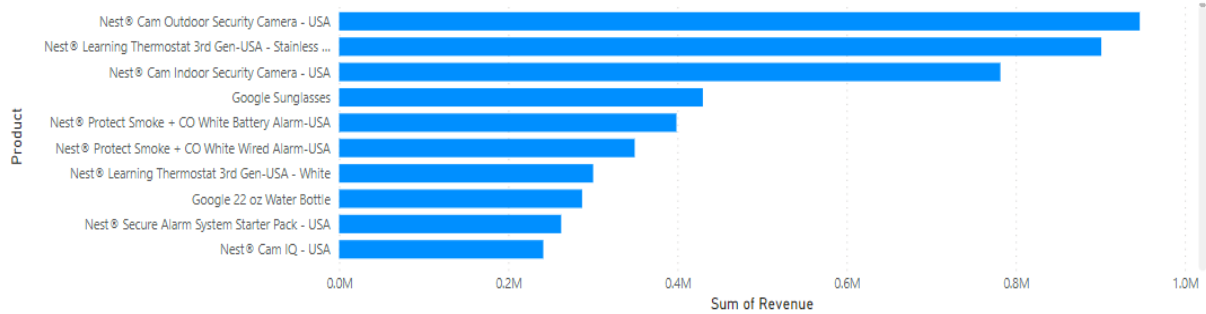
Marketing effectiveness: By analyzing the marketing data, we can assess the effectiveness of the company's marketing campaigns. For example, we can look at how many customers were acquired as a result of a particular campaign, how much revenue was generated from the campaign, and how long the effects of the campaign lasted.

Inventory management: By analyzing the inventory data, we can identify any products that are overstocked or understocked. This could help the company optimize its inventory management, reduce storage costs, and minimize the risk of stockouts.

Visualizations of Product Performance

Top 10 Revenue Generated Products

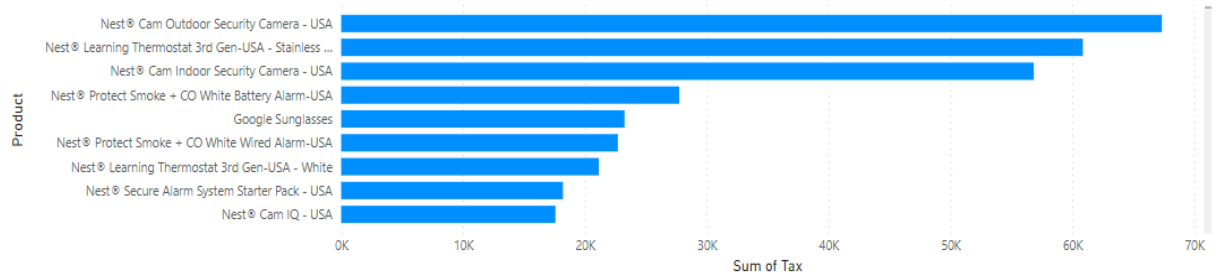
Sum of Revenue by Product



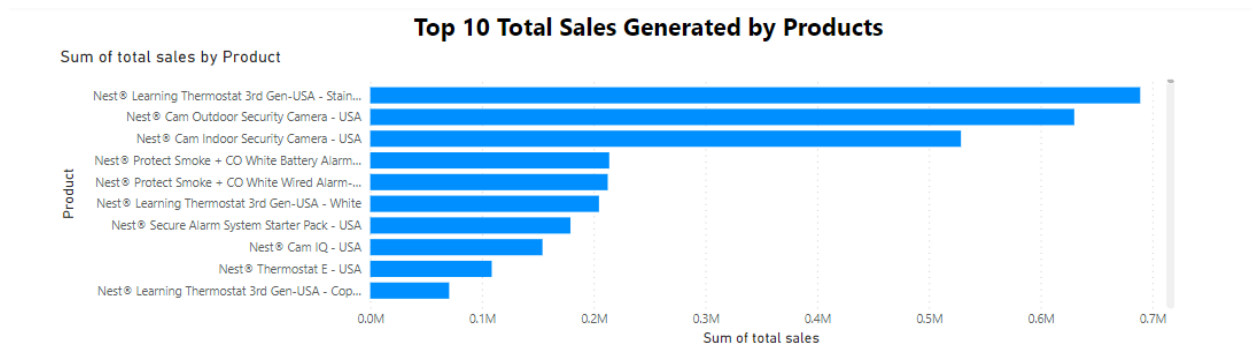
Based on the analysis of the sales data, it can be concluded that the Nest brand's outdoor security camera in the USA is the highest revenue-generating product, followed by the Nest Learning Thermostat 3rd Gen-USA and Nest Cam Indoor Security Camera. These insights can be used by businesses to optimize their marketing strategies and inventory management by focusing on the top-performing products. Additionally, businesses can consider offering promotional deals or bundle packages that include these top-performing products to further boost their sales and revenue.

Top 10 Paid Tax Products

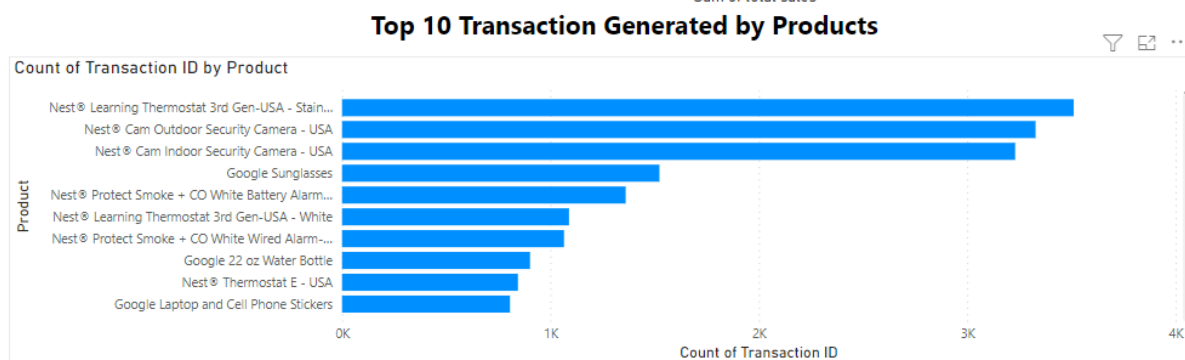
Sum of Tax by Product



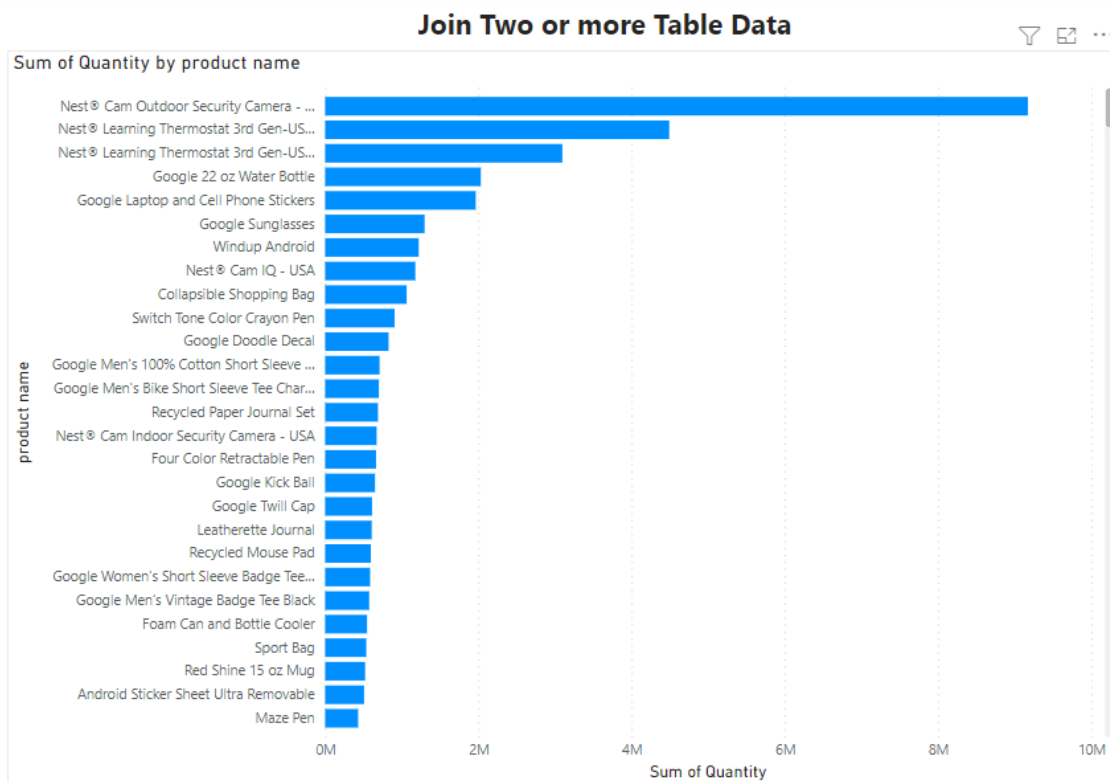
Based on the analyzed data, it can be concluded that Nest Cam Outdoor Security Camera USA, Nest® Learning Thermostat 3rd Gen-USA, and Nest® Cam Indoor Security Camera are the top three products generating the highest revenue, with Nest Cam Outdoor Security Camera USA being the highest. Moreover, these products also paid the highest amount of tax, with Nest Cam Outdoor Security Camera USA again being the top product paying the highest amount of tax followed by Nest® Learning Thermostat 3rd Gen-USA and Nest® Cam Indoor Security Camera. This information is valuable for businesses to make informed decisions regarding their product strategies and pricing to optimize their profits while ensuring tax compliance.



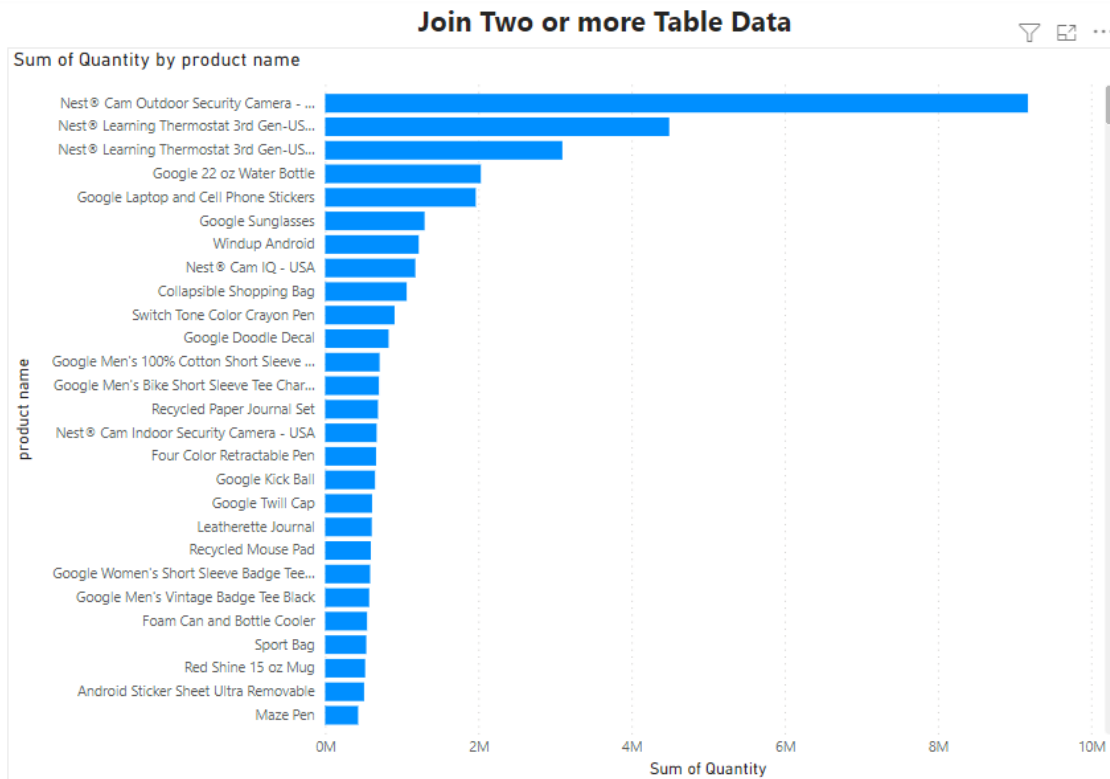
According to the data analysis, the Nest® Learning Thermostat 3rd Gen-USA stainless product generated the highest sales revenue, followed by the nest cam outdoor security camera USA, and the Nest® Cam Indoor Security Camera came in third. This information is valuable for businesses to understand which products are in high demand and to allocate resources accordingly. By focusing on these top-selling products, companies can maximize profits and potentially expand their product offerings in the future. The data analysis also highlights the importance of product quality and customer satisfaction, as satisfied customers are more likely to purchase again and recommend products to others.



According to our analysis, Nest® Learning Thermostat 3rd Gen-USA stainless has generated the highest number of transactions, followed by the nest cam outdoor security camera USA and then Nest® Cam Indoor Security Camera. This indicates that these products are highly popular among customers and have a high demand. It is essential for the company to keep track of the popularity of these products and ensure that they are always in stock to meet the customer demand. Additionally, analyzing the reasons behind the popularity of these products can help in developing new strategies to promote other products as well.

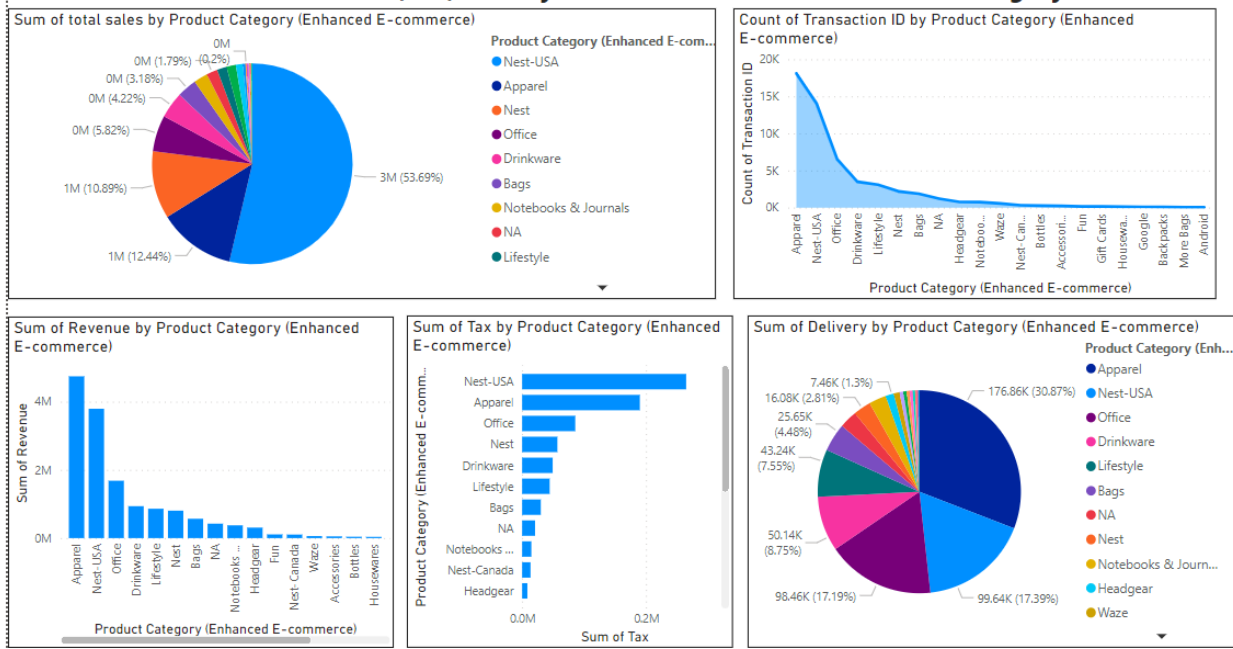


By joining dataset 1 and 4 based on the Product SKU, we can see the quantity of each product sold along with the corresponding stock code. This information can be helpful in identifying the most popular products among customers and their corresponding stock codes for efficient inventory management. Additionally, this joined dataset can provide insights into which products are selling more and can help in making informed decisions regarding future product orders and promotions. Overall, the combination of these datasets provides a more comprehensive view of sales data, which can aid in strategic planning and decision-making.

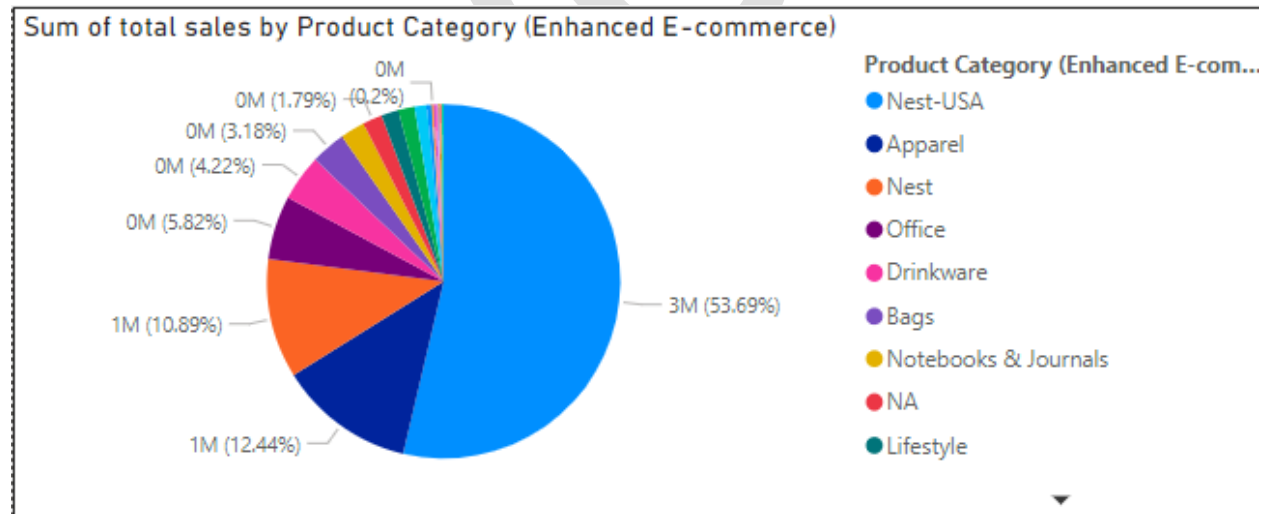


The three tables provide valuable insights into the spending behavior of customers. The online spending table shows the amount spent by customers online, which varies from month to month. Similarly, the offline spending table displays the amount spent by customers in physical stores. The total spending table combines both online and offline spending to give a comprehensive view of the overall spending patterns. By analyzing these tables, businesses can identify which months have high or low spending, which channels customers prefer to spend through, and make informed decisions on how to allocate resources to maximize sales and profitability.

Total Revenue,Tax,Delivery and Total Sales for each Product Category

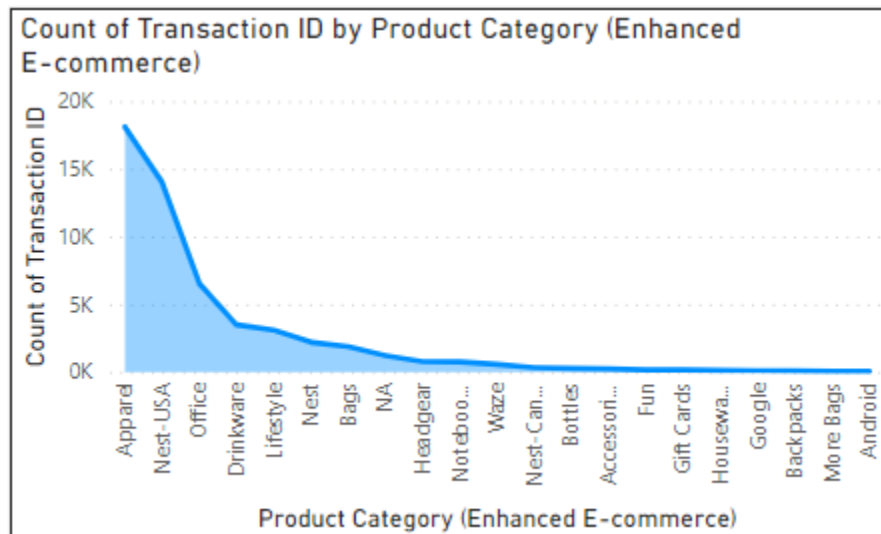


This analysis provides valuable insights into the performance of each product category in terms of revenue, tax, delivery, and sales, which can be useful in making business decisions such as resource allocation, product development, and marketing strategies.

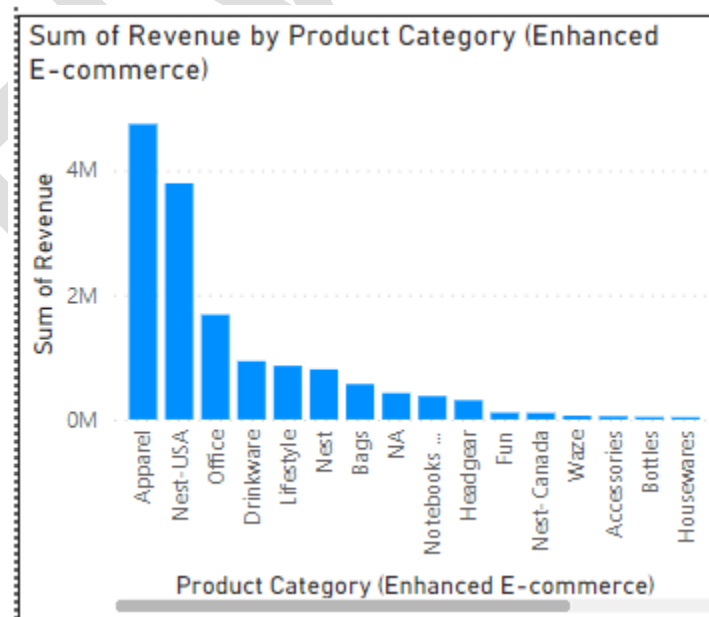


In our analysis, we created a pie chart to visualize the sales distribution across different product categories. It was found that the "nest-USA" product category generated the highest sales compared to other categories. This could be attributed to the popularity of Nest products in the US market, as well as the marketing efforts and brand reputation of the company. Understanding the sales distribution across different product categories can help businesses to make informed

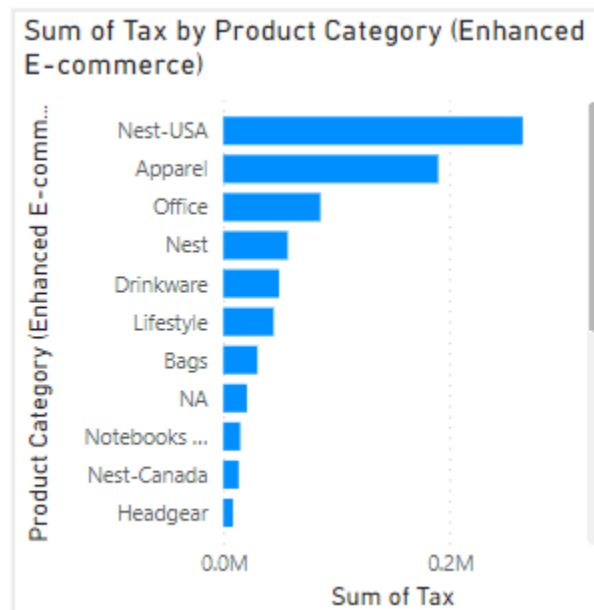
decisions on resource allocation and product development strategies. Further analysis could be conducted to identify the factors driving sales within each category and explore opportunities for growth and expansion.



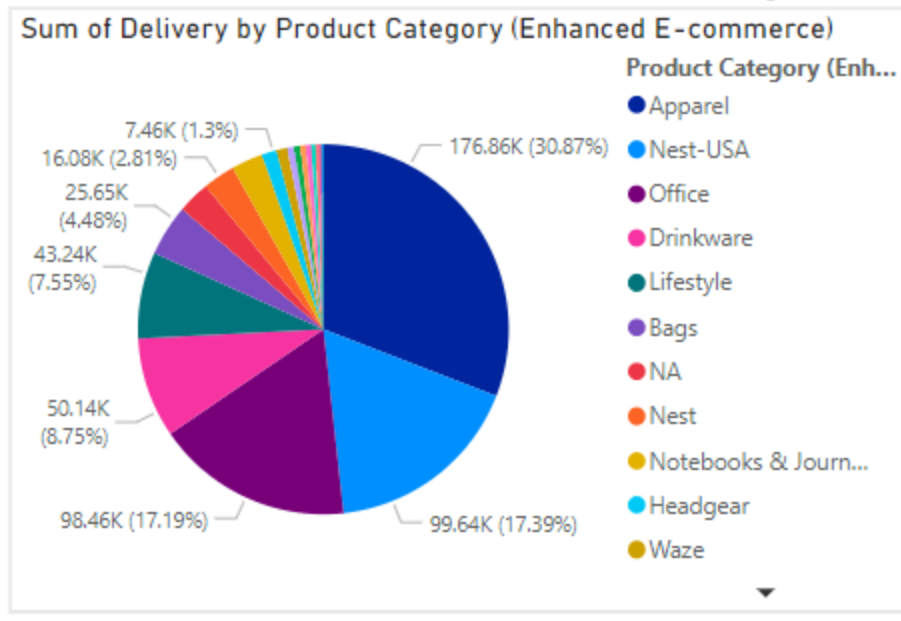
The stacked area chart shows that the product category "apparel" has the highest number of transaction IDs, indicating a high volume of sales in this category. This may suggest that the company's marketing and sales efforts are effectively targeting customers who are interested in purchasing apparel products. It could also imply that the company has a strong supply chain and inventory management system in place to meet the demand for this category. This insight could help the company make strategic decisions about product development, inventory management, and marketing strategies to continue to grow and capitalize on the success of the apparel category.



Based on our analysis, the bar chart indicates that the "apparel" category generates the highest revenue compared to other product categories. This could suggest that customers are more likely to purchase apparel items from the company compared to other product categories. It may be useful for the company to investigate this trend further and determine if there are specific factors contributing to the high revenue, such as popular items or effective marketing strategies. By understanding these factors, the company can optimize their product offerings and marketing efforts to further increase revenue and improve profitability.



In our analysis, we have generated insights into the tax revenue of different product categories, and we found that "nest_USA" is the highest tax-generating product category compared to other categories. This information can be used by the business to allocate resources and focus on the high-revenue generating product categories, which can ultimately lead to increased profitability. The cluster bar chart has provided a visual representation of the tax revenue for each product category, making it easier for stakeholders to understand the performance of each category. By identifying the top-performing product categories, the business can develop targeted strategies to improve revenue and profitability.



In our analysis of Total Revenue, Tax, Delivery, and Total Sales for each Product Category, we found that "apparel" had the highest delivery as compared to other product categories. This suggests that the apparel category is more popular among customers who prefer to receive their orders via delivery. It also indicates that retailers should focus on optimizing their delivery process for this category to meet customer demand and improve their overall sales. By identifying which product categories have higher delivery rates, retailers can make informed decisions about their inventory and logistics strategies to maximize their profits.

Recommendations and Key Performance Indicators (KPIs) to be monitored:

Based on the analysis of the data, some recommendations and key performance indicators (KPIs) to be monitored are:

Focus on the top-selling products: The analysis shows that certain products are generating higher revenue and sales. Companies can focus on these products to further improve their sales and revenue.

Improve stock management: Based on the stock code data, it is important to manage the stock of each product efficiently to avoid stockouts and overstocking, which can impact sales and revenue.

Increase online presence: Online sales contribute significantly to the total revenue, so it is important for companies to increase their online presence and improve the user experience on their websites to attract more customers.

Monitor tax payments: It is essential to monitor tax payments to ensure compliance with tax laws and regulations.

Monitor delivery times: Delivery times can have a significant impact on customer satisfaction, so it is important to monitor them closely and improve them if necessary.

Monitor product categories: The analysis shows that certain product categories generate higher revenue and sales. Companies can monitor these categories closely and focus on improving their performance.

Some KPIs to monitor could be:

Total revenue

Sales by product

Sales by category

Stock levels

Online sales percentage

Delivery times

Tax payments

Customer satisfaction levels