EXCEL ANALYSIS

Customer Purchase Behavior

Data Analysis and Knowledge Discovery
INFO 4670 – 401

Excel Analysis on Customer Purchase Behavior

Dataset Description

The dataset titled "Customer Purchase Behavior - Electronic Sales Data", sourced from Kaggle contains information about customer purchases in the electronics market. It includes customer demographics, product details, payment methods, ratings, order statuses, and other key attributes. This dataset was selected for consisting over 6,000 records, rich numerical variables and realistic business context to utilize key Excel functions for the assignment. The dataset also supports a wide range of analysis including customer behavior, product preferences and purchasing trends in the electronics sector.

Data Dictionary

VARIABLE NAME	VARIABLE TYPE	DESCRIPTION
Customer ID	Text	Unique identifier for each customer.
Age	Numeric	Age of the customer.
Gender	Categorical	Gender of the customer (Male or Female).
Loyalty Member	Categorical	Indicates if the customer is a loyalty program member (Yes or No).
Product Type	Text	Type of electronic product sold (e.g., Smartphone, Laptop, Tablet).
SKU	Text	A unique code for each product.
Rating	Numeric	Customer rating of the product (1- 5).
Order Status	Categorical	Status of the order (Completed, Cancelled).
Payment Method	Categorical	Method used for payment (e.g., Cash, Credit Card, Paypal)
Total Price	Numeric	Total price of the transaction.
Unit Price	Numeric	Price per unit of the product.
Quantity	Numeric	Number of units purchased.
Purchase Date	Date	Date of the purchase.

Shipping Type	Categorical	Type of shipping chosen (e.g., Standard, Overnight, Express).
Add-ons Purchase	Text	List of any additional items purchased (e.g., Accessories, Extended Warranty).
Add-on Total	Numeric	Total price of add-ons purchased.

Data Cleaning and Understanding

To prepare the dataset for analysis, several basic data cleaning steps were taken. Rows with missing values, especially in key fields such as ratings and pricing, were removed to ensure consistency. Numeric fields like age, unit price, and total price were checked for formatting issues and corrected where needed. Categorical variables such as gender, loyalty status, and payment method were reviewed for inconsistencies and standardized.

Analysis Goals

1. What is the total revenue generated by each product type, and which product category performs best overall?
2. Which product types bring in the most revenue from add-ons?
3. How does the sales fluctuate over time (monthly trends)?
4. Perform VLOOKUP function for Customer ID 1086 in the dataset.
5. Identify the Product Type, Product Code and Rating for the 10th purchase in the dataset.

Results

1. The objective of this analysis is to evaluate the total revenue generated by each product category in order to identify which type of electronic product contributes most to overall sales.

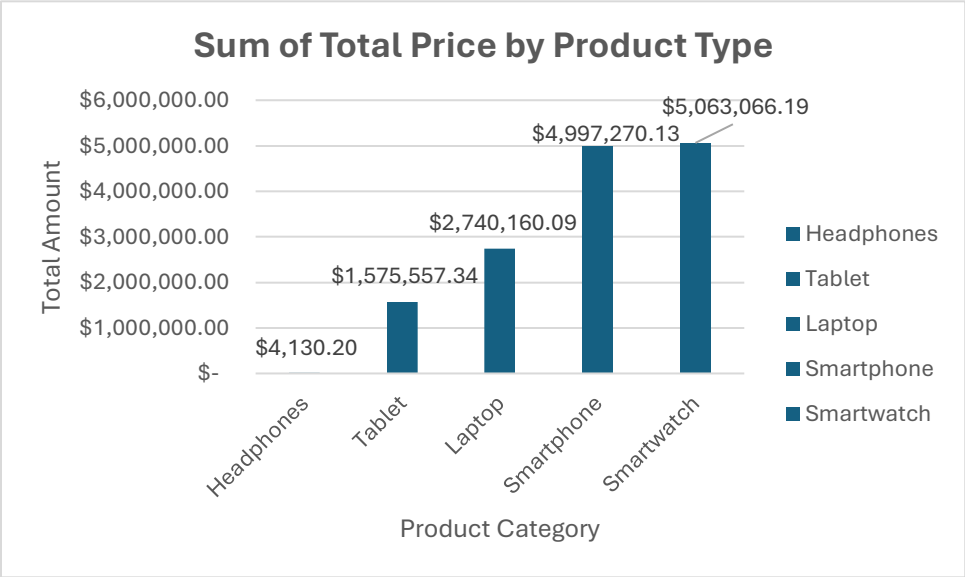
   Functions Used:
   - Sum of Sales Amount in a Pivot Table
   - Sort & Filter to rank sales representatives
   - Pivot Chart (Bar Graph) to visually compare revenue by product type

   A Pivot Table was created using the "Total Price" column, summarized by "Product Type" to calculate the sum of revenue generated by each category. A Pivot Chart was then generated to visually represent the revenue distribution.

   Below are the Pivot Table and Pivot Chart that show the total sales for each product type:

Row Labels	Sum of Total Price	
Headphones	$	4,130.20
Tablet	$	1,575,557.34
Laptop	$	2,740,160.09
Smartphone	$	4,997,270.13
Smartwatch	$	5,063,066.19
Grand Total	**$**	**14,380,183.95**

Pivot Table 1: Sum of Total Price by Product Type



Pivot Chart 1: Sum of Total Price by Product Type

From the Pivot Table and Chart, it is evident that Smartwatches generate the highest revenue, slightly outperforming Smartphones, which are the second highest. Laptops follow in third place. On the other hand, Headphones contribute the least to overall revenue. This suggests that smartwatches and smartphones are the strongest performers in the market, indicating high consumer demand or pricing for these categories.

2. The objective of this analysis is to determine which product categories generate the most revenue from add-on purchases, such as accessories or extended warranties.

Functions Used:

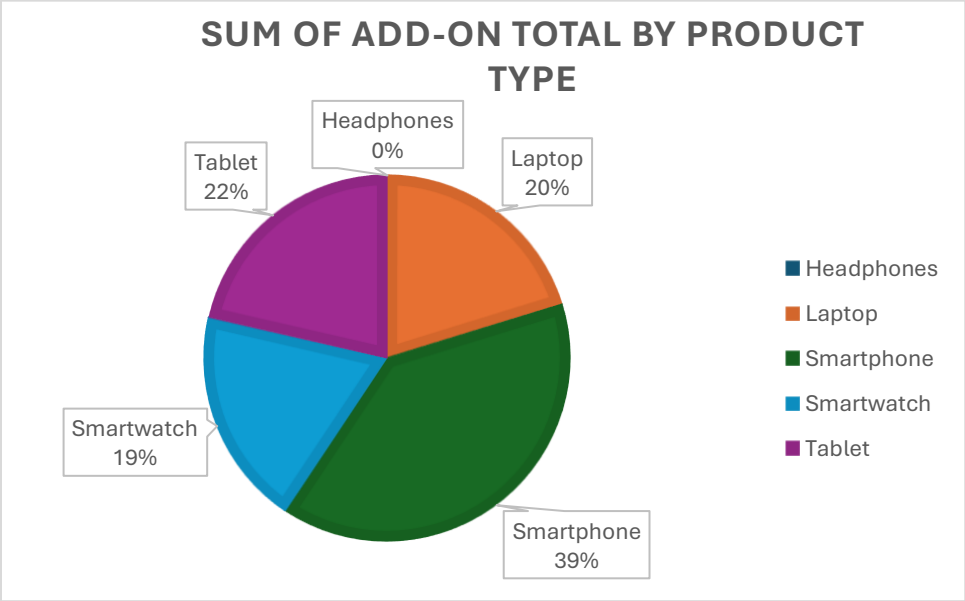
- Sum of Total Price in a Pivot Table
- Pivot Chart (Pie Chart) to visually compare revenue by product type

A Pivot Table was created using the "Total Price" column, summarized by "Product Type" to calculate the sum of revenue generated by each category. A Pie Chart was then generated to visually represent the revenue distribution.

Below are the Pivot Table and Pivot Chart that show the total sales from add-ons for each product type:

Row Labels	Sum of Add-on Total	
Headphones	$	83.00
Laptop	$	46,519.06
Smartphone	$	90,136.89
Smartwatch	$	44,220.48
Tablet	$	49,346.78
Grand Total	**$**	**230,306.21**

Pivot Table 2: Sum of Total Add-Ons by Product Type



Pivot Chart 2: Sum of Total Add-Ons by Product Type

The Pivot Table and Chart show that Smartphones bring in the highest revenue from add-ons, followed by Tablets and Laptops. Headphones generate the least add-on revenue, which may suggest limited opportunities for upselling or lower-priced accessories. These insights can help guide marketing and bundling strategies, especially for high-performing product lines.

3. The objective of this analysis is to evaluate monthly sales trends by observing the average transaction value across each month.

Functions Used:

- Grouped "Purchase Date" field by Month
- Calculated Average of Total Price in a Pivot Table
- Pivot Chart (Line Chart) to show sales trend over time

A Pivot Table was created with months as rows and the Average of Total Price as values. The Purchase Date column was transformed to display monthly groupings. A Line Chart was generated to clearly visualize the trend.

Below are the Pivot Table and Pivot Chart that show the sales trend across each month of the year 2024:

Row Labels	Average of Total Price
Jan	$ 2,571.43
Feb	$ 2,361.72
Mar	$ 2,373.81
Apr	$ 2,704.38
May	$ 2,565.78
Jun	$ 2,779.08
Jul	$ 2,612.91
Aug	$ 2,520.53
Sep	$ 2,792.69
Oct	$ 2,541.35
Nov	$ 2,482.68
Dec	$ 2,545.21
Grand Total	**$ 2,572.02**

Pivot Table 3: Sales Trend Over Time

Pivot Chart 3: Sales Trend Over Time

From the Pivot Table and Line Chart, we observe that September and June recorded the highest average sales values, suggesting strong customer spending during these months. In contrast, February and March had the lowest averages, indicating slower sales. Recognizing these seasonal patterns can guide inventory planning, promotions, and resource allocation throughout the year.

4. The purpose of this analysis is to demonstrate the use of the VLOOKUP function to quickly retrieve important customer details such as their age, gender and member type for Customer ID 1086.

Function Used:

- VLOOKUP

VLOOKUP for Customer ID 1086:		
Lookup Variable:	Result:	Formula Used:
Age:	76	=VLOOKUP(1086,Dataset!1:1048576, 2,FALSE)
Gender:	Male	=VLOOKUP(1086,Dataset!1:1048576, 3,FALSE)
Loyalty Member:	No	=VLOOKUP(1086,Dataset!1:1048576,4,FALSE)

Using the VLOOKUP function, I was able to accurately retrieve the relevant details for Customer ID 1086 such as the customer's age, gender and their loyalty member type without manually searching the dataset.

5. The purpose of this analysis is to demonstrate the use of the HLOOKUP function to quickly retrieve specific details such as Product Type, Product Code, and it's Rating for the 10th entry in the dataset.

Function Used:

- HLOOKUP

HLOOKUP for 10th Entry:		
Lookup Variable:	Result:	Formula Used:
Product Type:	Laptop	=HLOOKUP("Product Type",Dataset!1:1048576,11,FALSE)
Product Code:	SKU1005	=HLOOKUP("SKU",Dataset!1:1048576,11,FALSE)
Rating:	3	=HLOOKUP("Rating",Dataset!1:1048576,11,FALSE)

Using HLOOKUP, I efficiently retrieved specific data for the 10th entry in the dataset, making it quick and easy to access multiple data points including Product Type, Product Code, and Rating from a horizontal range.

Conclusion

The Excel analysis of the "Customer Purchase Behavior - Electronic Sales Data" revealed several key insights. Smartwatches and Smartphones emerged as the highest revenue generating product categories, both in total sales and in add-on purchases. Add-ons

significantly contributed to overall revenue, especially for high-end products like laptops and smartphones. Monthly trend analysis showed sales peaked in June and September, indicating potential seasonal demand patterns. Additionally, average purchase values were consistent across genders, with only slight variations in total and add-on spending.

Overall, these findings can help businesses optimize product focus, plan targeted marketing during high-performing months, and better understand customer purchase behavior to improve their sales strategy.

References

Seamons, C. Customer purchase behavior - Electronic sales data [Data set]. Kaggle. https://www.kaggle.com/datasets/cameronseamons/electronic-sales-sep2023-sep2024