Laptop Sales Analysis

- A Comprehensive Report

-HARMANJOT KAUR

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1. Introduction

In the digital age, laptops have become indispensable for both personal and professional use. With the rapid advancements in technology and an ever-growing demand for portable devices, the laptop market has witnessed substantial growth. To gain deeper insights into the sales trends, consumer preferences, and the competitive landscape of laptop brands, we embarked on this analysis of an open-source dataset comprising various laptop models and their sales data.

This article explores the performance of different laptop brands, their technical specifications, and the impact of pricing on sales. The goal is to provide actionable insights for manufacturers, retailers, and other stakeholders to optimize their inventory, pricing, and marketing strategies.

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2. Problem Statement and Objectives

Problem Statement

The laptop market is highly competitive, with numerous brands and models catering to various consumer needs. However, the market trends, especially in terms of sales performance and consumer preferences, are constantly evolving. Stakeholders face the challenge of understanding which brands, features, and price ranges appeal most to consumers. Therefore, a structured analysis of sales data is crucial for driving decisions related to product offerings, inventory management, and pricing strategies.

Objectives

The objectives of this analysis are as follows:

- **To identify the top-performing brands** in terms of sales and revenue.
- **To analyze the impact of technical specifications** (RAM, storage, screen size, etc.) on sales.
- **To assess pricing trends** and their influence on sales performance.
- **To provide strategic recommendations** for optimizing inventory and marketing efforts.

These objectives were designed to help stakeholders better understand market dynamics and align their strategies accordingly.

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3. Key Questions on the Data

Before diving into the analysis, we framed three key questions to focus on:

1. What are the top-performing laptop brands in terms of sales and revenue?

Understanding which brands dominate the market is vital for manufacturers, retailers, and marketers. By identifying the top brands, we can tailor marketing campaigns and stock the most profitable products.

2. How do different technical specifications influence sales?

Laptop specifications, such as RAM size, screen resolution, and storage capacity, significantly influence consumer purchasing decisions. We aimed to explore whether higher RAM, larger storage, or specific display types (e.g., touchscreen) correspond to higher sales.

3. How does pricing affect sales?

Price is one of the most critical factors in purchasing decisions. We sought to explore the pricing trends and whether premium pricing models lead to higher revenue or if lower-priced laptops dominate sales.

These questions helped structure our analysis and led us toward uncovering actionable insights.

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4. Dataset Overview

Source and Structure

The dataset used for this project is an open-source collection of laptop sales data, providing information on various laptop models, their brands, specifications, and sales figures. The dataset contains over 1,300 records, representing different laptop models from major brands. The key fields in the dataset include:

- **Brand**: The manufacturer of the laptop (e.g., Dell, HP, Lenovo).
- **Model**: The specific model of the laptop.
- **RAM**: Memory size in GB (4GB, 8GB, 16GB, etc.).
- **Storage**: Size of the internal storage, both SSD and HDD.
- **Screen Size**: Display size in inches.
- **Touchscreen**: Whether the laptop has touchscreen functionality.
- **Price**: Price in Euros.

We processed the dataset by cleaning missing values, converting data types, and adding derived columns where necessary to facilitate analysis.

Data Cleaning

Data cleaning involved handling missing data points and correcting discrepancies. For example, we observed some inconsistencies in price and screen size columns. These were rectified by using median imputation or removing the erroneous entries. Additionally, the price data was standardized to Euros for consistency.

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5. Data Modeling and Structure

5.1. Laptop Fact Table

- The **LaptopFact** table is at the core of the model, containing key metrics related to laptop sales, such as the **number of laptops sold**, **average price per unit**, and **total sales revenue**.

- It also includes foreign keys that connect this fact table to various dimension tables, allowing for analysis of different factors like brand, hardware configuration, and screen type.

5.2. Company Dimension (companyDim)

- This table holds information about the **laptop brands** or manufacturers. Each row represents a unique company (e.g., Dell, HP, Lenovo), allowing for analysis of brand-specific sales data.
- It provides a link between the **LaptopFact** table and the company names, allowing us to visualize sales and revenue for different brands.

5.3. Product Dimension (ProductDim)

- This dimension contains detailed information about the **product specifications**, such as **RAM size**, **screen type**, and **storage** options. These fields are used to break down sales by various product attributes and hardware configurations.
- Each product specification is critical for understanding the features that influence buying behavior.

5.4. Operating System Dimension (OsDim)

- The **OsDim** table stores details about the operating system installed on each laptop. It enables us to filter and analyze sales data based on different OS platforms, such as Windows, macOS, or Linux.

5.5. Sales Dimension (Sales_ID)

- This dimension captures information about the **sales transactions**, including the total number of units sold and revenue generated. It is used to track overall sales performance and provides a foundation for various KPIs.

5.6. Storage Dimension (StorageDim)

- This table holds details about the **storage capacity and type** of each laptop. Fields such as **PrimaryStorageType** and **SecondaryStorage** are used to analyze sales trends related to storage options like SSDs and HDDs.

By linking these tables through relationships, we could perform multi-dimensional analyses and gain detailed insights into the data.

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6. Data Analysis and Insights

6.1 Brand Performance

We analyzed the sales data by brand to identify the top-performing laptop manufacturers. The analysis revealed that **Dell**, **HP**, and **Lenovo** are the leading brands in terms of both sales volume and revenue. These three brands together account for over **50% of the total sales** in the dataset.

Key Findings:

- **Dell** emerged as the top-selling brand, with strong sales across different price ranges.

- **HP** maintained a competitive position with a focus on mid-range laptops.
- **Lenovo** captured a large share of the market, especially with its value-for-money models.

The performance of **premium brands** like **Razer** and **MSI** was also analyzed, showing that while these brands had higher average prices, their sales volume was comparatively low. These findings suggest a niche market for high-performance laptops.

6.2 Analysis of Laptop Specifications

Consumer preferences for laptop specifications played a significant role in sales performance. We analyzed several key attributes:

RAM Size:

Laptops with **8GB** or **16GB RAM** had the highest sales volumes, indicating that consumers prioritize sufficient memory for multi-tasking and performance.

Screen Size:

Laptops with **Full HD screens** (15-16 inches) dominated the market, while larger screens (17 inches) and **4K Ultra HD displays** catered to a more specialized audience.

Storage Type:

The analysis revealed that **SSD storage** was in higher demand than traditional HDD storage, likely due to the speed and reliability SSDs offer.

6.3 Pricing Trends

Price sensitivity is a critical factor in consumer purchasing decisions. We analyzed pricing trends across brands and models, which provided the following insights:

- The **average price of a laptop** was approximately **€1,130**.
- **Premium laptops**, priced over **€2,000**, accounted for a small percentage of total sales, indicating a preference for mid-range models.
- Laptops in the **€800 to €1,500** price range were the most popular, offering a balance of performance and affordability.

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7. Dashboard and Data Visualization

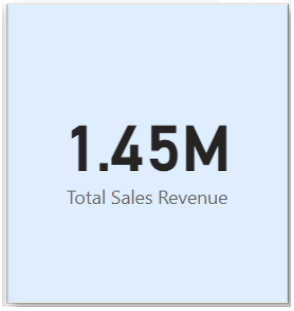
7.1. Average Price

- The **Average Price** card provides a snapshot of the **average price(customers want) of all laptops sold**. This metric is useful for understanding the pricing dynamics in the market and helps businesses price their products competitively.

- **How it helps**: By understanding the average price, businesses can position their products accordingly—whether to offer premium laptops or budget-friendly alternatives.

7.2. Total Sales Revenue

- This card shows the total **revenue generated from laptop sales**. It is a primary metric to measure financial performance and can indicate whether the sales strategy is effective.



- **How it helps**: Higher revenue suggests successful sales strategies and product offerings. It also helps identify whether certain configurations (e.g., high-end laptops) are driving revenue growth.

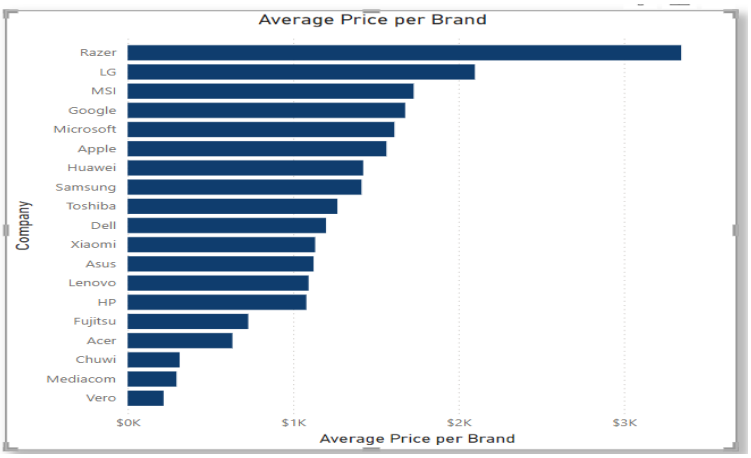
7.3. Laptops Sold

- The **Laptops Sold** card shows the total **number of units sold** over a specific period. This is an important KPI that reflects consumer demand and sales volume.

- **How it helps**: Businesses can track changes in demand over time and adjust their inventory or marketing strategies accordingly.

7.4. Average Price by Brand

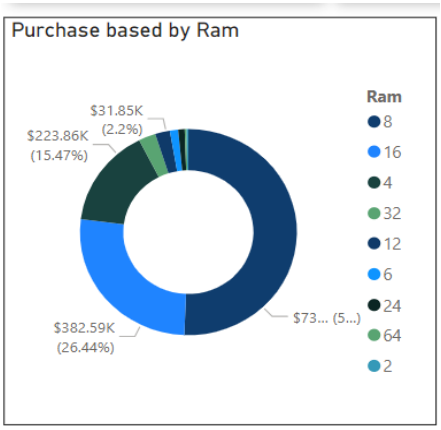
- This bar chart shows the **average price of laptops by brand**, allowing businesses to compare how different brands perform in terms of pricing.



- **How it helps**: If one brand consistently sells at a higher price point, businesses can focus on promoting or stocking that brand to maximize profits.

7.5. Purchase Based on RAM

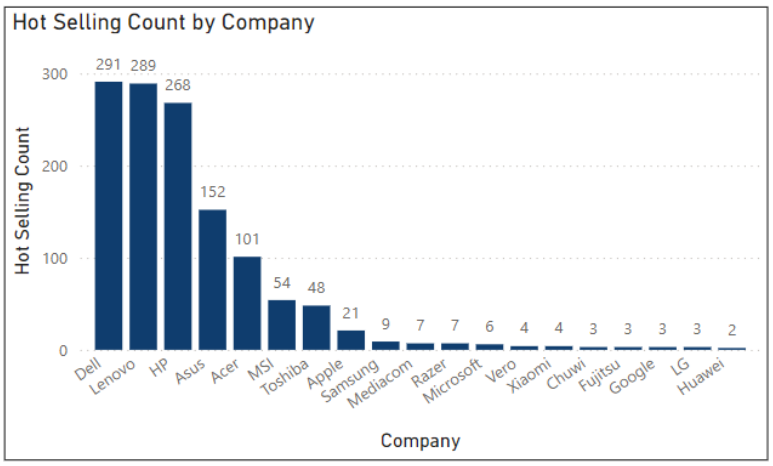
- The donut chart breaks down **laptop sales by RAM size**, showing which configurations (e.g., 8GB, 16GB) are the most popular among consumers.



- **How it helps**: Retailers can focus on stocking laptops with the most popular configurations to increase sales. For instance, if 8GB RAM laptops dominate sales, operators should consider keeping more inventory in this category.

7.6. Hot Selling Count by Brand

The Total Laptops Sold by Brand visualization displays the number of laptops sold for each brand, offering valuable insights into brand performance and market dominance. This helps businesses identify which brands are leading in sales and understand consumer preferences.

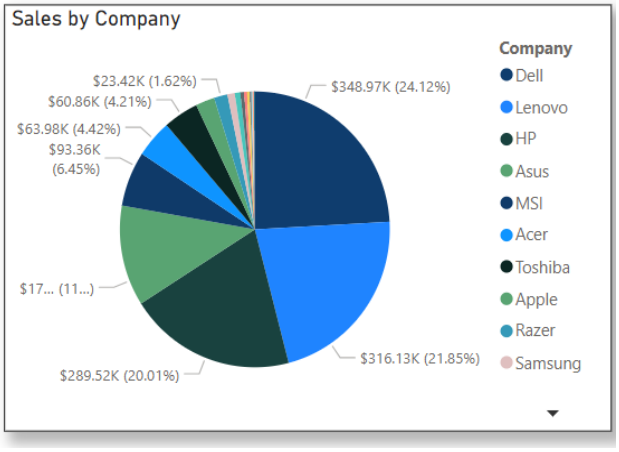


How it helps:

- Identify best-selling brands: Businesses can focus more on high-performing brands to increase revenue.
- Track market trends: This metric highlights shifts in consumer demand over time.
- Adjust inventory and marketing strategy: Insights from top-selling brands help businesses stock up on trending products and adjust marketing campaigns to boost sales.

7.7. Sales by Company

- This pie chart shows the **sales distribution by brand**. It provides an overview of which laptop manufacturers contribute the most to overall sales.



- **How it helps**: If a brand like Dell or HP has a significant market share, the retailer can focus on these brands to meet customer demand and boost sales.

8.Results

The analysis of laptop sales data provided several key findings:

1. **Brand Performance**: Certain brands like **Dell, HP, and Lenovo** consistently outperform others in terms of sales volume and total revenue. These brands also show a higher average price, indicating consumer trust and preference for established names.
2. **Hardware Preferences**: Laptops with **8GB and 16GB RAM** configurations are the most popular, driving the highest sales volume. Additionally, laptops with **SSD storage** and **Full HD screens** dominate sales, showing that consumers prioritize performance and display quality.
3. **Price Sensitivity**: The average price for laptops sold hovers around **$1,130**, with more expensive laptops being purchased less frequently. This indicates a price-sensitive market where consumers are looking for mid-range laptops that offer value for money.
4. **Sales Opportunities**: Retailers can improve revenue by stocking laptops that align with consumer preferences for **mid-range RAM configurations**, **SSD storage**, and **Full HD displays**. Additionally, promoting premium brands like **Apple** or **high-end gaming laptops** can help increase profit margins.

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9. Conclusion

The laptop sales analysis provided valuable insights into consumer preferences, brand performance, and pricing strategies. Key takeaways include:

- **Dell, HP, and Lenovo** are the leading brands, accounting for a majority of sales.
- Consumers favor laptops with **8GB/16GB of RAM**, **Full HD screens**, and **SSD storage

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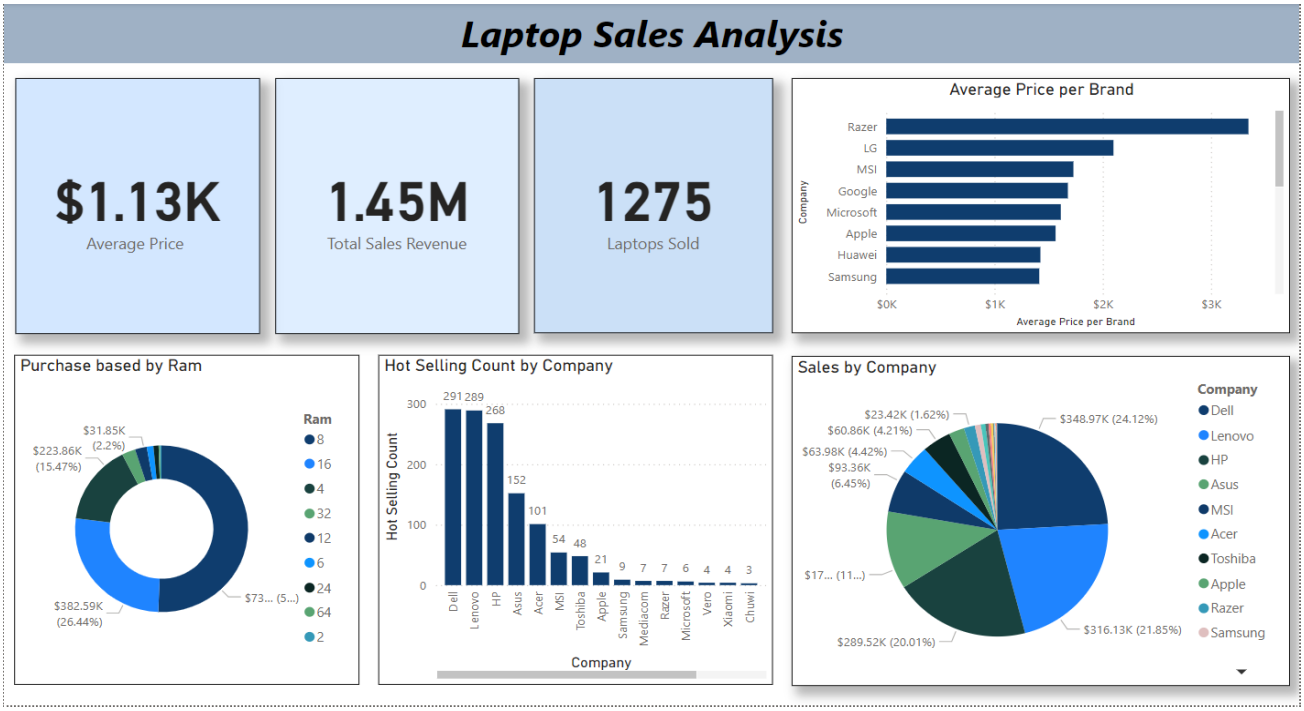
10. Appendix

Appendix A: Laptop Sales Dashboard Overview

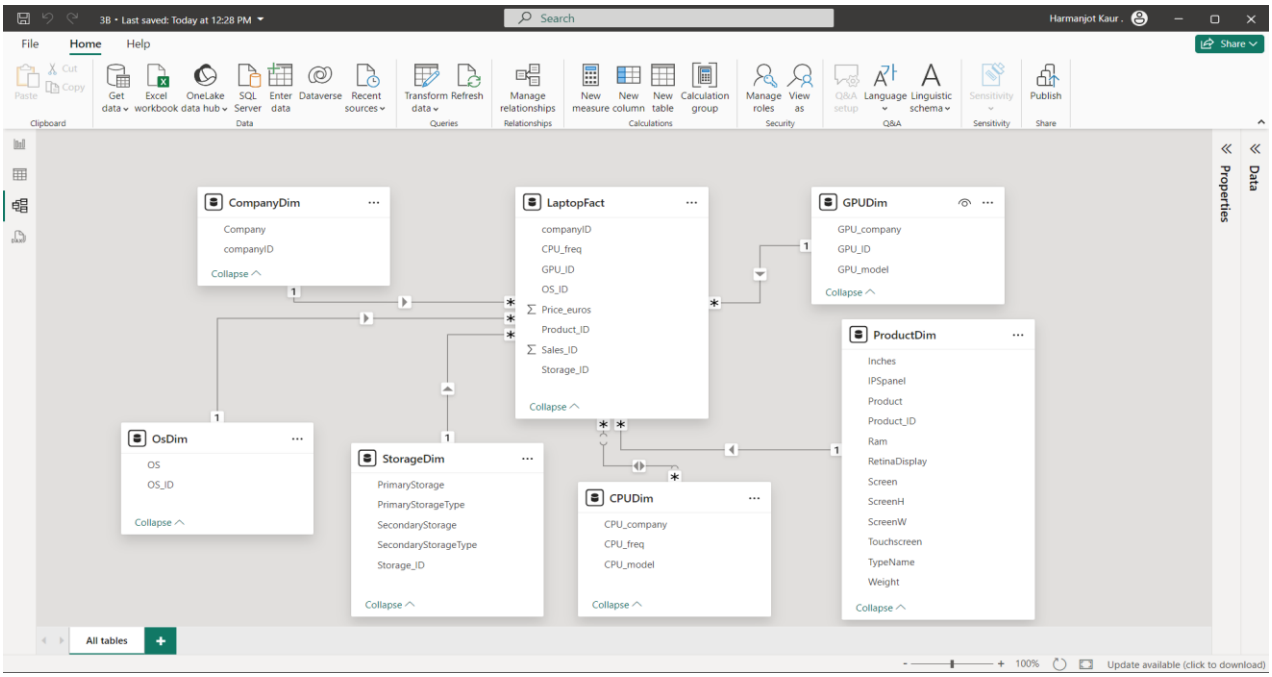
The Laptop Sales Dashboard provides a high-level overview of key performance indicators (KPIs) related to laptop sales. It includes visualizations for metrics like total sales revenue, the number of laptops sold, and average price by brand and configuration. The dashboard helps decision-makers quickly assess sales trends, product performance, and customer preferences across different laptop specifications.



1. **Key Performance Indicators (KPIs)**
    - The three KPIs—Average Price, Total Sales Revenue, and Laptops Sold—provide a quick summary of the overall sales performance. These indicators highlight the average price that a customer want to spend on laptops, the total revenue generated, and the total number of laptops sold.
2. **Purchase Based on RAM**
    - The RAM-based Purchase Pie Chart shows the breakdown of sales based on the amount of RAM in laptops. It helps identify which memory configurations are the most popular, such as 8 GB and 16 GB RAM models, which account for a significant portion of the sales.
3. **Hot Selling Count by Company**
    - This Bar Chart displays the number of units sold by each laptop brand. It allows for easy identification of the top-selling brands, such as Dell and Lenovo, providing insights into customer preferences for certain brands.
4. **Average Price per Brand**
    - This Bar Chart showcases the average price of laptops from different brands, offering a comparison of pricing strategies. Brands like Razer and LG command higher prices, while others like Samsung have lower average prices.
5. **Sales by Company**
    - The Company Sales Pie Chart highlights the revenue share generated by each company, revealing the top contributors to overall revenue. Dell, Lenovo, and HP lead in terms of sales revenue, providing insights into which brands are driving the most profit.

Appendix: Data Model Overview and Relationships

The data model presented is designed for analyzing laptop sales and comprises several key dimensions and fact tables, each serving a specific role in the data architecture. Below is an overview of the tables and the relationships among them:



- **LaptopFact**: This is the fact table, which stores the primary sales-related data. It includes foreign keys that link to various dimension tables such as CompanyDim, ProductDim, CPUDim, GPUDim, OSDim, and StorageDim. It captures key metrics like price, sales ID, and technical specifications (e.g., CPU and GPU frequency).
- **CompanyDim**: Contains details about laptop companies (e.g., Dell, Lenovo) and their associated company ID. This dimension table is linked to the LaptopFact table via the companyID foreign key.
- **ProductDim**: Stores detailed information about the laptop products, including screen size, RAM, weight, and other technical features. The Product_ID links this table to the LaptopFact table.
- **CPUDim**: Stores details about the processor (CPU) used in each laptop, including company and model information. The relationship with the LaptopFact table is maintained via CPU_ID.
- **GPUDim**: Contains information about the GPU (Graphics Processing Unit) used in laptops, including the manufacturer and model. It connects to LaptopFact through the GPU_ID.
- **OSDim**: Holds the operating system (OS) details, such as OS type and ID. It links to the LaptopFact table via the OS_ID foreign key.
- **StorageDim**: This table tracks information about the laptop's storage, including primary and secondary storage capacities and types (e.g., SSD, HDD). The Storage_ID key connects it to the LaptopFact table.