



# TECHNOLOGY PRODUCT ANALYSIS

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# INTRODUCTION

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- In this report, I have undertaken a detailed data analysis and modeling process aimed at transforming raw data into valuable business insights. This presentation focuses on communicating these insights effectively to support strategic decisions.

# DATA CLEANING AND TRANSFORMATION



- **Objective:** The first task was to ensure the dataset was clean and ready for analysis by addressing inconsistencies like missing values and outliers. This step ensures that we work with reliable and meaningful data.
- **Key Actions:**
  - Missing values were handled using appropriate methods (removal or imputation).
  - Outliers in pricing were removed to avoid skewing the analysis.
  - New features like "Success Rate" were introduced, which reflect how well a product is performing based on sales and customer ratings.
- **Result:** A clean dataset ready for analysis and modeling, ensuring accuracy in predicting trends and business outcomes.

# COMPARISON OF ORIGINAL AND CLEANED DATASET

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Feature	Old Dataset	Cleaned Dataset
Missing Values	May have missing values in several columns.	Missing values handled (removed or imputed).
Outliers	May contain outliers affecting analysis.	Outliers identified and removed.
Data Types	Columns might have incorrect data types.	Correct data types: <code>Product_ID</code> , <code>Launch_Year</code> , <code>Warranty_Period</code> converted to integers.
Feature Engineering	Raw features without additional insights.	Created new feature: <code>Success_Rate</code> and categorized into <b>Successful</b> and <b>Not Successful</b> .
Standardization	Numerical features may be in different scales.	Numerical features standardized for consistency.
Categorical Variables	Raw categorical data may be inconsistent.	Categories and encoding applied as needed.
Data Integrity	Potential issues with data integrity.	Ensured data integrity through cleaning processes.



# EXPLORATORY DATA ANALYSIS

- **Objective:** To uncover trends and relationships within the dataset that could provide deeper insights into product performance and customer behavior.
- **Key Insights:**
  - **Sales Trends:** Which product categories are performing better, giving us a clear indication of where to focus investments.
  - **Customer Ratings:** High-rated products were identified, showing strong customer satisfaction. Products with lower ratings highlight areas for improvement.
  - **Price and Sales Relationship:** Pricing strategies can be refined based on the identified correlation between price and sales performance.
  - **Value:** These insights inform where the business is excelling and areas that need improvement for future growth.

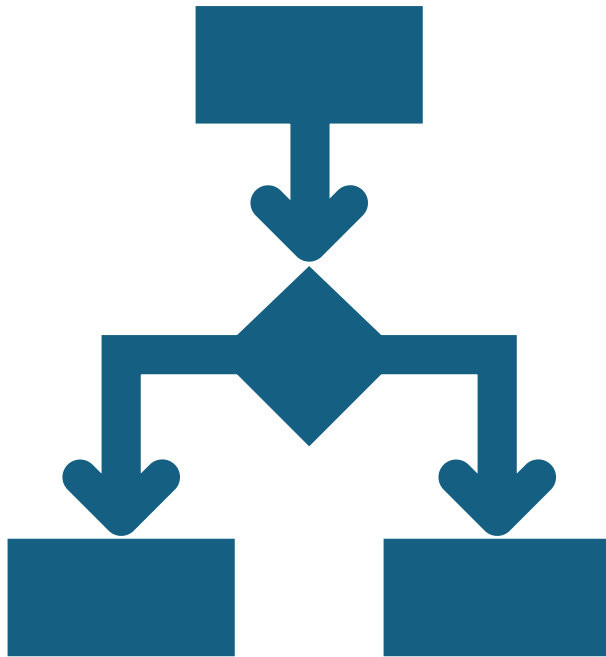


# STATISTICAL MODELING

- **Objective:** To build a predictive model that helps forecast key business metrics, like units sold.
- **Model Used:** A linear regression model was developed to predict units sold based on product attributes like price, customer rating, and specifications.
- **Results:** The model's accuracy provides confidence in its ability to forecast sales trends and guide future product decisions.



# MACHINE LEARNING DEVELOPMENT



- **Objective:** To predict product success by classifying products as either "Successful" or "Not Successful."
- **Models Used:**
  - **K-Nearest Neighbors (KNN)** and **Naive Bayes** were compared.
  - Both models provide reasonable accuracy, with the KNN model offering slightly better performance in classifying products.
  - **Outcome:** These models offer a data-driven approach to assess potential product success based on key features like price, customer feedback, and specifications



# OPTIMIZATION TECHNIQUES

**Objective:** To enhance the performance of the predictive models through techniques like feature scaling and hyperparameter tuning.

**Result:** The accuracy of the KNN model improved significantly after optimization, showing a better fit for classifying products accurately.





# DASHBOARD VISUALIZATION

- **Objective:** To present key findings and insights through an interactive Power BI dashboard designed for non-technical stakeholders.
- **Key Insights in the Dashboard:**
  - **Sales Performance by Category:** Shows how different product categories are performing in terms of sales and revenue.
  - **Customer Satisfaction Trends:** Highlights which products have high customer satisfaction and where there is room for improvement.
  - **Pricing Impact:** Displays the relationship between product pricing and sales, aiding pricing strategy decisions.
  - **Yearly Product Launch Trends:** Provides insights into how new launches have impacted sales over time.
  - **Operational Efficiency Metrics:** Analyzes warranty claims and battery life to assess product durability and reliability.



# TECHNOLOGY PRODUCT INSIGHTS

Category

All

Brand

All

Launch\_Year

All

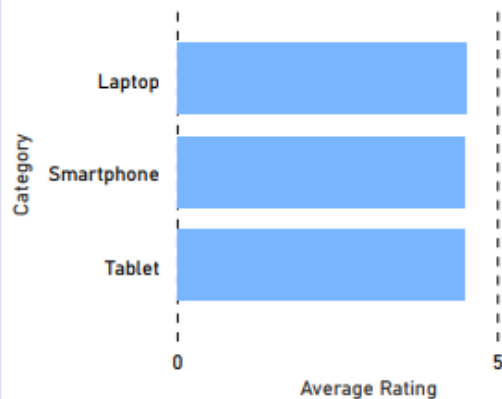
Product\_Name

All

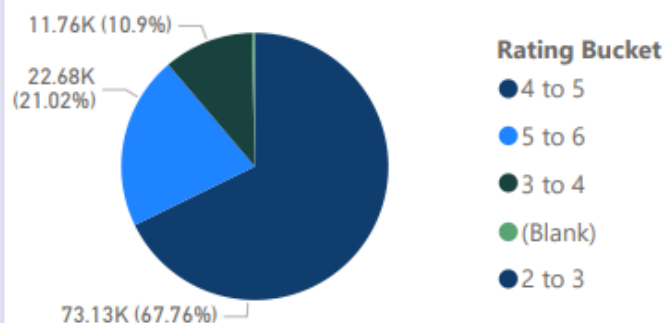
107.91K

Sum of Customer\_Rating

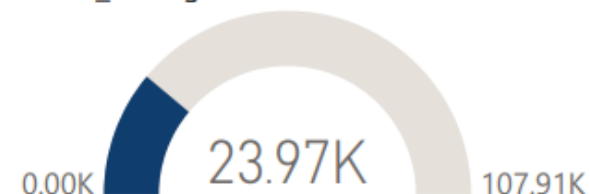
Average Rating by Category



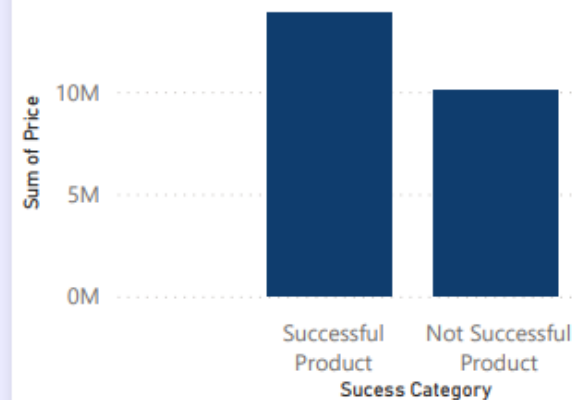
Rating Count by Rating Bucket



Count of Product\_Name and Sum of Customer\_Rating



Sum of Price by Success Category





Thank You