**DataSpark: Illuminating Insights for Global Electronics**

Domain: **Retail Analytics in the Electronics Industry**

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## 1. Executive Summary

This project involves conducting an Exploratory Data Analysis (EDA) for Global Electronics, a prominent retailer in consumer electronics. By analysing datasets related to customers, products, sales, stores, and currency exchange rates, the aim is to derive actionable insights that enhance customer satisfaction, optimize operations, and drive business growth.

## 2. Project Goals and Objectives

* **Goal**: To leverage data analytics to support strategic business decisions at Global Electronics.
* **Objectives**:
  + Identify customer demographics and purchasing behaviors.
  + Analyze product performance and sales trends. o Evaluate store effectiveness and geographical performance. o Understand the impact of currency fluctuations on sales.

## 3. Data Sources

The analysis will utilize the following datasets:

* **Customer Data**: Information on demographics, purchase history, and preferences.
* **Product Data**: Details about products, including pricing and categories.
* **Sales Data**: Transaction records detailing sales volume, revenue, and timeframes.
* **Store Data**: Information on store locations, sizes, and operational details.
* **Currency Exchange Data**: Rates impacting international sales.

## 4. Methodology

### 4.1. Data Pre-processing

* **Cleaning**: Identify and handle missing values, duplicates, and outliers.
* **Transformation**: Convert data types and standardize formats for analysis.
* **Integration**: Merge datasets to create a comprehensive view for analysis.

### 4.2. Database Setup

* **SQL Database Creation**: A relational database to store cleaned data.
* **Data Insertion**: Load the pre-processed data into the SQL database using appropriate scripts.

### 4.3. Visualization and Reporting

* **Tools**: Utilize Power BI or Tableau for data visualization.
* **Dashboard Creation**: Develop interactive dashboards that present insights clearly.

## 5. Analysis Framework

### 5.1. Customer Insights

* **Demographic Analysis**: Examine customer distribution by gender, age, and location.
* **Behavioural Analysis**: Investigate purchasing patterns, including average order value and frequency.
* **Segmentation**: Classify customers into segments based on their behaviour and demographics.

### 5.2. Sales Performance

* **Temporal Analysis**: Evaluate overall sales trends over time, including seasonal patterns.
* **Product Performance**: Identify best-selling products and analyse revenue contributions.
* **Store Performance**: Compare sales across different store locations.

### 5.3. Product Assessment

* **Popularity Metrics**: Identify most and least popular products based on sales data.
* **Profitability Assessment**: Calculate profit margins for various products.
* **Category Performance**: Analyse sales across different product categories and subcategories.

### 5.4. Store Evaluation

* **Performance Metrics**: Evaluate sales and operational metrics for each store.
* **Geographical Insights**: Analyse sales performance based on geographical distribution.

## 6. Expected Outcomes

The project will result in a comprehensive EDA report featuring:

* **Integrated Datasets**: A well-organized database ready for further analysis.
* **Key Insights**: In-depth understanding of customer demographics, purchasing behaviours, and product performance.
* **Visual Representations**: Effective use of data visualizations to communicate findings.
* **Strategic Recommendations**: Actionable insights tailored to improve marketing strategies, inventory management, sales forecasting, and store optimization.

## 7. Future Directions

* **Continuous Monitoring**: Establish a system for ongoing data analysis to capture new trends.
* **Feedback Loop**: Incorporate feedback from stakeholders to refine analyses and strategies continuously.
* **Advanced Analytics**: Explore predictive analytics for improved forecasting and decision-making.

### ****8.Business Insights & Recommendations Report****

## ****Customer Analysis****

### ****Key Insights:****

* **Gender Distribution:** Sales are nearly evenly split between **male (50.19%) and female (49.81%)** customers.
* **Orders Per Customer:** The average is **1.98 orders per customer**, indicating low repeat purchases.
* **Preferred Products:** Adventure Works Desktop PC1.60 ED160 Black and WWI Desktop PC1.80 E1800 White are the most purchased products.
* **Location Distribution:** Majority of customers are from **North America and Europe**.
* **Age Group Breakdown:** The **36-50 age group** contributes to the highest sales (30.39%).

### ****Recommendations:****

✅ **Marketing Strategy:**

* Run **personalized promotions** targeting high-value customer segments (36-50 age group).
* Increase brand awareness among younger demographics (18-25) using **social media and influencer partnerships**.
* Implement **loyalty programs** to boost repeat purchases.

✅ **Customer Retention:**

* Introduce **subscription models** or bundle offers for preferred products.
* Utilize **email campaigns** to re-engage past customers.

## ****Sales Analysis****

### ****Key Insights:****

* **Monthly Sales Trend:** Peaks in **March, September, and December**, indicating seasonal buying trends.
* **Category Performance:** **Computers and Home Appliances** contribute to the highest sales.
* **Top Selling Products:** Adventure Works and WWI Desktop models lead in sales volume.

### ****Recommendations:****

✅ **Sales Forecasting:**

* Stock up on high-demand categories before peak seasons.
* Offer special discounts or **holiday campaigns** to maximize revenue in peak months.

✅ **Revenue Optimization:**

* Introduce **cross-selling strategies** (e.g., recommending accessories for desktops).
* Bundle complementary products to increase **Average Order Value (AOV)**.

## ****Product Analysis****

### ****Key Insights:****

* **Most Popular Subcategories:** Desktops, Televisions, and Laptops drive the most revenue.
* **Profit Margin Breakdown:** Some categories (e.g., Music & Movies) have lower margins.
* **Least Popular Products:** Certain accessories and boxed games have low sales.

### ****Recommendations:****

✅ **Product Development:**

* Focus on high-margin categories like **laptops and smart home devices**.
* Discontinue or discount **slow-moving products** to free up inventory.

✅ **Inventory Optimization:**

* Adjust procurement based on product demand trends.
* Improve supply chain forecasting for **fast-moving items**.

## ****Store Analysis****

### ****Key Insights:****

* **Sales Per Store:** Significant variance, with some stores outperforming others.
* **Store Profitability:** A few stores contribute to **most of the profit**.
* **Sales by Location:** North American stores generate the highest revenue.

### ****Recommendations:****

✅ **Store Expansion:**

* Expand stores in high-performing regions like **North America and Europe**.
* Close or optimize **underperforming locations**.

✅ **Operational Efficiency:**

* Increase **sales per square meter** by optimizing store layout.
* Implement **AI-based inventory management** to match local demand.

## ****Conclusion****

* **Enhance marketing** with targeted promotions and loyalty programs.
* **Optimize inventory** based on seasonal trends and fast-moving products.
* **Improve sales forecasting** with data-driven insights.
* **Refine product development** by focusing on high-margin categories.
* **Expand profitable store locations** while optimizing underperforming ones.

**Next Steps:**

* Implement customer segmentation for better targeting.
* Track the effectiveness of marketing campaigns.
* Monitor real-time inventory performance to adjust procurement strategies.

**THANK YOU**