**INSIGHTS INTO E-COMMERCE SALES: ANALYZING TRENDS, CUSTOMER BEHAVIOR, AND REVENUE PATTERNS**

E-commerce sales refer to the transactions that take place online, where customers purchase goods or services from a business through digital channels such as websites, mobile apps, or social media platforms. The world of e-commerce has experienced unprecedented growth in recent years, with online sales reaching new heights. As more and more consumers turn to digital channels to make purchases, businesses are adapting their strategies to stay ahead of the curve. In this essay, we will explore the current state of e-commerce sales, discuss the latest trends and strategies, and provide best practices for businesses looking to succeed in this rapidly evolving landscape.

To measure the success of their e-commerce efforts, businesses are tracking a range of metrics, including conversion rates, average order value, customer acquisition cost, and revenue growth rate. These metrics provide valuable insights into customer behavior, purchasing patterns, and sales performance. By analyzing these metrics, businesses can identify areas for improvement, optimize their strategies, and make data-driven decisions to drive growth and revenue.

To provide a comprehensive understanding of the E-commerce sales, the following analysis was undertaken;

* Analyze sales data to identify trends
* Perform customer segmentation based on purchasing behavior
* Analyzing revenue patterns
* Developing visualizations to communicate findings effectively

Here are some potential insights that can be gained:

**Trends**

* Seasonal fluctuations: Identify peak sales periods, such as holidays or summer months, to inform inventory management and marketing strategies.
* Product category trends: Analyze sales data to determine which product categories are growing or declining in popularity.
* Geographic trends: Examine sales data by region or country to identify areas with high demand or growth potential.

**Customer Behavior**

* Purchase frequency and loyalty: Analyze customer purchase history to identify loyal customers, frequent buyers, and those at risk of churn.
* Average order value (AOV): Calculate AOV to understand customer spending habits and identify opportunities to increase average order size.
* Customer demographics: Analyze customer data to understand demographics, such as age, gender, and location, to inform targeted marketing strategies.

**Revenue Patterns**

* Revenue by product category: Analyze revenue by product category to identify top-performing products and areas for improvement.
* Revenue by customer segment: Examine revenue by customer segment, such as loyalty program members or first-time buyers, to understand revenue streams.
* Revenue by marketing channel: Analyze revenue by marketing channel, such as social media, email, or paid advertising, to evaluate the effectiveness of marketing campaigns.

To ensure accuracy and reliability, the following tools were used to collect and analyze data on E-commerce sales; PowerBI and MySQL. The analysis of sales data, customer segmentation based on purchasing behavior, revenue patterns, developing visualizations to communicate findings effective was conducted using a combination of quantitative and qualitative methods.

Power BI is a business analytics service by Microsoft that allows users to visualize and analyze data from various sources. It provides interactive dashboards, reports, and data visualizations to help businesses make data-driven decisions. Power BI is commonly used for Creating interactive dashboards and report, analyzing and visualizing large datasets, identifying trends and patterns in data, making data-driven business decisions.

SQL (Structured Query Language) is a programming language designed for managing and manipulating data in relational database management systems (RDBMS). SQL is used to Create and modify database structures, insert, update, and delete data, query and retrieve data, manage database security and access, generating reports and visualizations.

This e-commerce sales data provides an analysis of the order details, sales targets, and list of orders. The analysis includes an examination of the order details by category and subcategory, a comparison of actual sales to targets, and a breakdown of orders by customer location. Order details table provides insight into the sales performance of different categories and subcategories, the sales target table provides insight into the sales targets for different categories and the list of orders table provides insight into the orders received by the company.

In using MySQL tool for analysis, a schema was created for the e-commerce sales data and the following tables were imported; order details, sales targets, and list of orders. The SQL queries used includes SELECT, FROM, WHERE, GROUPBY, ORDERBY, JOIN, ON, and so on.

**MySQL Joins** is one of the concept of MySQL that was used in analyzing the e-commerce sales data. MySQL joins are used to combine rows from two or more tables based on a related column between them. This allows you to retrieve data from multiple tables in a single query, making it easier to analyze and manipulate data. The join concept was helpful in analyzing the e-commerce sales data because the e-commerce sales data had multiple tables which cannot be analyzed except you use the join concept. In analyzing the e-commerce sales data, some of the challenges faced are using the join concept and where we have to use the group by concept but along the line when I read more and looked at different examples, I was able to solve the queries which I now know and can do anytime. Since starting my SQL journey, I've gained experience with database design, development, and querying. I've developed skills in writing efficient SQL queries using SELECT, JOIN, SUBQUERY, and AGGREGATE FUNCTIONS, database design and normalization, improved in query writing efficiency, developed problem solving skills using SQL. All this knowledge that I gained has really shaped me in analyzing the e-commerce sales data.

Some of the SQL queries that was written include;

1. -- What is the average order value?

SELECT round(AVG(amount)) avg\_order\_value

FROM order\_details;

1. -- Product category with highest revenue

SELECT category, SUM(amount\*quantity)

FROM order\_details

GROUP BY category

ORDER BY SUM(amount) DESC LIMIT 1;

1. -- Product category with highest revenue

SELECT category, SUM(amount\*quantity)

FROM order\_details

GROUP BY category

ORDER BY SUM(amount) DESC LIMIT 1;

1. -- Customer with most orders

SELECT customername, COUNT(\*)

FROM list\_of\_orders

GROUP BY customername

ORDER BY COUNT(\*) DESC LIMIT 1;

1. -- Top-Performing Customers by State

SELECT lo.State, lo.CustomerName, SUM(od.Amount\*quantity) AS total\_sales

FROM List\_of\_Orders lo

JOIN Order\_Details od ON lo.Order\_ID = od.Order\_ID

GROUP BY lo.State, lo.CustomerName

ORDER BY total\_sales DESC limit 10;

In using PowerBi tool, the objective of this analysis is to identify trends and patterns in sales data and provide insights for future business decisions. The e-commerce sales data was imported from a CSV file into Power BI. The data was cleaned and prepared by removing any duplicate or missing values. New column was created for total revenue which was gotten by multiplying the value of amount and quantity. A data model was created in Power BI to support the analysis. The data model includes tables for target sales, order details, and list of orders, as well as relationships between these tables.

Several visualizations were created in Power BI to support the analysis, including:

* A Bar chart
* A pie chart
* Line chart
* Card
* Slicer
* Clustered Bar chart

The analysis revealed several key insights, including:

* Total revenue by category
* Total revenue by state
* Average quantity
* Maximum profit
* Top 5 customers
* Maximum target