

Amazon Sales Report

Business Intelligence Project

From Raw Data to Actionable Insights using Power BI

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January 29, 2026

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Project Context & Motivation

- E-commerce generates large, multi-dimensional datasets (products, orders, time, geography, logistics).
- Decision-makers need **fast and reliable insights**, not raw tables.
- Business Intelligence (BI) transforms raw data into:
 - Performance monitoring (KPIs)
 - Trend detection
 - Operational optimization (inventory, fulfillment, marketing)
- This project simulates a **real-world sales analytics BI workflow**.

Business Goal of the BI Project

Main Objective:

Analyze Amazon sales data to understand **sales performance**, **customer demand**, **product behavior**, and **geographic trends**, and support data-driven decisions through an interactive Power BI dashboard.

Business questions addressed:

- Which products/categories generate the most revenue and volume?
- How do sales evolve over time (daily/monthly trends, seasonality)?
- Which cities/states perform best?
- How do fulfillment types compare (Amazon vs Merchant)?
- Where can improvements be made (pricing, inventory, logistics)?

- **Source:** Kaggle dataset (Amazon Sales Report)
- **Format:** CSV file(s)
- **Why Kaggle?**
 - Realistic, industry-like datasets
 - Good for BI practice: large records, mixed types, multiple dimensions
 - Publicly accessible for academic portfolio projects

Raw Data Overview

- Thousands of transactional sales records.
- Mixed data types: dates, text identifiers, categorical fields, numeric measures.
- Typical column groups:
 - **Order:** Order ID, Date
 - **Product:** SKU / Product ID, Category
 - **Location:** City, State
 - **Operations:** Fulfillment type, shipment details
 - **Metrics:** Quantity, Sales amount

Challenges in raw data

Redundancy, missing values, inconsistent formats, and a structure not optimized for BI querying.

Key preprocessing steps:

- Remove irrelevant/redundant columns to reduce noise.
- Handle missing values (drop, impute, or flag depending on column meaning).
- Convert data types:
 - Dates → `datetime`
 - Quantity/Amount → `numeric`
- Standardize naming (consistent column names and categories).
- Validate integrity (duplicates, outliers, incorrect values).

Outcome

Clean, consistent data ensures **trusted KPIs** and **reliable dashboard insights**.

Selection of Useful Columns

Why column selection matters:

- BI dashboards must be **fast**, **relevant**, and **decision-oriented**.
- Reduces complexity and improves model performance.

Core selected columns (examples):

- **Order:** Order ID, Order Date
- **Product:** SKU / Product ID, Category
- **Location:** City, State
- **Operations:** Fulfillment Type (Amazon / Merchant)
- **Measures:** Quantity Sold, Sales Amount

Rationale

Each selected column answers a specific business question (what sells, where, when, and how).

Data Modeling in Power BI (Star Schema)

Why modeling?

- Improves performance and simplifies analysis.
- Reflects real data warehouse structures.

Proposed model:

- **Fact table:** Sales transactions (grain: one row per order line / transaction)
- **Dimension tables:**
 - Date (calendar attributes)
 - Product (SKU, category, attributes)
 - Location (city, state)
 - Fulfillment (type, status, method)

Benefit

Enables clean relationships, scalable measures, and consistent slicing/filtering across visuals.

Measures & KPIs (DAX)

Key measures built in Power BI:

- Total Sales
- Total Quantity Sold
- Average Order Value (AOV)
- Sales by Category / Product
- Sales by City / State
- Sales Trend over Time

Why KPIs matter

KPIs provide an executive summary for monitoring performance and guiding quick decisions.

(Optional) Add a small table of KPI definitions if you want more detail.

Dashboard Design (Power BI)

Dashboard objectives:

- Clear and professional layout
- Interactive exploration
- Business-focused storytelling

Main visuals included:

- KPI Cards: Total Sales, Quantity, AOV
- Bar chart: Sales by Category
- Line chart: Sales over Time
- Map / Table: Sales by City/State
- Comparison chart: Fulfillment Type performance

User value

A single dashboard provides an end-to-end view of sales performance and drivers.

Power BI interactivity features used:

- Slicers: Date, Category, Location, Fulfillment
- Drill-down (e.g., Category → Product)
- Cross-filtering between visuals
- Tooltips for detailed context

Result

Users can explore segments dynamically and discover patterns without writing queries.

Key Insights Discovered

- Revenue is concentrated in a small number of product categories (Pareto effect).
- Certain cities/states dominate sales volume and revenue.
- Sales show peaks during specific periods (seasonality or promotions).
- Fulfillment type differences reveal operational efficiency gaps/opportunities.

Actionability

These insights can guide inventory planning, marketing targeting, and fulfillment optimization.

Business Value of This BI Project

For decision-makers:

- Better inventory and demand forecasting
- Improved marketing and product strategy
- Optimized logistics and fulfillment operations
- Faster identification of top products and high-performing regions

For analysts and teams:

- Automated reporting and reusable model
- Scalable dashboard for new data and future enhancements

Tools & Technologies Used

- **Python (Pandas):** Cleaning, transformation, validation
- **Power BI:** Data modeling, DAX measures, visualization
- **CSV / Kaggle dataset:** Data acquisition and storage

Deliverable

An interactive Power BI dashboard enabling decision-oriented sales analysis.

What this project demonstrates:

- End-to-end BI workflow: data → model → KPIs → dashboard
- Strong analytical structure aligned with business questions
- Professional Power BI practices (star schema + DAX measures + interactivity)

Final message

Raw sales data becomes a decision-support system when transformed into trusted KPIs and interactive visuals.

Thank you!

Questions?