Amazon Sales Analysis –Project Report

1. Executive Summary

This project delivers a comprehensive sales performance analysis for Amazon products using Power BI. The objective was to design a scalable business intelligence solution that enables stakeholders to monitor revenue trends, product performance, customer engagement metrics, and time-based sales fluctuations.

The solution integrates structured data modelling, DAX-driven KPIs, and interactive dashboard design to support executive-level and operational decision-making.

2. Business Problem Statement

Amazon's product ecosystem generates large volumes of transactional data across categories, time periods, and customer interactions. Without structured analytics:

- Revenue trends remain difficult to monitor at granular levels
- Product-level performance insights are fragmented
- Seasonal and weekly sales patterns are underutilized
- Customer engagement metrics (reviews) are not integrated into performance analysis

This project addresses these gaps by building a centralized analytical dashboard with time-intelligence capabilities.

3. Dataset & Data Understanding

Source: Amazon_Combined_Data.xlsx

The dataset includes transactional-level sales records enriched with product and time attributes.

Core Data Attributes

- Product Category
- Product Description
- Sales Amount
- Quantity Sold
- Review Count
- Order Date (Month, Week)
- Quarter (QTR)

Data Volume & Structure

- Transaction-level granularity
- Multiple product categories
- Multi-period sales data enabling YTD and QTD calculations

4. Data Preparation & Transformation (Power Query)

Data transformation followed BI best practices:

- Data type validation (numeric, date, categorical)
- Standardization of product and category labels
- Creation of a structured **Date/Calendar table**
- Development of Year → Quarter → Month → Week hierarchy
- Removal of inconsistencies and redundant columns
- Validation of aggregation consistency

This step ensured analytical reliability and performance optimization.

5. Data Modelling (Star Schema Approach)

A star schema model was implemented to enhance scalability and performance.

Model Structure

- **Fact Table:** Sales (transaction-level data)
- **Dimension Tables:**
    - Date (Calendar)
    - Product (Category, Description)

Key Modelling Practices

- One-to-many relationships from dimensions to fact table
- Single-direction filtering to avoid ambiguity
- Separate Date table to enable time-intelligence functions
- Optimized model to reduce cardinality where possible

This modelling approach ensures accurate time-based calculations and efficient report performance.

6. Advanced DAX Implementation

Time-intelligence and ranking logic were implemented using DAX.

Time Intelligence Measures

- YTD Sales using TOTALYTD ()
- QTD Sales using TOTALQTD ()
- YTD Products Sold
- YTD Reviews

These measures dynamically adjust based on filter context and slicer selections.

Contribution & Ranking Logic

- Category Contribution % using DIVIDE () with ALL ()
- Product Ranking using RANKX () for Top N analysis
- Context-aware aggregation using CALCULATE ()

Analytical Value

These measures allow:

- Period-over-period tracking
- Executive KPI monitoring
- Category performance benchmarking
- Dynamic Top 5 product identification

7. Dashboard Architecture & Design Principles

The dashboard was designed with executive readability and analytical depth in mind.

KPI Layer (Top Section)

- YTD Sales ($2.18M)
- QTD Sales ($811.09K)
- YTD Products Sold (27.75K)
- YTD Reviews (19.42M)

Trend Analysis Layer

- Sales by Month (seasonality detection)
- Sales by Week (short-term fluctuation analysis)

Performance Analysis Layer

- Sales by Product Category (YTD vs QTD comparison)

- Top 5 Products by YTD Sales
- Top 5 Products by YTD Reviews

Interactivity

- Product Category slicer
- Quarter (QTR) slicer

The layout follows a structured storytelling approach: KPI → Trend → Deep Dive.

8. Key Analytical Insights

Revenue Trends

- Noticeable sales acceleration toward later months indicates seasonal demand impact.
- Weekly spikes suggest promotional campaigns or peak demand periods.

Product Performance

- Revenue concentration exists within specific product categories.
- Top-selling products differ from most-reviewed products, indicating demand vs engagement variation.

Engagement Analysis

- High review counts do not always translate to proportional revenue contribution.
- Engagement metrics provide complementary insights to revenue metrics.

9. Business Impact & Strategic Recommendations

Revenue Optimization

- Align marketing spend with high-performing months.
- Introduce upselling and bundling strategies for top revenue-generating products.

Inventory & Operations

- Use weekly demand patterns for inventory forecasting.
- Prepare stock allocation based on seasonal spikes.

Product Strategy

- Promote high-review products to increase conversion.
- Reassess underperforming categories for pricing or repositioning strategies.

Executive Reporting

- Implement monthly performance reviews using YTD vs QTD comparisons.

10. Performance Optimization Considerations

- Reduced unnecessary calculated columns
- Preferred measures over calculated columns where applicable
- Maintained efficient relationship structure
- Ensured optimized filter propagation

These practices improve dashboard responsiveness and scalability.

11. Conclusion

This project demonstrates mid-level Business Intelligence capabilities, including structured data modelling, advanced DAX implementation, time-intelligence analysis, and executive-focused dashboard design.

The solution transforms raw sales data into a scalable analytical framework capable of supporting revenue strategy, product optimization, and operational planning decisions.

Tools & Technologies Used:

- Power BI (Advanced DAX & Data Modelling)
- Power Query (ETL & Data Transformation)
- Microsoft Excel (Data Source)