**Product performance analysis**

Nimbly Electronics is a mid-sized consumer electronics company operating across India, specializing in personal gadgets — wireless headphones, smartwatches, and portable speakers.

Over the past three years, the company has expanded aggressively into multiple regions and launched multiple product lines. While overall sales revenue has grown steadily, the leadership team has started noticing a troubling pattern: profitability is inconsistent, and some flagship products are underperforming in unexpected markets.

The CFO has tasked the newly formed Business Analytics team (that’s your students!) with diagnosing product performance issues and preparing actionable insights using the company’s latest product-level data. The board is particularly concerned about missed quarterly targets and stock-outs on some models while other SKUs pile up unsold in warehouses.

**Business Context & Stakeholders**

* Sales Team claims pricing is competitive and blames marketing for insufficient campaigns in key markets.
* Marketing Team insists they ran promotions, but regional uptake varied and cannibalization between similar models might be happening.
* Operations says supply-chain lead times are unpredictable, making it hard to keep popular models in stock.
* CFO needs clarity on where profitability is leaking and which products to prioritize or phase out.

**Available Data**

* Product ID / Name
* Product Category (Headphones, Smartwatches, Speakers)
* Region (North, South, East, West)
* Quarter / Year
* Units Sold
* Selling Price per Unit
* Manufacturing Cost per Unit
* Marketing Spend per Region
* Return Rate (%)
* Stock-out Days per Quarter
* Warranty Claims (%)

**Problems to Solve**

1. **Profitability vs. Popularity Mismatch:** Some products sell well but contribute low margins, while others are profitable but sell poorly. Which products/regions should be prioritized?
2. **Excess Inventory & Stock-outs:** Certain SKUs face repeated stock-outs, while others tie up capital in unsold inventory. How can inventory be optimized?
3. **Regional Variability:** Same products perform differently across regions — is pricing, marketing, or consumer preference driving this?
4. **Marketing Efficiency:** High marketing spend doesn’t always translate to high sales. Is the spend actually improving ROI?
5. **Product Cannibalization:** Similar models might be eating into each other’s sales, lowering total profit without growing market share.

**Hint (Common metric used for product performance analysis)**

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| **Dimension** | **Example Metrics** | **Purpose** |
| **Sales/Revenue** | Units sold, Revenue growth, Average Selling Price | Measure demand and financial performance |
| **Profitability** | Gross margin, Contribution margin, ROI per product | Understand cost efficiency and profit health |
| **Market** | Market share, Competitive price index, Region-wise split | Track product’s standing in the market |
| **Customer** | Satisfaction scores, Repeat purchase rate, NPS | Gauge customer perception and loyalty |
| **Operations** | Stock-outs, Returns/defects, On-time delivery rate | Monitor supply chain and quality consistency |
| **Lifecycle stage** | Introduction, Growth, Maturity, Decline | Decide on marketing and investment strategies |

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