Case Study: FMCG Sales & Inventory Analytics with Microsoft Fabric

Problem
The FMCG client needed accurate and real-time visibility into sales, stock utilization, and promotion performance across multiple regions and brands. Manual reporting was slow, error-prone, and not scalable. Key pain points included: No standardized sales and inventory reporting Difficulty analyzing promotions and their effectiveness Lack of automation in daily reporting and stock utilization insights

Solution
An end-to-end data engineering and analytics pipeline was designed using Microsoft Fabric, leveraging the Medallion Architecture (Bronze, Silver, Gold). Key solution elements: **Bronze Layer**: Ingest raw FMCG sales and inventory data from Excel/CSV into OneLake **Silver Layer**: PySpark transformations for cleaning & standardization: - Convert *date* into M/d/yyyy format - Standardize *region* names to Title Case - Cast *price_unit* to Double and *promotion_flag* to Boolean - Remove duplicates (date + sku + channel) **Incremental Loads**: Metadata-driven, using *meta_watermark* and *meta_audit_log* **Data Quality Checks**: Ensured no negative sales/stock, no nulls in key fields, and flagged mismatches (delivered < sold) **Gold Layer**: Aggregated fact tables for: - Region × SKU sales and stock utilization - Category contribution analysis - Promotion uplift and pricing impact **Power BI Reports**: Dashboards for Executives, Inventory Ops, Growth KPIs, Promotion Effectiveness, and SKU Drilldown (Direct Lake Mode) **Dev-Test-Prod**: Environment portability achieved using JSON config files (dev.json, test.json, prod.json)

Results
The solution provided measurable impact for the client: Automated daily refresh of FMCG data with zero manual intervention Executives gained real-time visibility into sales, stock, and promotions Promotion effectiveness could be quantified with Promo Uplift % Stock-out risks reduced through accurate stock utilization metrics Faster deployment and scalability with Dev → Test → Prod portability

Prepared by: *Shankaraling Badadani*
Freelance Power BI & Data Engineering Consultant