Inventory Analytics and Optimization Report
Urban Retail Co.

Executive Summary

Urban Retail Co., a mid-sized retail chain with a wide product mix and geographic presence, has been struggling with inefficient inventory management practices resulting in expensive inefficiencies. This project leverages the capability of powerful SQL analytics and interactive Power BI dashboards to extract actionable insights from transactional data. The project focuses mainly on addressing frequent stockouts, overstocking problems, and demand forecasting errors. By analyzing inventory turnover, movement classes, aging patterns, and promotion effects, the project gives a thorough roadmap to maximize stock flows, improve levels of service to customers, and minimize unnecessary operational costs.

1 Project Background

Operating with more than 5,000 Stock Keeping Units (SKUs) in many categories including groceries, electronics, furniture, and apparel, Urban Retail Co. ships inventory through regional warehouses to numerous retail stores. In the past, the firm has utilized reactive restocking processes, with the resultant effect of either depleting stocks or accumulating them. This project was envisioned to transition the firm towards proactive, data-based stock management. Using SQL-based data modeling and KPI creation, and visualization using Power BI, we sought to provide transparency and management of the inventory dynamics.

2 Data Overview

The data set ranges from daily-level transaction histories with major attributes being date, store and product IDs, category, geography, inventory levels, units sold, price, discount, competitor price, promotion indicators, weather, forecasted demand, and seasonality. A star schema was designed around a core fact table for transactional measures and supporting dimension tables for date, store, product, weather, and promotions. This structured design facilitated fast querying and meaningful KPI derivation.

3 Key Analytical Findings

Inventory Turnover: Categories such as Clothing and Electronics demonstrated higher turnover rates (27% and 26% respectively), indicating rapid sales velocity. In contrast, Furniture and Toys exhibited significantly slower turnover, highlighting inefficiencies in product movement.

Low Inventory Risk: Clothing and Electronics frequently dipped below minimum inventory thresholds, suggesting recurring stockout events that may negatively affect customer satisfaction and sales potential.

Average Stock Levels: Clothing maintained the highest average stock levels, followed by Groceries and Toys, indicating a tendency to overstock in these areas. Electronics, despite high turnover, showed lower average stock, potentially exacerbating stockout frequency.

Store-Level Consistency: Stock levels appeared evenly distributed across stores, reflecting uniform replenishment policies. However, this approach may ignore regional demand variations and reduce flexibility.

Movement Classification: A majority of SKUs fell under the slow-moving category based on the ratio of

units sold to inventory levels. Only 6% qualified as medium movers, implying a skewed distribution that warrants product portfolio rationalization.

Inventory Aging: Clothing and Electronics had the oldest average stock, increasing the risk of obsolescence, markdowns, and storage costs. Regular inventory aging audits and clearance strategies are recommended.

Seasonal Patterns: A distinct inventory buildup was observed from October through April, aligning with known seasonal demand peaks. Post-peak months saw a decline in inventory, supporting the need for cyclical stocking policies.

Sales Insights: Clothing emerged as the top-performing category in terms of sales volume, followed closely by Electronics and Furniture, reinforcing the importance of prioritizing these categories for inventory and forecasting efforts.

4 Strategic Recommendations

Dynamic Replenishment: Establish adaptive reorder point models based on rolling average sales, lead times, and category-specific demand profiles. Prioritize fast-moving segments such as Clothing and Electronics.

Inventory Rationalization: Identify and phase out persistently slow-moving SKUs to reduce holding costs and improve shelf space utilization. Leverage discount campaigns and bundling to accelerate clearance.

Forecasting Enhancements: Integrate seasonality, promotional activity, and competitor pricing data into demand forecasting models, especially for high-value categories such as Electronics and Furniture.

Seasonal Inventory Planning: Adjust procurement schedules and safety stock buffers to align with demand surges during festive and holiday seasons. Incorporate weather-sensitive patterns for categories influenced by external conditions.

Localized Optimization: Move away from one-size-fits-all restocking strategies. Monitor store-level performance indicators to support region-specific replenishment and reduce inter-store variability in stockout and overstock incidents.

5 Technical Deliverables

Deliverables included optimized SQL scripts for ETL and KPI generation, a normalized relational database schema to enable scalable analytics, Power BI dashboards visualizing stockouts, turnover, inventory aging, and promotional impacts, and an Entity-Relationship Diagram (ERD) documenting data relationships and model structure.

6 Business Impact

By implementing these analytics-driven strategies, Urban Retail Co. is poised to see real operational gains. Measurable benefits include a decrease in stockout events by as much as 20%, reduced holding costs by means of more streamlined inventory procedures, improved forecasting accuracy, and an overall increase in customer satisfaction through greater product availability. In addition, the project establishes a strong data foundation for future inventory performance tracking and strategic supply chain planning.

7 Conclusion

This project demonstrates the power of combining SQL-based data analysis with dynamic business intelligence tools such as Power BI to solve challenging retail inventory problems. The analysis and strategic plan created here allows Urban Retail Co. to shift from a reactive inventory culture to a proactive, insight-driven approach-setting the organization up for long-term operational excellence and competitive market position in an increasingly data-oriented retail environment.