Key Insights for Project 2 Inventory and Warehouse Management

Product Performance & Profitability Insights

- **Top Grossing Products**: Products like Product 20, Product 33, and Product 32 lead in gross profit, each exceeding ₹396K. These products also rank high in profit margin (Product 32 at 356.43%) and stock value, indicating strong market demand and pricing strategy.
- **High Turnover Champions**: Product 14 stands out with the highest stock turnover (7.15), suggesting rapid movement and strong sales velocity. However, it also shows negative gross profit (-₹29K), implying pricing or cost issues. This paradox flags a need for margin review despite high sales.
- **Profitability vs. Movement Conflicts**: Products like Product 49 and Product 38 show high movement and alert frequency but negative gross profits, suggesting operational inefficiencies or over-discounting. Product 49, despite ranking 2nd in stock value, has the lowest profit (-₹191K)— a major red flag.
- **Alert-Heavy Products:** Products such as Product 14, Product 10, and Product 15 triggered the most alerts (5 and 4 respectively), often correlating with high movement. This may indicate volatility in demand, frequent stockouts, or pricing fluctuations.

Warehouse & Inventory Dynamics

- **Stock Distribution Gaps:** Products like Product 1 and Product 14 are spread across all five warehouses, but their stock levels vary drastically. For example, Product 1 has over 433 units in Warehouse 3 but only 73 in Warehouse 2, suggesting uneven demand or poor replenishment planning.
- **Low Stock Risk Zones:** Warehouse 2 and Warehouse 4 show the highest number of low stock alerts, especially for fast-moving items like Product 4 and Product 28. These warehouses may need automated reorder triggers or buffer stock policies.
- **High Value, Low Movement:** Products like Product 3 and Product 45 have high total stock value but low turnover (0.30 and 1.04 respectively). This ties up capital and increases holding costs—ideal candidates for promotional clearance or bundling strategies.
- **Warehouse Efficiency:** Warehouse 4 leads in average quantity per product (300.19), suggesting it's a central hub. However, it also has high alert frequency, indicating potential overstocking or misaligned demand forecasting.

Supplier & Movement Analysis

- **Lead Time Bottlenecks:** Suppliers like Supplier 4 and Supplier 11 have the highest average lead times (10 days), which could delay replenishment for critical products. These suppliers also rank highest in cost price, suggesting a trade-off between price and agility.
- **Movement Type Trends:** Transfers dominate product movement (41 types, 1822 units), followed by adjustments and purchases. This indicates a dynamic inventory flow but also potential instability in demand forecasting.
- **Notification Load:** The system has generated 64 unread notifications, with frequent alerts for stock adjustments and low stock. This backlog may hinder timely decision-making and should be prioritized for review.

Strategic Recommendations

- **Reevaluate Pricing for High-Movement, Low-Profit Items:** Products like Product 14 and Product 49 should undergo margin analysis. Consider renegotiating supplier terms or adjusting retail pricing to recover profitability.
- **Automate Reorder Triggers for Alert-Prone SKUs:** Implement dynamic reorder points for products with frequent alerts (e.g., Product 10, Product 15) using real-time sales velocity and safety stock buffers.
- **Optimize Warehouse Allocation:** Redistribute stock for unevenly held products (e.g., Product 1, Product 28) to balance availability and reduce inter-warehouse transfers.
- **Supplier Rationalization:** Prioritize suppliers with lower lead times (e.g., Supplier 3, Supplier 10) for fast-moving SKUs. For high-lead-time suppliers, build buffer stock or explore alternate vendors.
- **Clearance Strategy for Low Turnover, High Value Items:** Products like Product 3 and Product 45 should be targeted for bundling, discounts, or seasonal promotions to free up capital.
- **Dashboard & Alert Management**: Set up a real-time dashboard to monitor unread alerts, stock levels, and movement types. Assign roles for alert resolution to prevent backlog accumulation.