Final Year Design Project Showcase
Batch-2022
Year 2026

Department: Economics and Management Sciences Programme: BS Management Sciences	
1	**Project Title** Optimizing Supply Chain Performance through Food Waste Reduction: A Case Study of Metro Pakistan
2	**Project Idea** This project examines how food waste generated across Metro Pakistan's Ultra Fresh departments (Fruits & Vegetables, Fresh Fish, Meat, and Bakery) affects overall supply chain performance at its Safari Store in Karachi. Using waste records collected between October 2024 till September 2025, it explores the operational, procurement, and inventory-related factors that drive waste generation, identifies the products and departments responsible for the largest losses, and proposes practical, low-cost strategies to reduce waste while maintaining product freshness and service quality
3	**Process** The project employed a mixed-method research approach combining qualitative and quantitative techniques. Qualitatively, semi-structured interviews were conducted with department managers and operational staff, supported by direct site observations across the four Ultra Fresh departments to understand day-to-day receiving, storage, and handling practices. Quantitatively, one year of Metro Pakistan's internal waste records was analyzed using monthly trend analysis, descriptive statistics, and Pareto Analysis (the 80/20 principle) to determine item-wise waste contribution and to isolate the highest waste-generating products within each department. Combining these methods allowed the observed operational behaviors to be linked directly to statistically significant waste patterns, giving the recommendations a firmer empirical footing than either method could provide alone.
4	**Outcome** The study found that Fruits & Vegetables generated the highest volume of waste of the four departments, followed by Meat and then Bakery, while Fresh Fish recorded the lowest levels of waste. Across departments, waste was traced primarily to product perishability, inaccurate demand forecasting, weak inventory control, poor receiving quality, overproduction, short shelf life, sensitivity within the cold chain, and slow-moving stock keeping units. Based on these findings, the research put forward a set of operational recommendations, including improved demand forecasting, stronger inventory management, more disciplined FIFO implementation, tighter receiving quality inspection, optimized order quantities, enhanced cold chain monitoring, better production planning, technology-driven monitoring tools, closer supplier coordination, and a shift toward data-driven decision-making across the Ultra Fresh departments.
5	**Evidence (Theoretical Basis)**

	This study analyzes food waste generated in the Ultra-Fresh departments (Fruits & Vegetables, Meat, Bakery, and Fresh Fish) at METRO Pakistan's Safari Store using a mixed-method approach. Historical waste records (October 2024–September 2025), interviews, and operational observations were used to identify major waste contributors and operational challenges. The study found that Fruits & Vegetables accounted for the highest share of food waste due to perishability, forecasting inaccuracies, inventory management issues, and handling practices. Based on the findings, practical recommendations were proposed to improve demand forecasting, inventory control, cold chain management, and operational processes, supporting both cost efficiency and sustainable retail operations.	
6	**Competitive Advantage or Unique Selling Proposition**	
a	**Attainment of any SDG** SDG 12 – Responsible Consumption and Production The study supports SDG 12 by identifying operational causes of food waste and recommending data-driven strategies to reduce waste, improve resource utilization, and promote sustainable retail practices within the food supply chain.	
b	**Any Environmental Aspect** Reducing food waste can lower unnecessary disposal of edible products, minimize resource wastage, and contribute towards reducing the environmental impact associated with food production, transportation, and disposal.	
c	**Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process** The study identifies operational improvements in demand forecasting, inventory management, FIFO implementation, receiving quality checks, and cold chain monitoring. These recommendations are intended to reduce food waste, improve inventory turnover, and enhance overall supply chain efficiency in the Ultra-Fresh departments.	
d	**Any Other Aspect** The project provides a data-driven framework that can help retail organizations identify high-waste products, prioritize operational improvements, and support evidence-based decision making for sustainable supply chain management	
7	**Target Market** The primary beneficiaries of this study are modern food retailers and supermarket chains that manage perishable inventory, including departments dealing with fruits & vegetables, meat, bakery, and fresh fish. The findings are also relevant to supply chain managers, inventory planners, category managers, retail operations teams, and organizations seeking to improve sustainability and reduce food waste in retail operations.	
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11	**Video (If any)**	N/A