MEASI
Institute *of* Management

APPLIED OPERATIONS RESEARCH-434C2A
CASE STUDY
Case study I
Optimizing Student Room Allocation: A Case Study Approach

BACKGROUND

In a reputed college, the administration faces a strategic challenge in allocating rooms for six elective specializations—Finance, Marketing, Human Resource Management, Systems, Hospital Management, and Logistics Management. Each of the available lecture halls—LH1, LH4, LH5, LH6, LH7, and LH8—possesses unique attributes such as superior acoustics, modern seating, advanced technology, ambient lighting, or proximity to major facilities. Acknowledging the importance of these features, students were asked to rank the lecture halls based on their preferences. The collected preferences showed a high degree of variation: while Finance students strongly favoured LH4 and LH8, Marketing and Logistics Management students prioritized LH7 and LH5. HR students leaned towards LH7 and LH1, whereas Systems students preferred LH1 and LH5. Hospital Management students displayed a more evenly distributed ranking pattern, with LH4, LH1, and LH5 emerging as top choices. These varied preferences indicate that students' choices are influenced not only by physical infrastructure but also by perceptions of comfort, convenience, and academic suitability. As room availability is limited and several electives overlap in their time schedules, the administration must navigate conflicting choices while ensuring fairness, transparency, and satisfaction among students.The college administration now faces the complex task of designing a fair and efficient room allocation system that balances demand, room capacity, and students' ranked choices. Conflicts arise particularly when multiple departments

select the same lecture halls as their top preference—for instance, LH4 is highly preferred by Finance and Hospital Management students, while LH7 is strongly demanded by both Marketing and HR groups. Such overlaps could lead to dissatisfaction, requiring administrators to consider systematic strategies such as weighted preference scoring, rotational allocation, or hybrid decision models that integrate student choice with institutional priorities. This situation offers a practical learning opportunity to analyze how preference-based decisions are made in real institutional settings and how conflicts can be resolved through structured negotiation and rational planning. By examining this scenario, students can understand how unique room features influence academic experiences and evaluate the challenges administrators face in managing limited resources. The case encourages reflective thinking on designing equitable allocation mechanisms that optimize satisfaction while maintaining operational clarity.

Questions

1. How can the administration design a transparent and equitable allocation model when multiple groups compete for the same preferred lecture halls?
2. What strategies can be implemented to balance student satisfaction with institutional constraints in a high-demand room allocation scenario?

MEASI
Institute *of* Management

Case study II

Case Study: Optimizing Supply Chain Operations at Techno Electronics Pvt. Ltd.

BACKGROUND

Techno Electronics Pvt. Ltd., a fast-growing manufacturer of consumer electronic products such as mobile phones, televisions, and home appliances, has recently experienced operational challenges due to rising market demand. While the surge in demand reflects strong brand acceptance, it has exposed inefficiencies in the company's supply chain operations. Delays in production scheduling, high inventory carrying costs, and escalating transportation expenses have disrupted timely product delivery. To address these issues holistically, the management has decided to adopt Operations Research (OR) techniques to modernize and optimize its supply chain activities. The organization has collected critical data such as periodic demand forecasts, manufacturing capacities, production costs, transportation routes, logistics expenses, and inventory holding charges. The goal is to apply OR methodologies—specifically linear programming, network optimization, and inventory control—to redesign key functions including production planning, inventory management, and transportation scheduling. By doing so, Techno Electronics aims to maximize production efficiency, minimize waste, reduce operational bottlenecks, and ensure consistent product availability across regional markets.The case presents a realistic environment where strategic decision-making must be supported by quantitative models. OR-based production planning can help allocate limited machine hours, labour, and production lines across various product categories to meet forecasted demand without exceeding capacity constraints. Inventory models such as Economic Order Quantity (EOQ) and safety stock analysis

can help determine optimal reorder points, balance stockout risks, and reduce excess inventory costs. Similarly, transportation optimization models can minimize logistics expenses by determining the most cost-efficient routes and shipment quantities between manufacturing plants and warehouses. A major challenge lies in integrating these optimization models into a cohesive end-to-end system. Trade-offs arise between production efficiency, service levels, and total logistics costs, requiring management to carefully evaluate the best combination of decisions. Sensitivity analysis becomes crucial in understanding how uncertainties—such as fluctuating demand, changes in production costs, or rising fuel prices—may influence outcomes. Ultimately, the case emphasizes the practical relevance of Operations Research in designing resilient, cost-effective, and customer-responsive supply chains.

Questions

1. How can integrating production planning, inventory optimization, and transportation modelling help Techno Electronics achieve a balanced and cost-efficient supply chain while minimizing operational risks?
2. What challenges might the company face when implementing OR-based optimization models, and how can sensitivity analysis assist in improving the robustness of these decisions?