IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, February 2026
Impact Factor: 8.2

Systematic and Scientific Role of Operations Research in Industry for Managerial Decision-Making Optimization

Md. Sabir Ahamad[1] and Nitish Kumar Bharadwaj[2]
Assistant Professor (Guest), Department of Mathematics, S.N.S.R.K.S. College, Saharsa, Bihar, India[1]
Assistant Professor (Guest), Department of Mathematics, M.A.M. College, Naugachia, Bhagalpur, Bihar, India[2]
ORCID: 0000-0003-4112-6657
ahamadsabir6637@gmail.com and nkbmamc@gmail.com

Abstract: *In an era of globalization, technological disruption, and intense competitive pressure, industrial organizations are compelled to make complex managerial decisions under conditions of uncertainty and limited resources. Traditional intuition-based decision-making is increasingly inadequate for addressing large-scale, multi-criteria industrial problems. Operations Research (OR) provides a systematic and scientific framework that enables managers to analyze complex systems, optimize resource allocation, and improve operational efficiency through quantitative modeling and analytical techniques.*

This paper presents, a comprehensive review of the systematic and scientific role of Operations Research in industrial managerial decision-making. It examines the evolution of OR as an academic and applied discipline, outlines its methodological foundations, and discusses key techniques such as linear programming, simulation, queuing theory, transportation models, and project management tools (PERT/CPM). The paper further highlights the integration of OR with computing technologies and its expanding applications across manufacturing, logistics, healthcare, agriculture, transportation, and public-sector planning. Challenges related to data quality, computational complexity, and implementation are critically discussed.

By synthesizing classical OR methodologies with contemporary industrial requirements, this study demonstrates how Operations Research supports evidence-based, economically efficient, and strategically aligned managerial decisions. The paper concludes by identifying future research directions emphasizing scalability, decision-making under uncertainty, and integration with advanced analytics and artificial intelligence.

Keywords: Operations Research; Industrial Optimization; Managerial Decision-Making; Quantitative Models; Simulation and Queuing Theory; Project Management

DOI: 10.48175/IJARSCT-31213