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A Review on Relation Between Operation Research and Different Field of Sciences

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Abstract: Operations research (OR) is the discipline of applying advanced analytical methods to help make better decisions. By using techniques such as mathematical modeling to analyze complex situations. OR has enhanced organizations and experiences all around us. From better scheduling of airline crews to the design of waiting lines at Disney theme parks. OR is the interdisciplinary mathematical science, now a days OR are very useful in different ways like in project designing, mathematical modeling, statistical analysis and industrial engineering. In this article we review various paper and then define relation between OR and other branch of sciences.

Keywords: Industrial engineering, Logistic, Management science, Operation research, Economics

I. INTRODUCTION

An operation research (OR), is an interdisciplinary mathematical science that focuses on the effective use of technology by organizations. OR has been defined as "the application of the methods of science to complex problems arising in the direction and management of large systems of men, machines, materials and money in industry, business, government and defense". Employing techniques from other mathematical sciences such as mathematical modeling, statistical analysis, and mathematical optimization operations research arrives at optimal or near-optimal solutions to complex decision-making problems [1]. Because of its emphasis on human-technology interaction and because of its focus on practical applications, operations research has overlap with other disciplines, notably industrial engineering and management science, and draws on psychology and organization science. Work in operational research and management science may be characterized as one of three categories:

A. Fundamental or foundational work takes place in three mathematical disciplines: probability, optimization, and dynamical systems theory.
B. Modeling work is concerned with the construction of models, analyzing them mathematically, implementing them on computers, solving them using software tools, and assessing their effectiveness with data. This level is mainly instrumental, and driven mainly by statistics and econometrics.
C. Application work in operational research, like other engineering and economics' disciplines, attempts to use models to make a practical impact on real-world problems.

The major subdisciplines in modern operational research, as identified by the journal *Operations Research* are computing and information technologies, decision analysis, environment, energy, and natural resources, financial engineering.

II. RELATION BETWEEN OPERATION RESEARCH AND DIFFERENT FIELD OF SCIENCES

A. Operation research and Industrial Engineering

A concept of the present and future scopes and limitations of professional activity in these fields; as well as upon an evaluation of what academic disciplines provide the most suitable preparation for the respective professional activities. This study examines these subjects and concludes that educational programs for these professions should have much in common and that, although a wide variety of quite different types of educational experience can provide the basis for professional work in industrial engineering and in operations research, these educational programs should emphasize the system management [2].

B. Operation research and Economics

The interconnection between economics and operations research in game theory can be illustrated by the Averch-Johnson hypothesis [3]. This hypothesis states that regulated firms have a bias to over investing in capital rather than labor. Economics as a subject has been explored and developed for centuries. The field used to be called political economy, reflecting its public policy orientation, which carries through to today. The subject areas of economics can be defined broadly as follows: macroeconomics, the study of economic aggregates and microeconomics, the study of economic agents, such as firms, and the market structures within which these agents operate to optimize their utility or profits. Examples of markets include monopolies, oligopolies, and perfect competition. Economists also develop tools such as the statistical techniques of econometrics, which are used for estimating the parameters of economic models. . Henderson [4] and Land [5] successfully built models of coal markets

using this approach. Only recently have databases, computers and algorithms progressed to the point where these ideas can be realized for economy-wide models. Policy models almost always include econometric components as well.. In econometric models of production one measures the inputs and outputs to statistically estimate the parameters of a production function. Optimization models have come to play an important role in determining the mix of assets in a portfolio. Because of the ability to solve far larger linear programs than in the past, stochastic programming models for building portfolios have made an important mark in the industry.

C. Operation research and Logistic

This study discusses the relation between logistics and operations research. By referring to an example of location analysis, this article shows that OR contributes significantly to solving logistics problems. Logistics is defined as "the process of strategically managing the acquisition, movement and storage of materials, parts and finished inventory (and related information flows) through an organization and its marketing channels to fulfill orders most cost-effectively."1 Thus, logistics aims at managing operations, such as material supply, transportation, storage, inventory control, production, distribu tion, service of clients, and waste handling. "Managing" inclu des, of course, optimizing (or, at least, better organizing) the design, planning and control of logistics systems.

D. Operation research and Management Science

OR is often equated with management science (MS), although their development and classes of problems covered do not match exactly. Indeed, MS has its origins in developments concerning management of industrial systems in the second half of 19th and beginning of 20th century. OR is frequently associated with quantitative models (e.g., for resource allocation problems). MS often associated with qualitative solutions for other problems (e.g., personnel development). Leaving aside such rather minor differences, OR and MS (often written together as OR/MS) may be considered as the science of decision-making and systems management

III. CONCLUSION

OR is a technique that includes mathematical program ming, heuristics, multi-criteria and multi-objective techniques, and network algorithms. The techniques have been used to find optimal routes for harmful materials or optimal locations of facilities causing environmental concerns. The models developed simultaneously consider environmental impacts and technical or economic aspects of supply chains. By using this tool we find solution very fast. The impacts of environmental regulation on industry decisions in general and on site selection decisions in particular have increased significantly in recent years and reviewed in several case studies OR have been very useful.

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