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A BRIEF EXPLANGATION ABOUT OPERATION RESEARCH

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Abstract

Operation research is one of the branches of mathematics that can enable people in numerous approaches by imparting medical technique to their actual life problems. It is no exception. Its roots are as old as science and society. The roots of operation research extend to even early 1800s. It is one of the branches of mathematics that can enable people in numerous approaches by imparting medical technique to their actual life problems. In 1950 operation research was introduced as a subject of academy study in American universities. Today the impact of operation research can be felt in many areas. This can be seen by the ever-increasing number of educational institutions offering the subject at degree level. Operation activities have spread to diverse fields such as hospitals, libraries, city planning, transportation system, crime investigation etc. Some of the Indian organization using operation technique like Indian Airlines, Railways, Defense Organization, Delhi cloth mills etc.

Keywords: Operation Research; Queuing Theory; Decision Making, Optimization,Simulation.

Introduction

Operations Research is an interdisciplinary branch of applied mathematics and formal science which makes use of strategies like mathematical modelling, algorithms, statistics and statistics to attain most reliable or near most beneficial answers to complicated conditions. Operations Research has also become an integral part of the Industrial Engineering profession. Operation research started just before World War II in Britain with the establishment of teams of scientists to study the strategic and tactical problems involved in military operations. The objective was to find the most effective utilization of limited military resources by the use of quantitative techniques. Operation Research is a relatively new discipline. The contents and the boundaries of the OR are not yet fixed. Operations Research tools are not from any one discipline. Operations Research takes tools from different discipline such as mathematics, statistics, economics, psychology, engineering etc. and combines these tools to make a new set of knowledge for decision making. Today, Operation research became a professional discipline which deals with the application of scientific methods for making decision. The main purpose of Operation research is to provide a rational basis for decisions making in the absence of complete information.

History of Operation Research

Operation Research is a relatively new discipline. Whereas 70 years ago it would have been possible to study mathematics, physics or engineering at university it would not have been possible to study Operation Research. It was really only in the late 1930's that operational research began in a systematic fashion, and it started in the UK.

Now a days, almost every organization in all countries has staff applying operations research, and the use of operations research in government has spread from military to wide variety of departments at all levels. The growth of operations research has not limited to the U.S.A. and U.K., it has reached many countries of the world. India was one the few first countries who started using operations research. In India, Regional Research Laboratory located at Hyderabad was the first Operations Research unit established during 1949. At the same time another unit was set up in Défense Science Laboratory to solve the Stores, Purchase and Planning Problems. In 1953, Operations Research unit was established in Indian Statistical Institute, Calcutta, with the objective of using Operations Research methods in National Planning and Survey. In 1955, Operations Research Society of India was formed, which is one of the first members of International Federation of Operations Research societies. Today Operations Research is a popular subject in management institutes and schools of mathematics.

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Scope of Operation Research

Objective of Operation Research

1) Decision making and improves the quality.
2) Identify optimum solution.
3) Integrating the systems.
4) Improve the objectivity of analysis.
5) Minimize the cost and maximize the profit.
6) Improve the productivity.
7) Success in competition and market leadership.

Characteristics of Operation Research

1) **Optimization:** The purpose of operation research is to achieve the best performance under the given circumstances. Optimization also involves comparing and narrowing down potential options.
2) **Simulation:**This involves building models or replication in order to try out and test solutions before applying them.
3) **Probability And Statistics:** This includes using mathematical algorithm and data to uncover helpful insight and risks, make reliable prediction and test possible solutions.

Methodology Of Operation Research

1) Formulating the problem.
2) Constructing a model to represent the system under study.
3) Deriving a solution from the model.
4) Testing the model, the solution derived from it.
5) Establishing controls over the solution.
6) Implementation

Tools And Techniques of Operation Research

1. Inventory Control Models
2. Queuing Theory
3. Replacement Models
4. Allocation Models
5. Competitive Strategies
6. Linear Programming Techniques
7. Sequencing Models
8. Simulation Models
9. Network Models
10. Game theory

Operation Research in the Real World

1)Assignment: assigning Uber drivers to customers
2)Scheduling: scheduling multiple TV shows together to achieve the maximum views possible

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3)Financial Engineering: asset allocation, risk management, derivatives pricing, portfolio management, etc.
4)Smart Bidding: on YouTube, the automated bidding system for algorithmic advertisement (determining how much incremental value can be attributed to a particular impression and how much we should pay for it.
5)Pricing Science: airline ticket pricing
6)Routing: master planning the routes of buses so that as few buses are needed as possible
7)Facility Location: - deciding the most appropriate location for new facilities such as warehouse, factory or fire station
8)Network Optimization: packet routing

Conclusion

This paper provides an overview of operations research, its origins, its approach to solving problems, and some examples of successful applications. From the standpoint of an industrial engineer, O.R. is a tool that can do a great deal to improve productivity. It should be emphasized that O.R. is neither esoteric nor impractical, and the interested I.E., is urged to study this topic further for its techniques as well as its applications.

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