

INTRODUCTION TO OPERATIONS RESEARCH

Subject: OPERATIONS RESEARCH

Semester :III

Department of M.B.A

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Operations Research is relatively a new discipline, which originated in World War II, and became very popular throughout the world. India is one of the few first countries in the world who started using operations research. Operations Research is used successfully not only in military/army operations but also in business, government and industry. Now a day's operations research is almost used in all the fields.

Operations research is concerned with finding solutions to complex problems and scenarios. Modeling techniques and algorithms are expansively used.

Operations research primarily is all about the maxima and the minima functions. Using these, an organization attempts to maximize its output, turnover and profits and minimize its losses and risks.

1. Operation research is a scientific method of providing executive departments with a quantities basis for decisions regarding the operations under their control”.
2. “Operation research is concerned with scientifically deciding how best to design and operate man machine systems usually under conditions requiring the allocation of & care resources”. O.R. Society of America
3. “Operation research is a scientific approach to problem solving for executive management”. H.M. Warner
4. “O.R is the application of scientific method by interdisciplinary teams to problems involving the control of organized (men-machines) systems so as to provide solution which best serve the purpose of the organisation as a whole”.

The tools for operations search is provided from the subject's viz. economics, engineering, mathematics, statistics, psychology, etc., which helps to choose possible alternative courses of action. The operations research tool/techniques include linear programming, non-linear programming, dynamic programming, integer programming, Markov process, queuing theory, etc.

Marketing:

- (i) Advertising budget allocation.
- (ii) Product introduction timing.
- (iii) Selection of advertising media.
- (iv) Selection of product mix.
- (v) Customer's preference of size, colour and packaging of various products.

Finance:

- (i) Capital requirements, cash flow analysis.
- (ii) Credit policies, credit risks etc.
- (iii) Investment decision.
- (iv) Profit plan for the company.

Research and Development:

- (i) Product introduction planning.
- (ii) Control of R&D projects.
- (iii) Determination of areas for research and development.
- (iv) Selection of projects and preparation of their budgets.

Allocation and Distribution in Projects:

- (i) Optimal allocation of resources such as men materials machines, time and money to projects.
- (ii) Determination and deployment of proper workforce.
- (iii) Project scheduling, monitoring and control.

Production and Facilities Planning:

- (i) Factory size and location decision.
- (ii) Estimation of number of facilities required.

Organization Behaviour:

- (i) Selection of personnel, determination of retirement age and skills.
- (ii) Recruitment policies and assignment of jobs.
- (iii) Recruitment of employees.
- (iv) Scheduling of training programs.

Tools of Operation Research

Linear programming.

Waiting line theory or queuing theory.

Inventory control models.

Network Analysis.

Dynamic programming.

Assignment problems.

Decision theory.

Integer Programming.

Transportation Problems.

Simulation.

Goal Programming.

Networking.

Markov Analysis.

Game Theory.

Stages of Development of Operations Research The stages of development of O.R. are also known as phases and process of O.R, which has six important steps.

These six steps are arranged in the following order:

Step I: Observe the problem environment

Step II: Analyze and define the problem

Step III: Develop a model

Step IV: Select appropriate data input

Step V: Provide a solution and test its reasonableness

Step VI: Implement the solution

Limitations of Operations Research

1. Distance between O.R. specialist and Manager: Operations Researchers job needs a mathematician or statistician, who might not be aware of the business problems. Similarly, a manager is unable to understand the complex nature of Operations Research. Thus there is a big gap between the two personnel.
2. Magnitude of Calculations are enormous which can be handled only by machines.
3. Operations research models is very expensive
4. When all the factors related to a problem can be quantifiable only then operations research provides solution otherwise not but the non-quantifiable factors are not incorporated in O.R.
5. Complexities of human relations and behavior makes implementation of OR difficult.

Operations Research is relatively a new discipline, which originated in World War II, and became very popular throughout the world. India is one of the few first countries in the world who started using operations research. Operations Research is used successfully not only in military/army operations but also in business, government and industry. Now a day's operations research is almost used in all the fields. Proposing a definition to the operations research is a difficult one, because its boundary and content are not fixed. The tools for operations search is provided from the subject's viz. economics, engineering, mathematics, statistics, psychology, etc., which helps to choose possible alternative courses of action.

The operations research tool/techniques include linear programming, non-linear programming, dynamic programming, integer programming, Markov process, queuing theory, etc. Operations Research has a number of applications. Similarly it has a number of limitations, which is basically related to the time, money, and the problem involves in the model building. Day-by day operations research gaining acceptance because it improve decision making effectiveness of the managers. Almost all the areas of business use the operations research for decision making.