OPERATION RESEARCH

B.B.A -4th sem

Meaning and Definition of Operation Research:

- It is the method of analysis by which management receives aid for their decisions. Though the name of this method, Operation Research (O.R.) is relatively new, but the method used for this is not a new one. Operation Research is concerned with the application of the principles and the methods of science to the problems of strategy.

The subject of operation research was born during Second World War in U.K., and was used for military strategy. During World War II, a group of scientists, having representatives from mathematics, statistics, physical and social sciences were entrusted to the study of various military operations. This team was very successful and greatly contributed to the meticulous handling of entire operation and related problems of the operation.

- The operation research can be defined as:
- *Definitions:*

- (i) It is the application of scientific methods, techniques and tools to problems involving the operations of a system so as to provide those in the

control of the system with optimum solutions to the problems.

- ii) Operation Research is a tool for taking decisions which searches for the optimum results in parity with the overall objectives and constraints of the organisation.
- (iii) O.R. is a scientific method of providing executive department with a quantitative basis of decisions regarding the operations under their control.
- (iv) O.R. is a scientific approach to problem solving for management.
- (v) O.R. is an aid for executive in making his decisions by providing him with the needed quantitative information's based on the scientific method of analysis.
- Operations research (OR) is an analytical method of problem-solving and decision-making that is useful in the management of organizations. In operations research, problems are broken down into basic components and then solved in defined steps by mathematical analysis.
- The process of operations research can be broadly broken down into the following steps:
- Identifying a problem that needs to be solved.
- Constructing a model around the problem that resembles the real world and variables.

- Using the model to derive solutions to the problem.
- Testing each solution on the model and analyzing its success.
- Implementing the solution to the actual problem.

- Disciplines that are similar to, or overlap with, operations research include statistical analysis, management science, game theory, optimization theory, artificial intelligence and network analysis. All of these techniques have the goal of solving complex problems and improving quantitative decisions.

The concept of operations research arose during World War II by military planners. After the war, the techniques used in their operations research were applied to addressing problems in business, the government and society.

Characteristics of operations research

There are three primary characteristics of all operations research efforts:

1. Optimization- The purpose of operations 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 replications in order to try out and test solutions before applying them.
3. Probability and statistics- This includes using mathematical algorithms and data to uncover helpful insights and risks, make reliable predictions and test possible solutions.

Importance of operations research

The field of operations research provides a more powerful approach to decision making than ordinary software and data analytics tools. Employing operations research professionals can help companies achieve more complete datasets, consider all available options, predict all possible outcomes and estimate risk. Additionally, operations research can be tailored to specific business processes or use cases to determine which techniques are most appropriate to solve the problem.

Uses of operations research

Operations research can be applied to a variety of use cases, including:

- Scheduling and time management.
- Urban and agricultural planning.
- Enterprise resource planning (ERP) and supply chain management (SCM).

- Inventory management.
- Network optimization and engineering.
- Packet routing optimization.
- Risk management.