

Introduction to operation Research

Operation Research is a scientific approach to problem solving for executive decision making which requires the formulation of mathematical, economic & statistical models for decision and control problem to deal with situations arising out of risk and uncertainty.

In fact, decision & control problems in any organizations are more often related to certain daily operations such as, inventory control, production scheduling, manpower planning and distribution and maintenance.

* Origin and development of O.R.

The term O.R. was first coined in 1940 by McClasky and Taeften in a small town of U.K.

This new science came into existence in military context.

During world war II, military management called on scientists from various disciplines and organised them into teams to assist in solving strategic & tactical problems. i.e. to discuss, evolve & suggest ways and means to

improve the execution of various military projects.

By their joint efforts, experience & deliberations, they suggested certain approaches that showed remarkable progress.

This new approach to systematic & scientific study of the operations of the system was called the Operations Research or operational Research (O. R.)

Following the end of world war, the success of military teams attracted the attention of industrial managers who were seeking solutions to their complex executive - type problems.

In recent years, O.R. has an increasingly great impact on the management of organization.

* Advantages of O.R.

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1. Through a model the problem under consideration becomes controllable.
2. It provides some logical & systematic approach to the problem.
3. It indicates the limitations and scope of an activity.
4. It helps in incorporating tools that eliminates duplication of methods applied to solve any specific problem.
5. It helps in finding avenues for new resource and improvement in a system.
6. It provides economic description and explanation of operations of these system they represent.

Limitations of O.R.

1. Models are only attempt in understanding operations and should never be considered as absolute in any sense.
2. Validity of any model with regards to corresponding operations can only be verified by carrying out the experiment & observing relevant data characteristics.
3. Construction of model requires experts from various disciplines.

* Nature of O.R.

After tracing the process of establishment and growth of O.R.

we can consider it as a source to other new sciences.

Literally, the word 'operation' may be defined as some action that we apply to some problems or hypotheses & the word 'research' is an organised process of seeking out facts about the same.

O.R. has been variously described as the "science of use",

"quantitative common sense",

"scientific approach to decision-making problem".

→ But only a few commonly used and widely accepted namely,

B

But

(1) O.R. is the art of giving bad answers to problems which otherwise have worse answers.

— T. L. Saaty

(2) O.R. is a scientific approach to problems solving for executive management
— H. M. Wagner

(3) O.R. is a scientific method of providing executive depts. with a quantitative basis for decisions under their control.

— P.M. Morse and C.E. Kimball

(4) O.R. is the application of scientific methods, techniques and tools to problems involving the operations of a system so as to provide those in control of the system with optimum solutions to the problem: — churchman

(5) O.R. is applied decision theory.

— D.W. Miller & M.K. Starr

* Features of O.R.

(a) Decision making:-

primarily, O.R. is addressed to managerial decision-making or problem solving.

A major premise of O.R. is that decision making.

(b) Scientific Approach:-

O.R. employs scientific methods for the purpose of solving problems.

It is a formalised process of reasoning.

(c) Objective:- O.R. attempts to locate the best or optimal solution to the problem under consideration,

For this purpose, it is necessary that a measure of effectiveness is defined which is based on the goals of the organisation.

This measure is then used as the basis to compare the alternative courses of action.

(d) Inter-disciplinary Team Approach:-

O.R. is inter-disciplinary in nature & requires a team approach to a solution of the problem.

Managerial problems have economic, physical, psychological, biological, sociological & engineering aspects.

This requires a blend of people with expertise in the areas of mathematics, statistics, engineering, economics, management, etc & so on.

(e) Digital computers:- Use of a digital computer has become an integral part of the O.R. approach to decision-making