

Operational Research: A Study of Decision Making Process

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Abstract—Decisions has to be taken in this complex world. Making a decision solely on a single criterion appears insufficient in which the decision making process deals with complex organizational environment. It is impossible to squeeze the complexity of opinions, motivations and the goals found in organizations into a single objective. Therefore, decisions may involve several objectives that are conflicting in nature. Decision maker may be an individual or a group of individuals. The presence of several criteria which are wholly or partially contradictory in nature leads to the development of multi-criteria decision making problems or multi-criteria optimization problems. Therefore, decision making is a multi criteria optimization. Some time decision are analytical and it requires the data. Operational research is only the means of taking the decision and provides the data to manager to take the appropriate and valid decision. The managers use this quantitative data for taking the decisions and find out the better decision. Hence, it is used to solve complex problems. In operations research, problems are broken down into basic components and then solved in defined steps by mathematical analysis.

Keywords—Decision Making, complex, problems, operational research, optimization

Introduction

Operations research provides the data to analyst to take the decision and means to apply scientific, systematic, technical and mathematical methods for taking the appropriate decision and solve the problem. OR does not provide decisions it only present quantitative data to the managers. The managers use this quantitative data for taking the decisions and find out the better decision. Hence, it is used to solve complex problems. OR helps to take decisions about operation and production

Operations research (OR) is an analytical, logical and systematic method of problem-solving and decision-making that is helpful in the management of organizations. In operations research, problems are broken down into basic components and then solved in defined steps by mathematical analysis. Analytical methods used in OR include mathematical logic, simulation, network analysis, queuing theory and game theory etc.

Meaning and definition

It is the combination of two terms Operational + Research

Operational:- working as in order, ready for use

Research:- the systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions.

Operational Research :-the application of scientific and mathematical techniques to the study and analysis of problems is called operational research which provide us the data to take the decision.

Achievement by Using of Operational Research

Forecasting and Scheduling:- OR Methods and models provide data to airlines vehicles in supply chains, orders in a factory and of operating theatres in a hospital to take the decision.

Capacity planning and facility planning:- computer simulations of airports for the rapid and safe processing of travelers, improving appointments systems for medical practice.

Planning and developing: OR recognize the possible future developments in telecommunications and help in deciding how much capacity and competence is needed in a business.

Capitulate management:- OR helps in setting the cost of airlines space and seat and hotel rooms. So that changes can take place as per demand and probable risk can be taken by the producer

Credit scoring: OR Helps to the finance company to decided about customers and offer the best prospects for credit companies.

Sales promotion:- OR helps in evaluate and estimate the value of sale promotions, marketing finding developing customer profiles and computing the life-time value of a customer.

Advantages of Operations Research in Decision Making

Efficient Control:

The management of organizations recognizes that it is a complicated and expensive issue that why it needs proper supervision and control and to execute in the organization it needs continuous executive supervision to every routine work. An O.R. approach may provide the manager an analytical, logical and

quantitative basis to identify the area of problem. The major area in this category is production, manufacturing and construction scheduling and inventory replacement.

Effective Systems:

Operational research techniques are to analyze the problem of decision making such as good site for plant, whether to open a new storehouse, etc. It also helps in assortment of cost-effective means of transportation, jobs sequencing, production scheduling, replacement of old machinery, etc.

Better and Analytical Decisions

Operational Research Techniques and models helpful to make the better decisions and diminish the risk of making flawed decisions. These methodology gives the executive an better foresight how to makes the decisions.

Good Co-ordination and Management

An operations-research-oriented techniques are useful for an effective and efficient planning model that helps in co-coordinating relationship between the different divisions of a company.

Maximize profits & Minimize Losses

The operational Research techniques provide the quantitative data to take the decision which help the analyzer to take the appropriate decision which lead to maximize the profit and minimize the losses.

Limitations of Operations Research in decision making

Operated by Technical & Electronic Devices:

These days operational research techniques obtain an optimal solution using various computational systems, model and techniques. In this scenario, these factors are colossal and expressing them in quantity and establish the relationships among these require calculations that can only be handled by computers.

Solve only quantitative problems: O.R. techniques provide a solution only when all the elements related to a problem can be quantified. All relevant variables do not lend themselves to quantification. Factors that cannot be quantified find no place in O.R. models.

Widen the Gap between executive and Researcher: O.R. being specialist's job requires a mathematician or a statistician, who might not be aware of the business problems. Similarly, a manager fails to understand the complex working of O.R. Thus, there is a gap between the two.

More time and cost consuming: When the basic data are subjected to frequent changes, incorporating them into the O.R. models is a costly affair. Moreover, a fairly good solution at present may be more desirable than a perfect O.R. solution available after sometime.

Problem in execution and Implementation: Implementation of decisions is a delicate task. It must take into account the complexities of human relations and behavior

Role of Operations Research in decision Making

Operations research plays an important role in almost all areas of decision making. Some areas where operational research (OR) techniques can be used as listed below:

Financing and Investment Polices:

This category includes the analysis of credit and loan policy, fund flow and cash flow and also considers the dividend, share and bonus policy. It reflects the portfolio of investment too.

Selling, Promotion, Marketing & Publicity

It emphasis on selection of the product and timing which means what type of commodity should be manufactured at the proper passage of the time. It focuses on the media of publicity like print media and electronic media may be chosen. It also used to know about how many number of sales persons are required to some specific area. More over OR also use to select the product mixed which include product, price, place and promotions.

Acquisition, Investigation, Manufacturing and Personnel Management

The operational research techniques being used to purchase, substitute and reorganize the most advantageous policies. These techniques also include location and manufacturing size of retail outlets, factories and warehouses, loading and unloading facilities for trucks, allocation and scheduling of resources and optimum to merge the products, recruitment and selection of best suitable employee for a company and job assignments etc.

Research and Development

The methods currently available in literature for numerically solving operational research problems may be broadly classified as deterministic methods and probabilistic methods. The deterministic methods try to guarantee that a neighborhood of the solution of a problem is attained. Such methods do not use any stochastic techniques, but rely on a thorough search of the feasible domain. They are applicable, however, to a restricted class of problems only. On the other hand the probabilistic methods make use of probabilistic or stochastic approach to search for the solutions for the problems. Although probabilistic methods do not give an absolute guarantee of the exact solution having been obtained, these methods are sometimes preferred over the deterministic methods because they are applicable to wider class of problems. There does not exist any operational research technique which can say I am the best. Therefore there is always a need to investigate and

develop an operational research technique for better solution.

Scope of Operation Research in Decision Making

OR has used effectively in many area of research. The Operation Research may be considered as a tool which is employed to raise the efficiency of management decisions. Scientific method of OR is used to comprehend and explain the phenomena of operating system. It is useful in the following various important fields

In agriculture and cultivation

As we seen that the population is increasing day by day and resultant of it there is deficiency of groceries and every country of the world facing the problem of most favorable or best possible allocation of the land for their crops as it is requires by the climate conditions. Moreover the problem of water resources distribution and allotment for the same is also the problem of developing countries. So the operational research techniques provide the data to determine the policy and by effects of the policy proper action can take place in the better directions.

In Economy

It is vital need for every government to do a careful planning for the economic progress of the country. So that the country should be prepare to face the economic crisis by using the operational research methodology an institute can establish the profit plan. It is also apply to increase the per capital income by using the limited recourses. The replacement and alternate polices is depend on the OR techniques

In corporate house and business

As we know that experience makes the man perfect and the executives of the industry take the decision by using its past experience but at the age of retirement or due any reason he left the job the loss can be stumble upon by the organization. Thus apply the Operational techniques to the business an executive can take the right and appropriate decision about using the limited resources of land, labor, machinery, capital and other resources of the production

In promotion and selling of the product

OR techniques assist the marketing executives to take the decision about where they should sell their product, how they can transport the product at minimum cost. It also helps in decide about the price of the commodity, requirement of the stock as per the future demand of the product. By using the appropriate OR technique there can be proper choice of advertise media as per cost constraint. which type of media would be economical print or electronic media.

In human resources management

A personnel manager can make use of OR techniques to appoint the highly suitable and qualified human being on minimum salary, OR technique help to calculate the retirement age of the staff. Moreover OR Techniques help t in recruitment of person as per the requirement of the organization whether on contract basis or permanent basis, fulltime or seasonal working

In production and manufacturing

OR technique helps the production manger to calculate the size and how many items should be produced. It is helpful in scheduling and sequencing of the machine. OR methodology helps to choose the appropriate location of the plant, plant design etc.

In Life Insurance Plan and Premium.

OR approach is also applicable to facilitate the L.I.C offices to decideWhat should be the premium rates for a range of policies. How well the profits could be allocated in the cases of with profit policies?

Conclusion

At the conclusion point we can say that the operational research techniques are used to make the decision in the field of agriculture, production ,life insurance, finance and marketing, but it provides data to take the decision its depend upon human intellectual how to use this data to take the appropriate decision. In nutshell it is used in management. But its execution depends upon the mathematical models and calculations. Operational research technique helpful in better control, effective management, maximize the profit , minimize the loss etc. Optimization is the act of obtaining the best result under given circumstances. Therefore, it has been observed that decision making in operational research techniques is ability of choosing an efficient and less expensive alternative amongst a group of options which leads to optimization.

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