

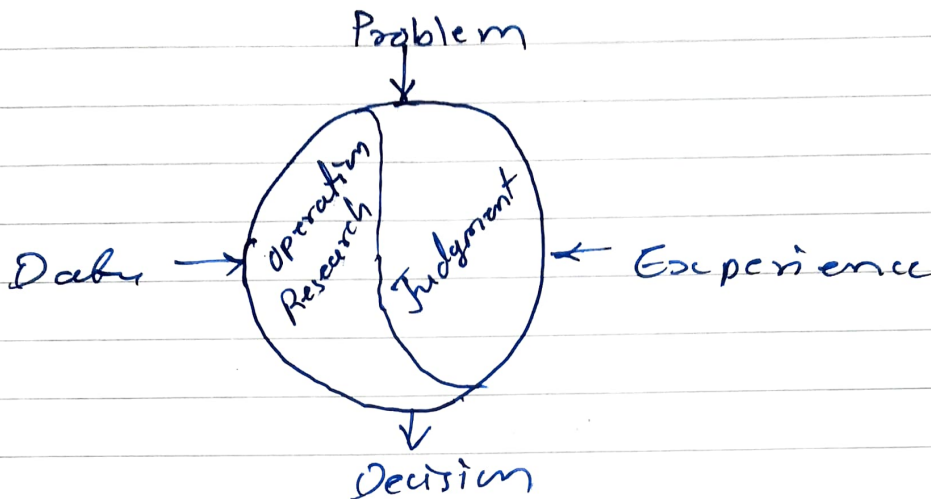
1. Basics of Operation Research

classmate

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* Decision Making!



* Historical Perspective of O.R.!

1.) Pre World War - II!

↳ 1885! Frederick W. Taylor - emphasized the application of scientific analysis in production.

↳ Henry L. Gantt - Job scheduling by time.

↳ 1915! F W Harris - Inventory control

↳ 1917! A K Erlang - telephonic traffic

2.) World War - II!

↳ 1945! "Research on Military Operations"

↳ The name OR!

- Operational Analysis
- System Analysis
- Benefit Analysis
- Management Science
- Decision Science.

3.) Post World War Development:

- ↳ mechanization
- ↳ automation
- ↳ decentralisation of operations
- ↳ division management function.
- ↳ complex managerial problems.
- ↳ managerial decision making became popular.

* O.R. in India:

- ↳ last phase of 2nd world war at the Air headquarters - Nuclear problem
- ↳ 1949 - Regional Research Laboratory, Hyderabad
- ↳ Ahmednagar Textile Research Association
- ↳ Defence Science Laboratory (DSL) by Prof. O.S. Kothari
- ↳ 1953 - Indian Statistical Inst., Kolkata by Prof. Mahalanobis.
- ↳ 1957 - O.R. Society of India (ORSI) - First Pass. Prof. Mahalanobis
- ↳ 1959 - 2nd conf. on OR at New Delhi by Int-Federation of OR Society (IFORS)
- ↳ 1968 - ORSI organized Annual conference since 1968.
- ↳ used in Planning Commission, Railways, Public sector undertakings; BHEL, SAIL, EIL, ONGC etc.

* OR Education in India:

- ↳ 1961-62 - IIM, A'bad & Kolkaty
- ↳ IIT, The Delhi Uni. offered full time master's degree course in OR (1963)
- ↳ ORSI - 1973 - Short term training programme.

* Growth of O.R. in Different Sectors in India:

↳ Industry:

- 1960
- Hindustan Unilever Ltd.
- Metal base company Ltd.
- Union Carbide (Ind) Ltd.
- L&T, TISCO, TELCO
- Fertilizer corp. India.

↳ Transportation:

- 1973
- Railways.

↳ Banking & Finance:

- 1969

↳ Agriculture:

• 1970

↳ Defence:

• 1959

↳ Energy:

• oil industry first uses.

↳ Health Care:

* OR Defined:

↳ 1962, Sept. - OR Society of UK

↳ H.M. Wagner:

Operation Research is a scientific approach to problem solving for executive management.

↳ Morse & Kimble:

OR is a scientific method of providing executive departments with a quantitative basis for decisions regarding the operations under their control.

↳ Clark:

OR is the art of winning wars without actually fighting them.

↳ O.R. Society of America:

O.R. is an experimental and applied science devoted to observing, understanding and predicting the behaviour of purposeful man-machine systems; and operations researchers are actively engaged in applying this knowledge to practical problems in business, government and society.

* Characteristics (or Features) of OR!

- 1.) Systems approach
- 2.) Inter-disciplinary Team approach
- 3.) Methodological Approach
- 4.) Operations Economy.

* Phases of OR!

- 1.) Judgement Phase
- 2.) Research Phase
- 3.) Action Phase.

* Models and Modeling in Operations Research!

a.) Classification of OR models!

- 1.) by degree of abstraction
- 2.) according to structure.
- 3.) by purpose
- 4.) by nature of the environment
- 5.) according to behaviour characteristic
- 6.) according to procedure of solution
- 7.)

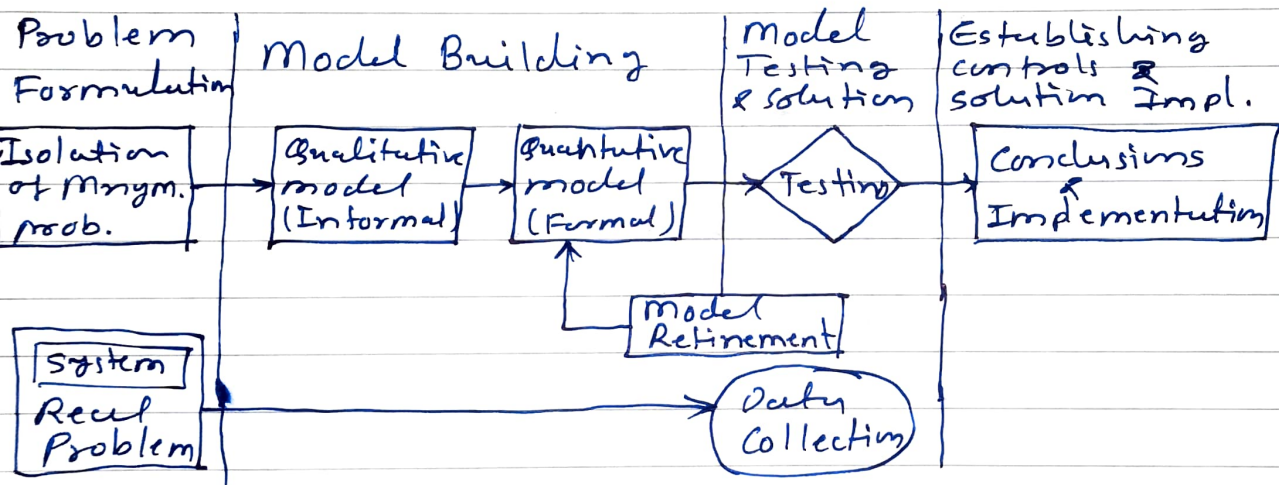
b.) Characteristic of Good Model.

- c.) Advantages & disadvantages of OR models
- d.) General methods for solving OR models

* The Methodology of Operations Research!

Steps in solving OR problems:

- 1.) Formulation and definition of the problem
- 2.) Construction of the model
- 3.) Solution of the model
- 4.) Testing the solution of the model
- 5.) Establishing controls over the solution
- 6.) Validation of the model
- 7.) Implementation of the results.



* Applications & Scope of O.R.! (May-2015, 14, Dec-12)

An O.R. workers is required

- i.) to minimize the input value for a specific output or/and
- ii.) to maximize the output value for a specific input or/and
- iii.) maximize some function of these values.

1.) In industry:

- ↳ Resource allocation
- ↳ Product mix decision
- ↳ Blending of raw materials

- ↳ Inventory control
- ↳ Loading problems
- ↳ Assignment problems
- ↳ Replacement problems
- ↳ Simulation of real problem / situation
- ↳ maintenance problems.

2.) Planning:

- ↳ Production planning
- ↳ Scheduling
- ↳ Sequencing
- ↳ Material control

3.) Public utilities:

- ↳ Transportation problem
- ↳ Queuing Problem

4.) Agriculture:

- ↳ Crop selection criterion
- ↳ Area selection criterion

5.) Management:

- ↳ Finance and accounting
- ↳ Marketing
- ↳ Advertising media selection
- ↳ Sales effort allocation & assignment
- ↳ Investment decision analysis
- ↳ Break-even analysis

6.) In defence :

- ↳ Weapon allocation
- ↳ Intelligence activities
- ↳ Administration activities
- ↳ training.

* Limitation of O.R. :

- 1.) Magnitude of computation
- 2.) Absence of quantification
- 3.) Conventional thinking
- 4.) Distance between managers & operation research
- 5.) Money & time costs
- 6.) Implementation.