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MAGDI BATATO AT NESTLÉ MALAYSIA (A): INTRODUCING TEAM-BASED PRODUCTION

HISTORY

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OR was formally established as a field of research about 60 years ago during the Second World War. The British army assembled a group of scientists headed by Professor PMS. Blackett, a physicist and a Nobel laureate, to investigate research into several complex problems. This group consisted of physicists, mathematicians, physiologists, engineers, army officers and others and were officially called 'Army Operational Research Group'. Unofficially, this group was known as 'Blackett's Circus'. Members of this group came from various disciplines and this proved to bring a multi-faceted approach to the solving of the complex problems facing the army such as the routing of convoys, logistic planning, submarine tracking and others. By developing effective methods of using the new tool of radar, this team was instrumental in winning the Air Battle of Britain. Though their research on how to better manage convoy and ambulance operations, they also played a major role in winning the Battle of the North Atlantic. Similar efforts assisted the Island Campaign in the Pacific.

When the war ended, the success of OR in the war effort spurred interest in applying OR outside the military as well. By the early 1950s, OR had been used in a variety of organizations in business, industry and government.

The increase in the use of computers further advanced the spread of Operations Research. In the 1950s Operations Research societies were established in England and in the United States. Operations Research was also made an academic discipline when it was first offered as a course in the Massachusetts Institute of Technology in 1948 and in the University of Birmingham in the early 1950s.

In the 1970s many winners of the Nobel Prize were due to their contributions to Operations Research. In this modern era, the usage of fifth generation computers will lead to the processing of information using complex models, application and simulations and thus Operations Research techniques will develop even further.

MODELS IN OR

Definition of Model

A model is a representation of a reality and can take the form of a graph, and can be physical or mathematical.

TYPES OF MODELS

1. **Iconic Model**
An iconic model uses exact physical representation and is best used for model development exercises. The construction of the model itself and the objects that represent it are more important than the model itself.

2. **Analogic Model**
Analogic models are used to represent a problem with the use of an analogy. The model is made of physical objects that are used to represent the problem. The model is made of physical objects that are used to represent the problem. The model is made of physical objects that are used to represent the problem.

3. **Simulation Model**
Simulation models are used to represent a problem with the use of a computer. The model is made of physical objects that are used to represent the problem. The model is made of physical objects that are used to represent the problem.

CHARACTERISTICS OF GOOD MODEL

The model should be:
1. Easy to understand
2. Easily manipulated
3. Included in it is a way to obtain a solution that is not reasonable
4. Complete in its structure
5. Easy to construct

DEFINITION OF OR (1)

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A technique for the management of man-machine systems that also helps the management of man-machine systems such as the management of resources in industry, business, government and defence. The way to overcome the problem is by building scientific models for the system that include factors such as risk and chance in order to have better decisions and strategies that can help managers and administrators to form policies and take action in a scientific manner.

Operations Research Society of the U.K.

DEFINITION OF OR (2)

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Operations Research is concerned with choosing the best way to make operational systems as efficient as possible using the use of linear techniques.

Operations Research Society of the U.K.

LESSON OUTCOMES:

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1. Define operations research
2. Identify the basic steps of operations research
3. Identify model in operations research and the characteristics of good models

INTER-DISCIPLINARY APPROACH

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Operations Research uses techniques and knowledge from various disciplines. This is based on the fact that a decision maker does not have all the information and expertise to understand all aspects of a problem facing an organization. Hence, a group of experts is formed who can solve various types of quantitative management problems. The group consists of mathematicians, statisticians, programmers, managers, behavioural scientists, etc. and discuss the real-life decision problem to produce a solution. If the solution is not satisfactory, the model is revised.

SCIENTIFIC METHODS

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Scientific method refers to any method that can be proved. The steps that are involved in solving a problem by the scientific method are as follows:

1. Define the problem and the observation method.
2. Observations are made in various situations to understand the problem environment.
3. A hypothesis is put forward based on the observations.
4. Experiments are designed to test the hypothesis.
5. Experiments are carried out, measurements taken and reported.
6. The conclusion is examined, the hypothesis is accepted or rejected.

STEPS IN OR

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1. Identify the problem
2. Build a mathematical model that represents the system under study
3. Test the model and obtain a solution.
4. Maintain the system.

DISCUSS IN PAIR

1. 'Operations Research' can be defined in many ways. Give a definition from what you understand of Operations Research.
2. What is the function of a model in decision making? Explain briefly 4 types of models. Give 4 characteristics of a good model.
3. Give 2 advantages of using Operations Research to solve problems.
4. How can Operations Research address management in decision making?
5. Model building is an important part of Operations Research. Name 2 types of models and give an example for each type of model.
6. Explain the meaning of 'Operations Research'.
7. Explain the steps involved in solving problems in Operations Research.

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MODELS IN OR

Definition of Model

A model is a representation of a reality and can take the form of a graph, and can be physical or mathematical.

TYPES OF MODELS

- 1. Iconic Model**
An iconic model is an exact physical representation and may be larger or smaller than what it represents. The characteristics of an iconic model are the objects that it represents are the same.
- 2. Analogic Model**
Analogic models use some set of physical measurements to represent another set of physical measurements. An analogic model may be in the form of a diagram such as a demand curve, histograms, etc.
- 3. Symbolic Model**
A symbolic or mathematical model represents a problem with the use of symbols. This model is frequently used in Operations Research. A symbolic or mathematical model represents a problem or the use of symbols. This model is frequently used in Operations Research.
- 4. Simulation Models**
Simulation models are used when the systems under study are complex and all of the model's correct attributes represent the systems.

CHARACTERISTICS OF GOOD MODEL

The model should be:

1. Easy to understand.
2. easily manipulated.
3. Robust or it is not easy to obtain a solution that is not reasonable.
4. Complete in its structure.
5. Easy to present.

DEFINITION OF OR

(1)

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A technique that uses mathematical sciences to solve complex problems that arise from the management of man-machine systems such as the management of resources in industry, business, government and defence. The way to overcome the problems is by building scientific models for the system that include factors such as risk and change in order to form forecast, decisions and strategies that can help managers and administrators to form policies and take action in a scientific manner.

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Operation Research Society of the U.K

DEFINITION OF OR (2)

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Operations Research is concerned with choosing the best way to handle man-machine system in a scientific manner usually with the use of limited resources.

Operation Research Society of the U.S



INTER-DISCIPLINARY APPROACH

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Operations Research uses techniques and knowledge from various disciplines. This is based on the fact that a decision maker does not have sufficient knowledge and expertise to understand all aspects of a problem facing an organisation. Hence, a group of experts is formed who can solve various types of quantitative management problems. This group consists of mathematicians, scientists, programmers, financiers, behavioural science experts and others. The multi-disciplinary approach to problem solving thus can lead to a more informed decision.

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STEPS IN OR

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Build a mathematical model
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Test the model and obtain a
solution.

Maintain the system.

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