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#### STRUCTURING BUSINESS PROBLEMS:

#### INTRODUCING MODEL-BASED PROBLEM SOLVING

#### **HISTORY** Thecasesolutions.com monly excellabled as a field of research sizes. (Or years agodistry the Second World Wort. The year-whited a years of secretics headed for Policipus PPAS, Balacett, a physicist and a Nobel or reseaglise research for Secretic content for Policipus PPAS, Balacett, a physicist and a Nobel or reseaglise research for Secretic content for Secretic PPAS, and the Secretic PPAS of Policipus PPAS, and the Secretic PPAS of Policipus PPAS, and the Secretic Georgia Peas PPAS of Policipus PPAS, and the Secretic Georgia PPAS of PPAS 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 Thecasesolutions.com Thecasesolutions.com The cases olutions con SCIENTIFIC METHODS STEPS IN OR Thecasesolutions.com Thecasesolutions.com Identify the problem 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: Build a mathematical model that represents the system Define the problem and the observation method. under study 2. Observations are made in various situations to understand

Test the model and obtain a

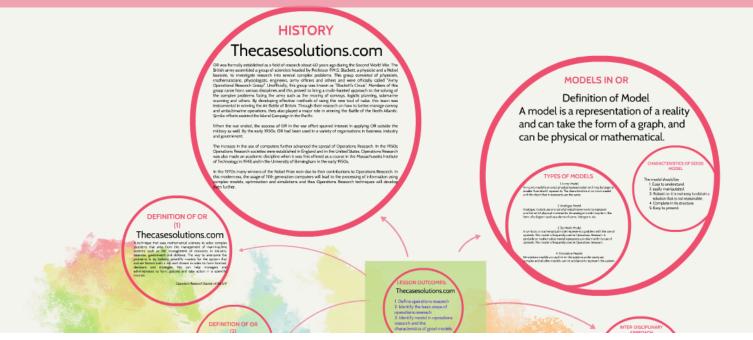
solution.

A hypothesis is put forward based on the observations.

Experiments are designed to test the hypothesis.
 Experiments are carried out, measurements taken and reported.
 The conclusion is examined, the hypothesis is accepted.

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# STRUCTURING BUSINESS PROBLEMS: INTRODUCING MODEL-BASED PROBLEM SOLVING



#### **LESSON OUTCOMES:**

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

#### **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 P.M.S. 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 moving of convoys, logistic planning, submarine scanning and others. By developing effective methods of using the new tool of radar, this team was instrumental in winning the Air Battle of Britain. Through their research on how to better manage convoy and antisubmarine 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 organisations 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 won 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, optimisation and simulations and thus Operations Research techniques will develop even further.

# 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 a risk and chance in order to form forecast, decisions and strategies. this can help managers and administrators to form policies and take action in a scientific manner.

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, behaviourial science experts and others. The multi-disciplinary approach to problem solving thus can lead to a more informed decision.

## 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:

- 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.
- The conclusion is examined, the hypothesis is accepted or rejected.



Identify the problem

Build a mathematical model that represents the system under study

Test the model and obtain a solution.

Maintain the system.