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BIBLE STUDIES

COURSE NAME:
(BIBLE STUDIES)

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(QUANTITATIVE METHODS)

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1.0 Introduction

The assumption that there is an increase level or degree of necessity in the theory and practice of management is said to be the quantitative approach. There are some factors which help or responsible for the development of quantitative approach and are; decision problems of management are so complex that only a conscious, systematic and scientifically based analysis can yield realistic action, availability of well-structured quantitative models and methods that are available for solving these complex managerial problems, attitude of accumulating scientific knowledge in the management of organizations, and also the availability of computer software to apply quantitative models to real-life problems.

Therefore, if those who make decisions are totally utilized the potentials quantitative models, then the decision problem be defined, analyzed and solved in a concision, rational, logical, systematic and scientific manner based on data, facts, information and logic and not on whims or guess.

1.1 The concept of the course

The concept of this course is to study; quantitative approach to decision making, theory and application of quantitative approach to decision making, fundamental probability, theory and application of fundamental probability, probability distributions and their theory and application, linear programming; applications and model formation.

1.2 Features of quantitative approach

The features or characteristics of quantitative approach have a very broad items being summarized as follows:

1.3 Interdisciplinary Approach

To deduce a solution to a problem by using this type of approach is very essential because interdisciplinary involves teamwork. This is so because since we attempt to solve a complicated or confusion management problem, only a person may not have full capacity or complete knowledge governing all the areas or aspects which may comprise, economics, political, psychological, social, etc. therefore one cannot be expected to find a satisfactorily solution or desirable answer to all managerial problems. Therefore, an individual come together as a team of specialists in different fields like; science, mathematics, statistics, economics, engineering, etc. this will enable each specialist gets a specific aspect to handle encouraging an appropriate and desirable solution to problem.

1.4 Scientific Approach

The scientific approach or method consists of making observations and defining the problem, as well as formulating and testing the hypothesis, analyzing the results of the test. The data that is being obtained is then used to find whether the hypothesis should be accepted or rejected. When the hypothesis is being accepted the results must be put into Implementation or else the alternative hypothesis should be formulated.

1.5 Holistic Approach

When getting at or arriving at a decision, a group of persons as team take into their hands to examine the relative importance of all the conflicting and multiple objectives. This also in either way examines the validity of claims of various departments of the organization from the perspective of its implications to the entire organization.

1.6 Objective oriented Approach

The quantitative approach seeks to obtain an optimal solution to the problem under analysis and for that matter a measure of effectiveness or desirability can be defined to be used comparing alternative courses of action with respect to their possible results.

1.7 Quantitative Approach to problem solving

There are some essential features of quantitative approach but the most important one is the use of the scientific method or approach and the building of decision models. Using this approach in solving problems can be based on three identified phases:

1.8 Judgement phase;

This particular phase also consists of some sections of phases as; identification of a real-life problem, selection of an appropriate objectives and values of various variables related to this objectives, application of the appropriate scale of measurement, that is to say, deciding or planning on the effectiveness or the desirability, and finally the formation of an appropriate model of a problem and the abstraction of the important or vital information, so that a decision to the decision-maker’s goals can be obtained.

1.9 Research phase

The largest and the longest of phase among all other phases is the research phase, but the other two phases are of equal important because they also provide basis for scientific research method. This helps in utilizing; observation and data collections for better understanding of the problem, formation of hypothesis and models, observation and experimentation to test the hypothesis on the basis of additional data, analysis of the available information and verification of the hypothesis using pre-established measures of desirability, predictions of various results or outcomes from the hypothesis, and finally generating of the outcome or result, taking into consideration the other alternative methods.

2.0 Action phase

The action phase is made up of recommendations making calling for the implementation of decision. The implementation of this decision can be done by an individual who deem fit for implementing results or outcomes. The individual should know or be aware of the environment in which the problem occurred, be aware of objective, of assumptions behind the problem and the required omissions of the model.

B.) Quantitative Analysis Process

There are some steps which cover the quantitative process analysis which are being discussed below:

2.1 Step 1 Defining the problem

This step or problem definition consists of how to identifying the problem or problems as well as understanding and describing in simple or precise terms of the problem that the organization is facing. The objectives to be achieved by the organization and other alternative courses of action can pass through the hands of experts or specialists to determine for the organization. The analysis can begin by using observations which detail into the organization's structure, climate, communication and control system, the organization's objectives and expectations. The information of such nature enhances examining the difficulty of the study in terms of cost, time and resource requirements, the success of study probability and among others.

Factors to take into consideration for problem formulation

1. Problem components
2. Decision environment
3. Alternative courses of action
4. Measure of effectiveness

2.2 Step 2 Collecting Data Constructing a Mathematical Model

When the problem is obviously identified and or defined what follows is to make collection of a required data and then formulate a mathematical model. Construction of model is made up of hypothesizing, relationships between variables subject to and not subject to control by decision-maker. With every decision problem model there are some components to be considered as;

1. Decision variables (controllable)

2. Exogenous variables (uncontrollable)
3. Objective function or performance measures
4. Policies and constraints or limitation
5. Functional relationships: in a decision problem, the decision variables in the objective function and in the constraints are connected by a specific functional relationship. A general decision problem model might take the form:

   Optimize (Max or Min.) $Z= f(x)$

   Subject to constraints $g_i(x)$ {≤,=,≥} b_i ; i=1,2,….m

   And $x \geq 0$

   Where, x =a vector of a decision variables ($x_1, x_2, \ldots\ldots x_n$)

   f(x) =criterion or objective function to be optimized

   $g_1(x)$ =the ith constraint

   b_i fixed amount of the ith resource.

A model is being referred to as linear model when all functional relationships among decision variables $x_1, x_2, \ldots x_n$ in f(x) and g(x) are of linear form but if one or more of the relationships are non-linear, then the model is called a non-linear model.

2.3 Step 3 Solving the Mathematical Model

When we are able to formulate the mathematical models what next is to deduce solutions of which numerical values will be obtained for the decision variables. To obtain the numerical values for these decision variables depends on specific mathematical model type or types, also solving the models demands the use of various mathematical tools or concepts and numerical procedures. Generally, there are two groups of methods are used for solving models:

a. Optimization Methods; these methods of optimization produce the best and or accurate values for the decision variables for both unconstrained and the constrained problems. With constrained problems their values are simultaneously satisfy all of the constraints and give an optimal and or acceptable value for the objective function or measure of effectiveness. The solution that is achieved is said to be the optimal solution to the problem.
b. Heuristic Methods; these methods produce values of the variables that help to satisfy all the constraints, however, not necessarily provide optimal solution, these values however, produce or provide an acceptable value for the objective function.

These methods are sometimes seen as or described as “rules of thumb which work” the commonest example of these methods is ‘stand in a shortest line’ but using this rule may not function or work if everybody in the shortest line demands extra time, generally, it is not something bad or bad rule to follow. In very complex models or time-consuming models we then employ these methods to obtain optimal solutions.

Inappropriate or lack of an appropriate methodology causes difficulties in problem solving and psychological perception on the part of the problem solver. The following are the various categories of major difficulties in problem solving;

a. Failure to identify or recognize the presence or existence of a problem; this is due to the fact that, some people tend to personalize problems, information is not received to signal that a problem exists, problems arise in contexts with which people have had no experience, and lack of objectives or standards.

b. Incorrect definition of a problem or failure to define the correct problem; thus, obvious problems are most often the symptoms of much deeper problems, the inability to indicate or identify correctly or accurately what is really happening or going on can also lead to inaccurate problem identification, in addition to that incorrect inference also may leads to inaccurate problem identification, attitudes and beliefs can blind the one solving the problem to the real causes of an undesirable situation, problems and their causes are over simplified, fixation on either a ‘world view’ or ‘functions’ provides too narrow scope.
c. Failure to use all available information; he who is solving the problem fails to seek out information, the existence of perceptual blocks to thinking.
d. Failure to recognize or question assumptions; thus, it may be assumed that there is a solution to every problem and also, sometimes rigid thinking brings limitations on one’s point of view.
e. Failure to consider a wide range of alternatives; here problem definition is limited, as well as premature evaluation or judgement, and in addition to that lack of time is always cited as an excuse

2.4 Step 4 validating the solution:

It is very important that the solutions will be reviewed after the mathematical models are being solved, to ensure that the values obtained are accurate and or correct, and that the resulting decisions can be implemented without fear or inconveniences. There are some reasons why the validating of solutions is important and few of them are listed below;

a. The mathematical model may not have enumerated all the limitations of the problem under consideration
b. Certain aspects of the problem may have been overlooked, or omitted, or simplified
c. The data can be incorrectly estimated or recorded, may be when entered into the computer.

2.5 Step 5 implementing the solution

The one making the decision, or the decision- maker has not only to find or identify good decision alternatives however, to select alternatives which are capable of being implemented. The implemented solutions much be persistently or continuously be reviewed and updated since it is important in the light of a changing environment. It should be noted that the behavioral aspects of change are extremely vital for the successful implementation of results. The decision maker should all the time be aware of the objectives, assumptions, omissions, and that of limitations of the model.

2.6 Step 6 modifying the model

The mathematical model cannot be useful unless the degree by which it actually denotes the system or problem being modelled should or is be established. When validation is ongoing and realize that solutions cannot be implemented, then we need to indicate or identify constraint or constraints which were omitted in the course of formulating the original problem or to find whether some of the original constraints were not correct and there is the need for modification. In cases of these nature, we should or must return to the problem formulation step and vigilantly make the appropriate

modifications to denote more accurately the given problem. A model should be applicable for a reasonable period of time and must be updated from to time, taking into consideration the past, present and the prospect aspects of the problem.

2.7 Step 7 establishing control over the solution

The changes within the environment and its dynamism sometimes have greater or significant implications with regard to continuing validity of models and their solutions. That is to say a control procedure has to be accomplished for detecting significant changes in decision variables of the problem of which suitable adjustments can be done in the solution without building a model every time a significant change occurs.

2.8 How to apply

I will always make sure that in every situation of action taking, the problem or problems will be identified and defined and continue to follow all the steps under quantitative analysis process.

2.9 Conclusion

In conclusion I say that there are some opportunities involving quantitative approach as; compelling the decision maker to be quite explicit about his objectives, assumptions and his perspectives to constraints, helping the decision maker to consider very critically what variables influence decisions, it rapidly helps pointing out gaps in the data needed or required to support workable solutions to a problem, and also the models under quantitative approach can be solved by using a computer, which helps the management to have more time for decisions which require quantitative approach.

In addition to the above, there are also demerits concerning quantitative approach as; the solution to a problem is often by making it simplified or by simplifying assumptions and that such solutions have serious limitations, also the models sometimes do not denote the realistic situation in which decisions should be done, and again, the one making the decision or the decision maker is not fully aware of the limitations of the models that he or she is using.

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