Decision Support System for Managers
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Module – 01
Introduction to Decision Support Systems
Lecture - 01
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Hi, welcome to our course on Decision Support Systems! Today, the first starting module; so, we will be discussing about Introductory Concepts on 'Decision Support Systems', ok.

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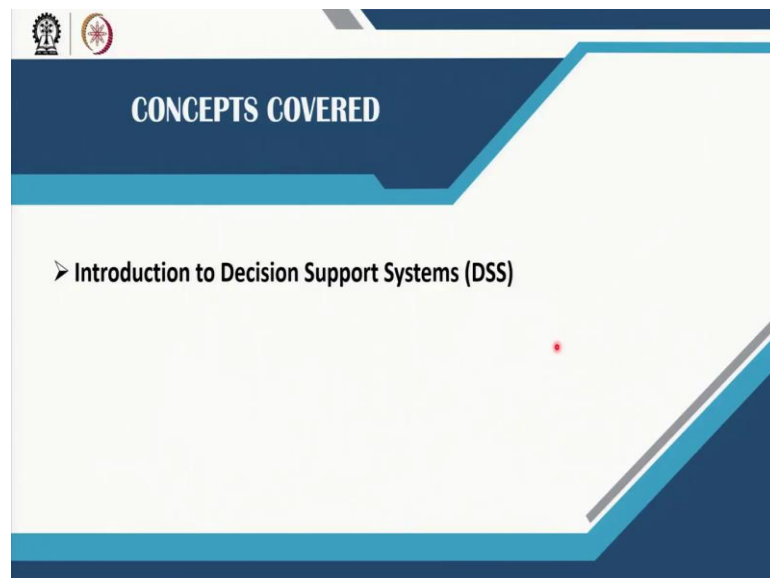
So, that will be the concept covered in this particular module.

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So, what is the decision support system? Right. A decision support system is basically a man computer interactive system which aids in making decision. This helps the managers to make decisions. So, there is an interaction between the manager and the computer. In decision support system what happens is that the computer's ability to process databases and models is combined with the manager's ability to draw on his experience and judgment.
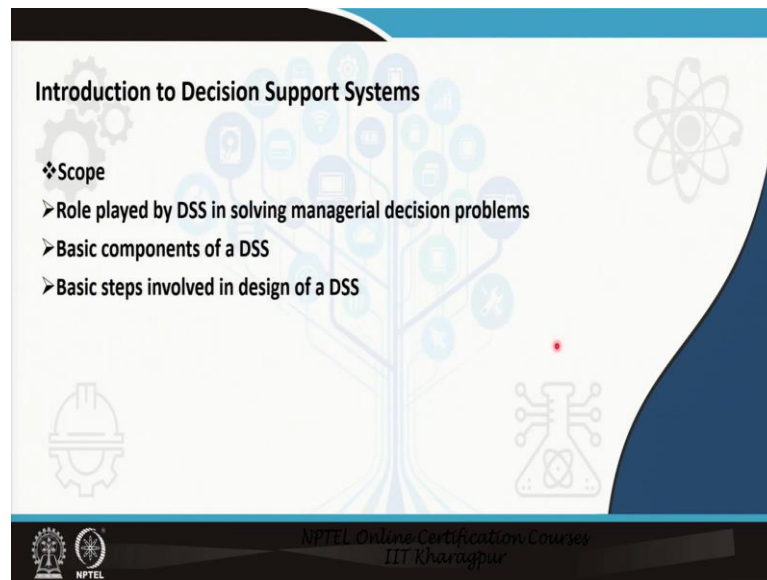
And, thereby also it capitalizes manager's intuition in taking a decision ok. So, once again decision support systems are basically man computer interactive system. It aids in management in making decision. It combines computers ability to process databases and models with the manager's ability to draw on his experience and intuition and thereby exercise his judgment.
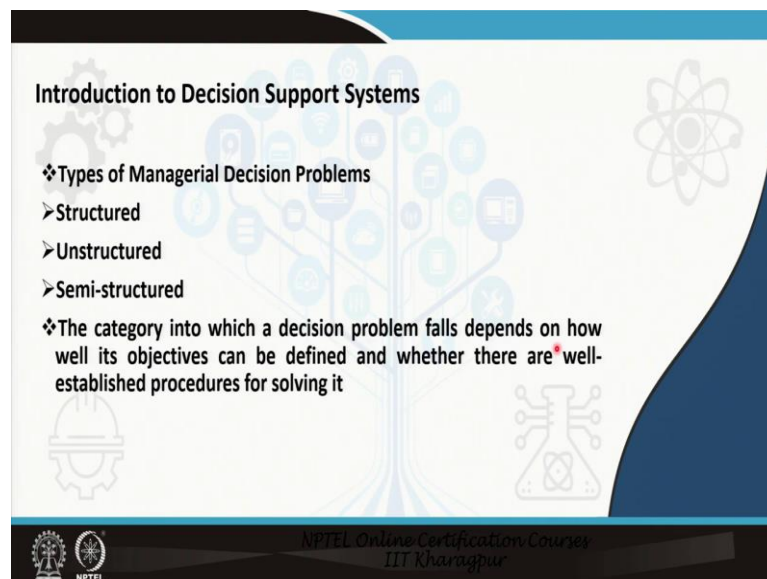
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So, the scope of this particular module is basically we will discuss about the role played by decision support systems in solving managerial decision problems. Then we will be discussing about the basic components of a decision support system. And, thereafter we will deal with the basic steps that are involved in the design of a decision support system.

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Now, when we discuss about decision support systems, the first thing that we need to know is what are the different types of managerial decision problems. First of all what is basically a decision making that we need to know? In any decision making environment

we have a problem at hand and then we need to find out or identify different alternatives to solve that particular problem.

Then we have to analyze those alternatives and select one of the out of the several alternatives to solve the problem. And, that alternative is supposed to be the best alternative as per the manager who is taking the decision. There are various criteria based on which those alternatives are adopted or selected, also it also depends on the mental makeup of the managers or the decision maker.

Now, we will discuss in detail at a later point in time: what are the basis for selection of those alternatives for solving a problem? Now, coming back to the different types of managerial decision problems, we need to know about three different types. One is structured decision problem, second one is unstructured decision problem and the last one is semi structured problem.

The category in which a decision problem falls depends on how well the objectives of the problem can be defined and whether there are well established solution procedures for solving that problem ok.

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Now, problems where we have a well defined objective and well established solution procedures they belong to the class of problem which are basically structured decision

problems. Typically, you see in any inventory replenishment situation the type of problems that we encounter are basically the structured ones.

Problems where the objective is vague and there are no well established solution procedures for solving those problems they are basically unstructured problems. For example, say when you are trying to find out what are the new products to be manufactured then that belongs to an unstructured problem and semi-structured problems combine the features of both this structured as well as unstructured. So, they lie in between.

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The structured problems can be completely delegated to the computer, because they are the objective is well known, well defined, there are established solution procedures for solving those problems. And, hence it can be completely delegated to the computer whereas, the unstructured problems have to be solved by the manager alone; where it requires his intuition, his judgment, his experience to solve those kind of problems.

And, semi-structured problems basically lie between the structured and unstructured problems. It can neither be wholly solved by a computer nor can be solved by the manager alone. Hence, in solving a semi structured problem it requires a man computer interaction, it requires a man computer team for solving those problems. It is therefore, in handling the semi-structured problems that the decision support systems can be most effective.

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Now, we need to know: what are the different phases of a decision making process? The first thing is the intelligence phase; in the intelligence phase, that decision-maker scans the environment, processes the raw data and identifies the problem areas. Basically, he will be scanning this entire environment; will try to see: what is the nature of data; what kind of data is available in the environment?

And, then he would try to understand: what is the problem area, and identify their problem. In the design phase what happens is that the problem that has been identified in the intelligence phase for that problem they try to find out various alternatives. So, various alternatives are formulated for solving the identified problem and each of these alternatives are analysed in this particular phase.

And, then we come to the choice phase, in the choice phase a selection is made from the proposed alternatives and the chosen alternative is implemented. So, that is what I said early that what decision making process is. In a decision making process, we are trying to select the best alternative out of the set of alternatives which have which have been formulated to solve the given problem in hand.

And, this selection of this best alternative is also dependent on the mental makeup of the manager, what he wants to achieve and there are other criteria which I said that we will discuss at a later point in time.

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Now, already we said that decision support systems are mostly suited for semi-structured type of problem where there is an interaction between the manager and the computer. In the process the problem solving is iterative and interactive in nature; that means, once the problem output is interpreted by the manager, he might revise the input.

And, in the process again he gets an output, he interprets that output; if he is not happy or not satisfied then again he can modify the data and then this entire process is repeated several time. And hence we said that the problem solving process is not only interactive, but iterative in nature. The computer provides some output to the manager, the manager then interprets the output, gives new input, modifies the existing data.

And, then he might asks new questions and this process is repeated. The computers major tools in solving the problems are models, both simple models as well as sophisticated models. Whereas, the manager mostly uses his experience and judgment in interpreting the model output and then trying to modify the basic input to solve the problem.

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The models that are used in decision support systems by the computer basically consists of finding the relationships between the major elements governing the system which is being studied. And, in developing that relationship it might require certain degree of abstraction. The output of the models will basically be an approximation of the behaviour of the real system.

And the models will be valid only if certain assumptions about the real system are satisfied; that means, each and every models that we are using in decision support systems will basically depend on various assumptions that we make. And, if those assumptions are valid, if those assumptions are satisfactory then the models will also be giving valid output.

Now, in this respect another important thing that needs to be discussed is that, what are the differences between a management information system and a decision support system. Because, management information systems also provides the managers with the right information at the right time to take certain decisions. But then what is this salient or the basic difference between MIS and DSS?

DSS designer views effectiveness as more important than the efficiency. In MIS, the managers are more bothered about efficiency whereas, in decision support systems managers are more keen to find out an effective solution.

Now, what is this difference between effectiveness and efficiency? When we are talking about effectiveness, we are basically trying to find out that whether we are doing the right thing. And, when we are talking about efficiency, we are mostly emphasizing whether we are doing it in the right manner.

So, effectiveness basically questions that whether the given problem that we are trying to solve is the right one or not and given a problem whether we are solving it in the right manner or not is what basically efficiency means. So, effectiveness involves identifying what should be done, am I doing the right thing and ensuring that the chosen criteria is a relevant one. On the other hand efficiency is basically I am doing it in the right manner or not.

So, efficiency involves some kind of minimization of cost say time or effort in performing a specified activity. In decision support systems we are more bothered about effectiveness rather than efficiency and one thing we have to remember then that in DSS the computer is used not to replace the decision maker, but to enhance his or her decision making abilities ok. It is not replacing the decision maker.

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In DSS, the manager plays a very active role because; we already said that is a man computer interactive system. And, the manager uses his or her experience and judgment wherever necessary and controls as well as directs the computer in its tasks. The manager might input a given set of data at a point in time, interpret the output then a may again revise the input and he may give different set of commands ok.

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So, here the manager's experience and judgment plays a very important role, while talking about the range of capabilities of a decision support system we also need to remember that not all decision support systems include models in order to be effective. A decision support system can be a simple data retrieval facility and yet it can be useful in aiding decision making.
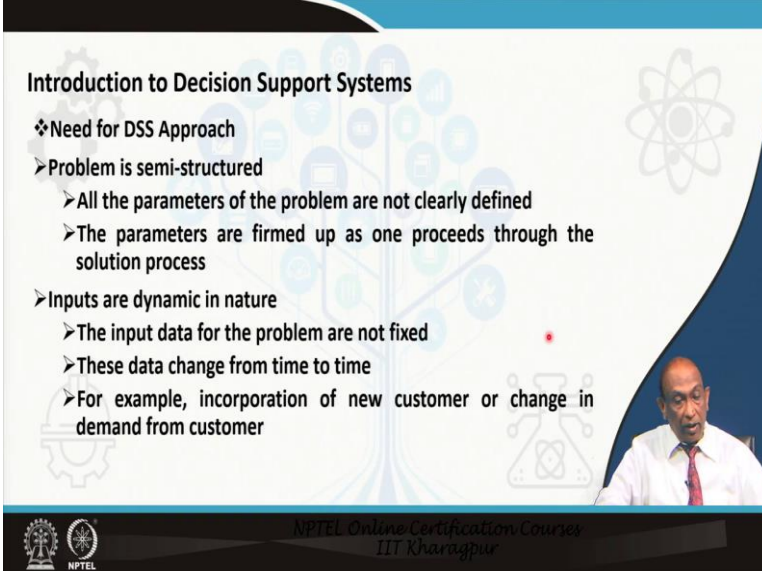
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The range of facilities offered by decision support systems can be therefore, listed as retrieving information from a database. Decision support systems provide adhoc data

analysis, it has an inbuilt mechanism for doing those kind of ad hoc data analysis. It has the capability of aggregating data in the form of reports. Decision support systems can also help in estimating the consequences of proposed decisions and thereby it proposes the right kind of decisions. So, these are the range of capabilities of a decision support system.

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Need for decision support system approach is very relevant when we are basically trying to solve a particular problem. We have to remember that a problem must be semi-structured ok. Once again I repeat semi-structured problems are those kind of problems where the objective is not well defined; neither there are well established solution procedures.
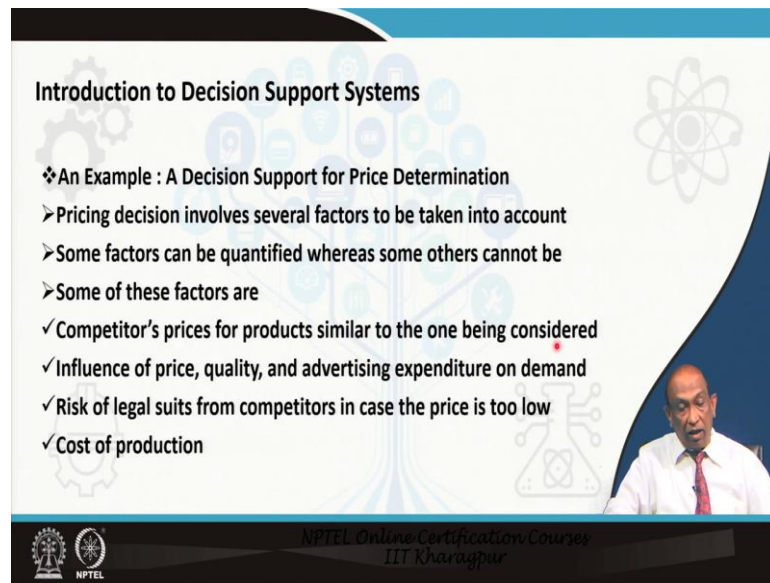
So, in here all the parameters of the problem are not clearly defined and the parameters are firmed up as one proceeds through the solution process. Here the inputs which are provided to the model for solving the problem are dynamic in nature; that means, the input data for the problem are not fixed. These data change from time to time for example, incorporation of new customers or change in demand from a customer ok. So, these are highly dynamic data.

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Now, we will give an example of a decision support system for determination of price of a product ok. So, when you are trying to determine the price of a product is basically a pricing decision involving several factors. Some of these factors can be quantified and some of these factors cannot be quantified. What are those kind of factors? Number 1: competitor's prices for products similar to the one that we are considering.

Influence of price, quality and advertising expenditure on demand for that product. Risk of legal suits from competitors in case the price that I set is too low. Another factor maybe the cost of production of or for that particular product because the price that, I set for that product must be more than the cost of production.

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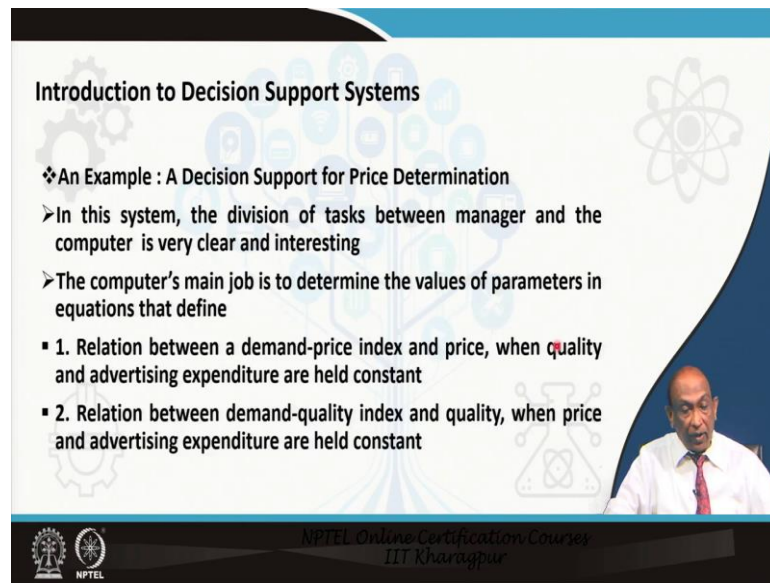
So, if these are all these factors suppose there may be a several other factors, let us limit our discussion with respect to these factors only. So, some of these factors determine to a certain extent the lower and the upper bound for the price. But, having decided that this is the lower bound of the price and this is the upper bound of the price, there is a range over which the price can be varied.

One of the objectives of the decision support system is to predict the outcomes when the price, quality or advertising expenditures are varied over some ranges. So, there is a flexibility in that and we have to find out that to what extent the price can be changed when other factors are varied over this ranges.

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So, that system that we are talking about basically involves division of tasks between manager and the computer and this is very clearly delineated. The computer's main job is to determine the values of parameters in equations that define the relation between a demand price index and price when quality and advertising expenditure are held constant.

Again the parameters need to be determined in the equation that, define the relation between demand for the product or demand quality index and quality when price and advertising expenditure are held constant.

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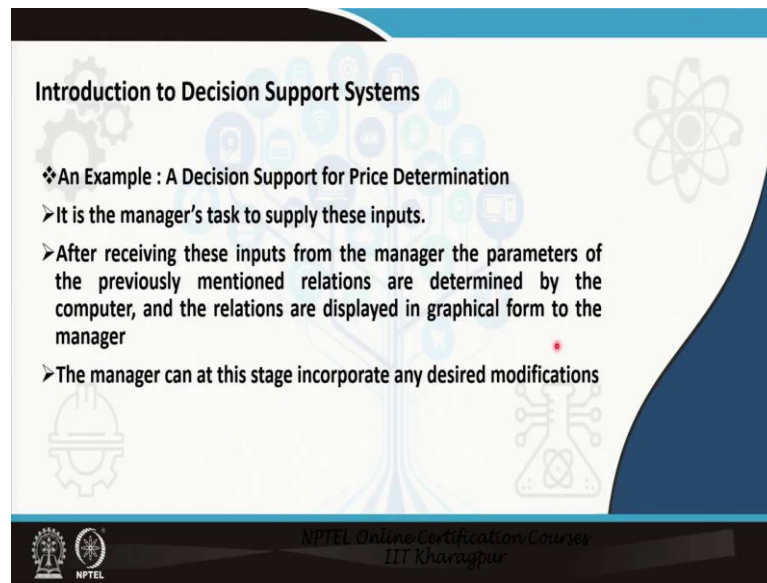
The relation 3 can be relation between demand advertising index and advertising expenditure when quality and price are held constant. And the 4th relation can be the relation between demand and all the three variables price, advertising expenditure and quality.

Now, the computer cannot determine the parameters of these relations unless it has at least a few inputs; that means, for each value of the dependent variable, the independent variables value have to be also supplied. And, these given set of data need to be input first by the manager in order that the computer can determine the values of these parameters.

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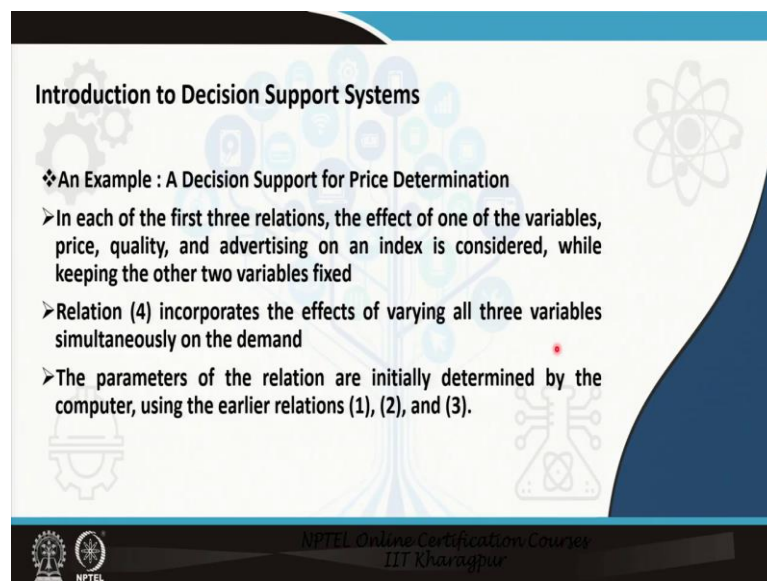
So, it is the manager's task to supply these inputs; that means, for a given set of input variables this is the value of the dependent variable; like this a complete set has to be given. And after receiving these inputs from the manager, the parameters of the previously mentioned relations; all those four relations that I had mentioned will be determined by the computer. And, then this relationship will be displayed in graphical form to the manager. The manager can at this stage incorporate any desired modifications.

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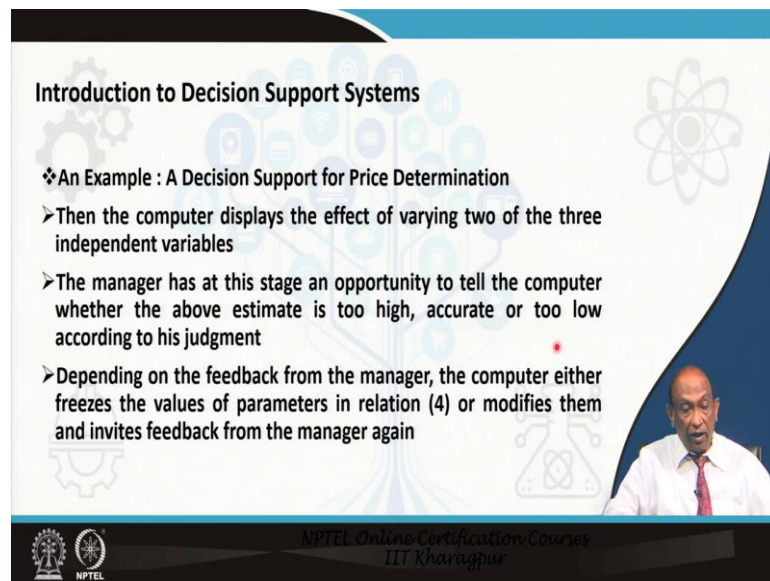
In each of these first three relations, the effect of one of the variables price, quality and advertising on an index is considered, while keeping the other two variables fixed. And, in relation 4 the effects of varying all the three variables simultaneously on the demand is being studied. So, the parameters of the relation are initially determined by the computer using the earlier relations 1, 2 and 3.
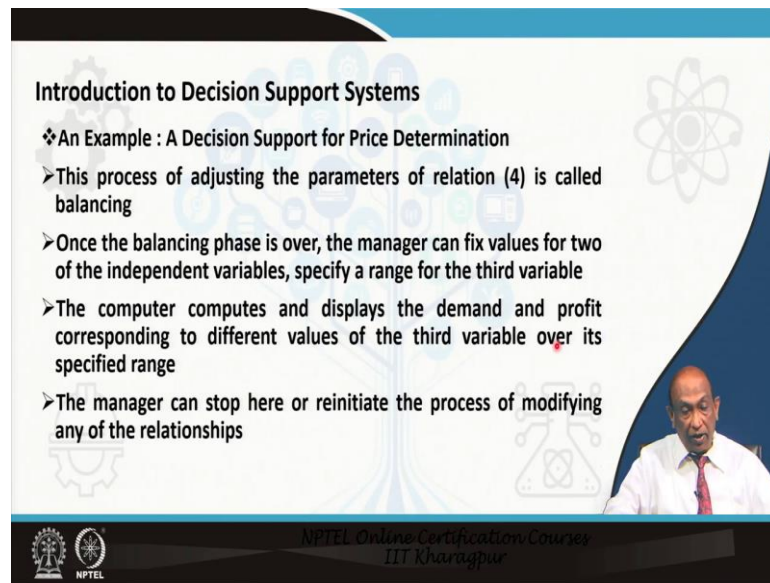
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Then, the computer displays the effect of varying two of the three independent variables and then see: what is the effect on the dependent variable? The manager has at this stage an opportunity to tell the computer whether the above estimate is too high, accurate or too low according to his judgment.

And depending on the feedback from the manager, the computer either freezes the values of parameters in the 4th relation or modifies them and invites feedback from the manager again. In as in our next module we will also discuss how the different parameters are fixed.
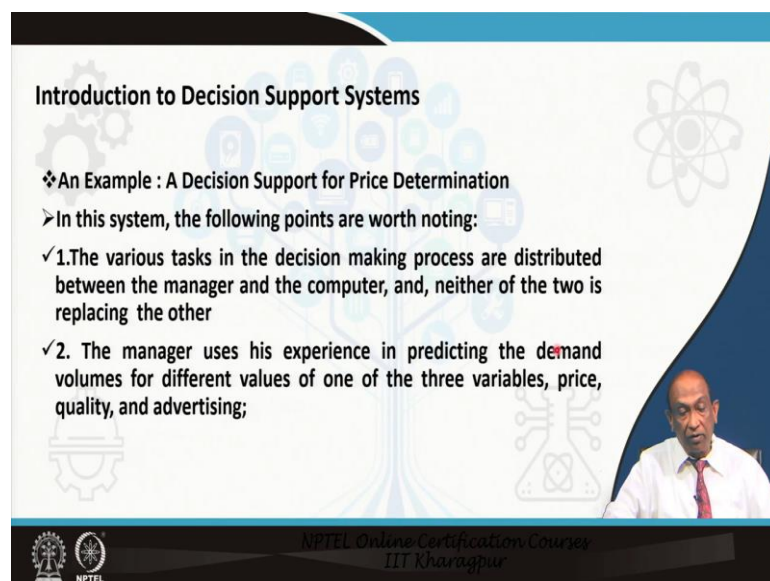
The process of adjusting the parameters of relation 4 is basically called balancing. Once the balancing phase is over, the manager can fix values for two of the independent variables and specify a range for the third variable. The computer computes and displays the demand and profit corresponding to different values of the third variable over its specified range. The manager can stop here or reinitiate the process of modifying any of these relationships.
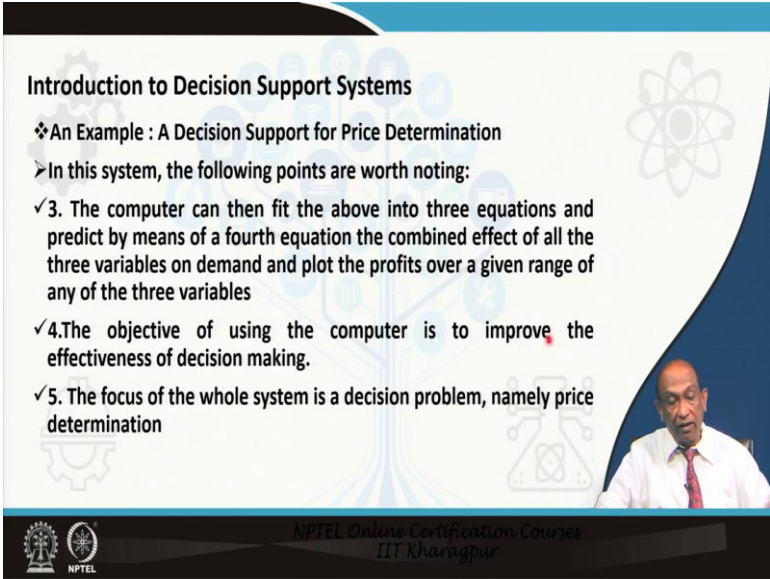
In this system, the following points are worth noting: number 1, the various tasks in the decision making process are distributed between the manager and the computer and neither of the two is replacing the other. And, the second one the manager uses his experience in predicting the demand volumes for different values of one of the three variables price, quality and advertising.
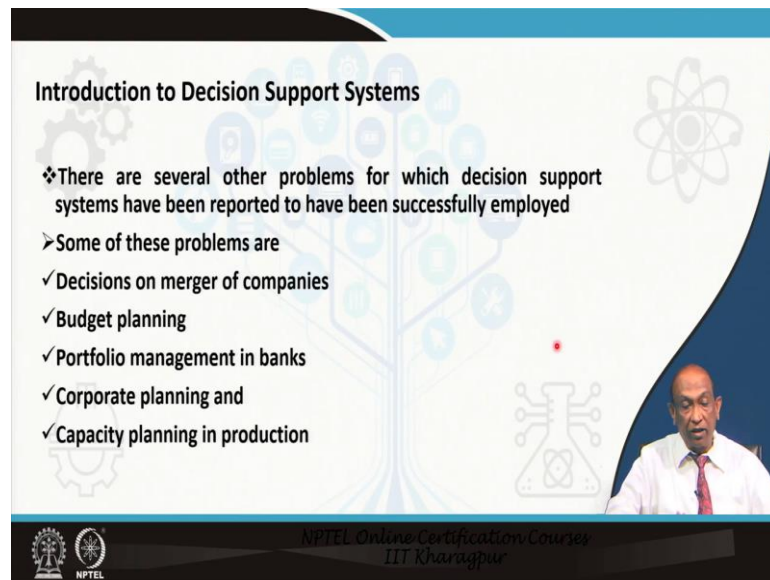
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The computer can then fit the above into three equations and predict by means of that fourth equation the combined effect of all the three variables on demand and then plot the profits over a given range of any of the three variables.

The objective of using the computer is to improve the effectiveness of decision making. The focus of this entire system or the whole system is a decision problem, namely price determination which is semi-structured in nature.
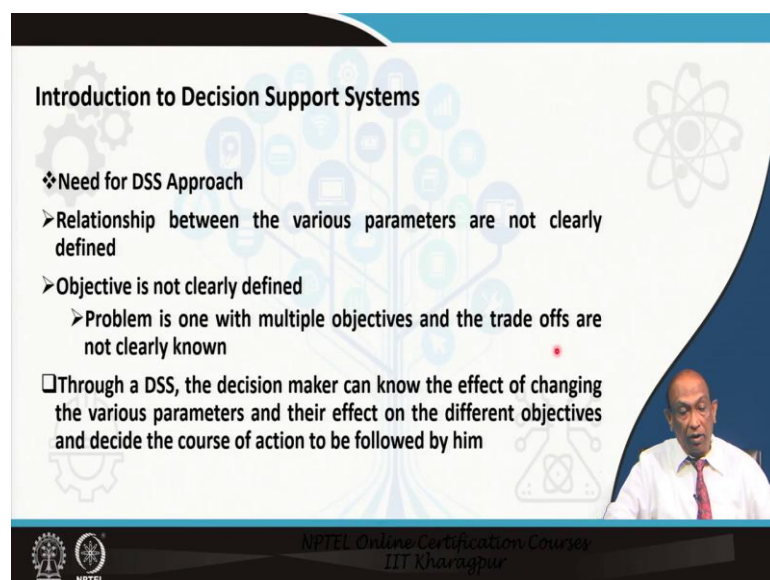
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There are several other problems for which decision support systems have been reported to have been successfully employed, some of these problems are decisions on merger of companies. Basically semi-structured in nature. Budget planning, portfolio management in banks, corporate planning, also capacity planning in production; these are examples of highly popular decision support systems.
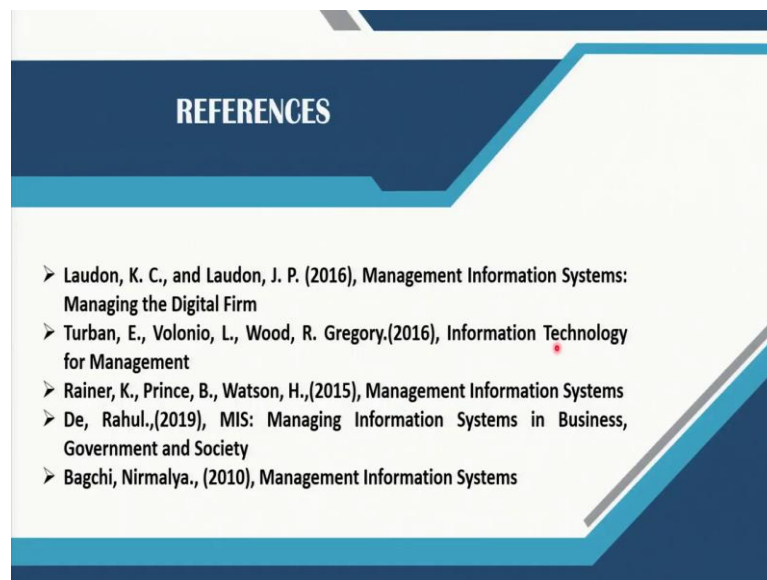
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So, relationship between the various parameters when they are not clearly defined then we need a DSS approach for solving the parameter problem. Mostly DSS is suited for

situations where the objective is not clearly defined. Problem is one with multiple objectives and the trade offs are not clearly known; through a decision support system the decision maker can know the effect of changing the various parameters and their effect on the different objectives and decide the course of action to be followed by him.

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These are the references that I have used for this first module.

Thank you all!