Decision Support System for Managers
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Module – 05
Models in Decision Support Systems
Lecture – 05
Models in Decision Support Systems (Contd.)

Hi, welcome to module 5 of week 1 of our course on Decision Support Systems! Today, we will continue our discussions with 'models in decision support systems', because modelling is the one of the most important function in decision support systems. And we really need to clarify our concept on modelling and the use of models in decision support system as one of its important components.

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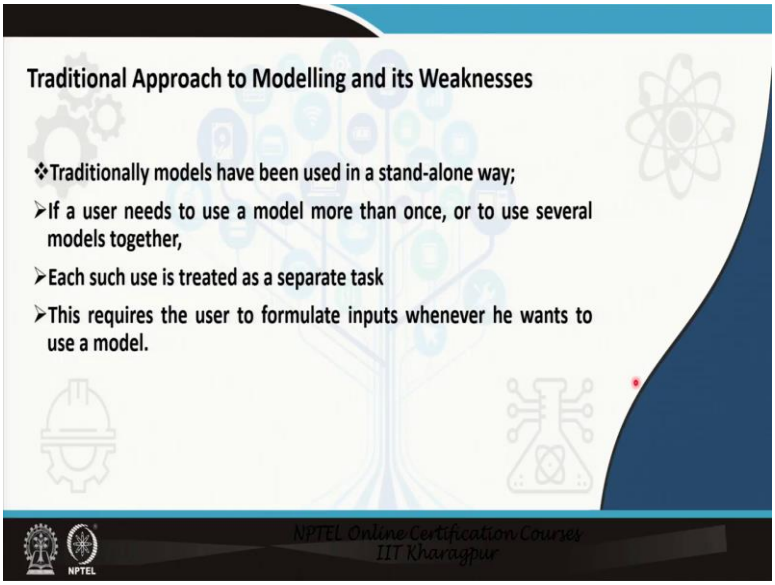

So, we start with traditional approach to modelling and its weaknesses. Traditionally models that have been used in decisions support systems have been used in a standalone manner.

If any user needs to use a model more than once, or to use several models together, then in that case each such use has been treated as a separate task. And this requires the user to formulate inputs whenever he wants to use a model. So, this is one of the greatest weakness associated with traditional approach to modelling.

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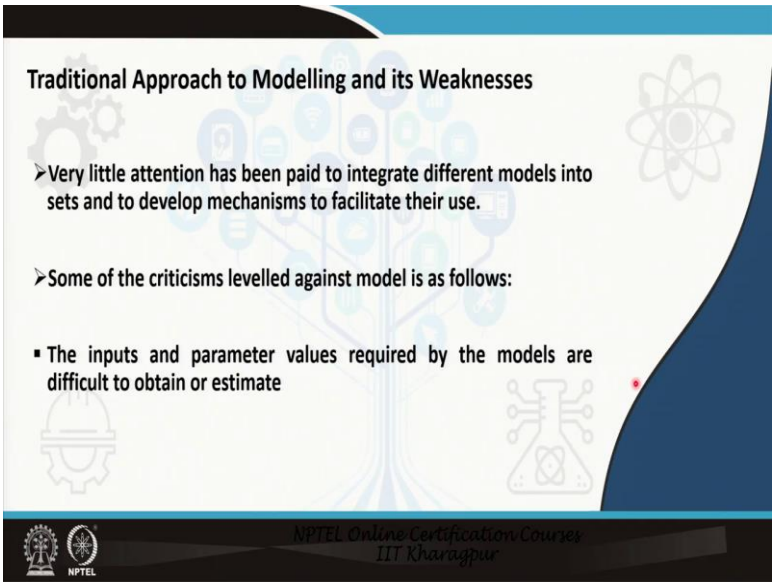

Very little attention has been paid to integrate different models into sets and to develop mechanisms to facilitate their use. Some of the criticisms levelled against model is as follows. The inputs and the parameter values required by the models are difficult to obtain or estimate; this is one of the problems.

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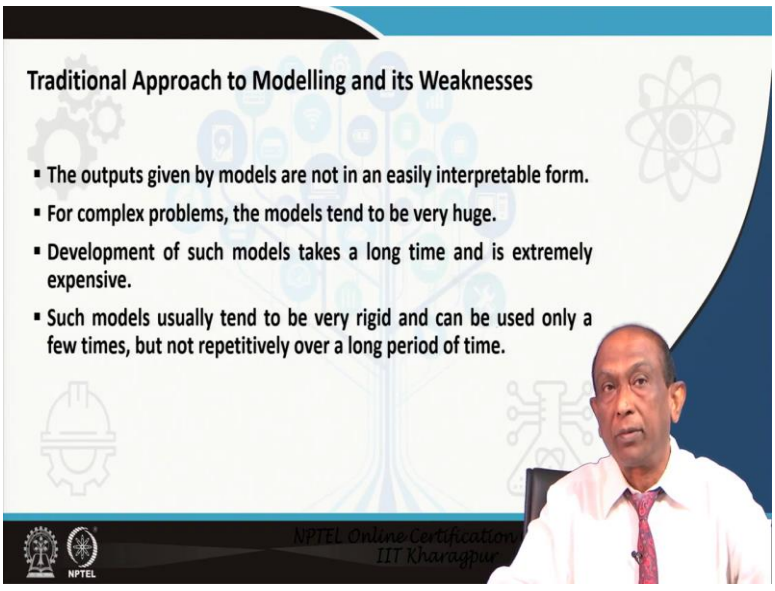

The outputs given by models may not be in an easily interpretable form. There are traditional approach to modelling the greatest weakness is here that the output generated

by the models cannot be easily interpreted until and unless the manager is highly accomplished and have got lot of knowledge in that particular area.

Another problem associated with modelling is that for complex problems, the traditional approach to modelling is such that the models tend to be very huge. And development of such kind of models takes a long time and this extremely expensive. Such models usually tend to be very rigid is absolutely there is no flexibility and can be used only a few times, but not repetitively over a long period of time.

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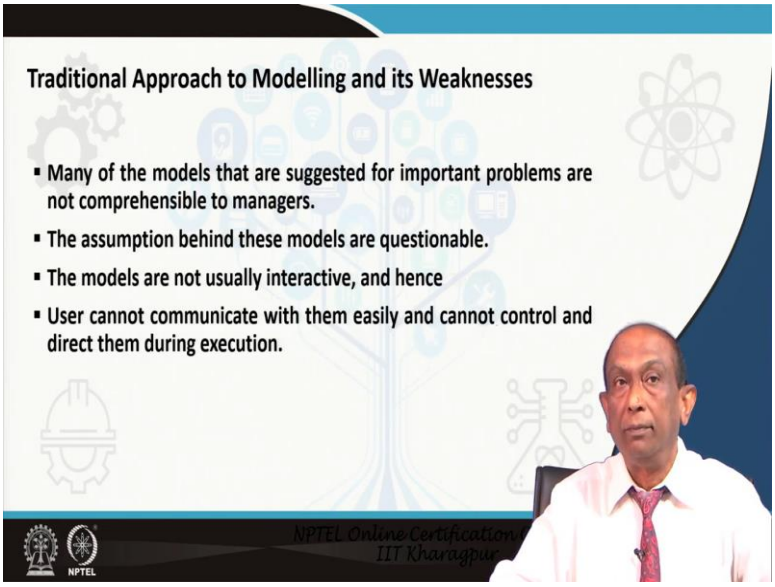

Many of the models that are suggested for important problems are not comprehensible to managers. And one of the biggest drawbacks for traditional approach to modelling is that the assumption underlying these models may not be valid, they may be questionable. The models are not usually interactive, and hence the user managers cannot communicate with them easily and cannot control and direct these models during their execution.

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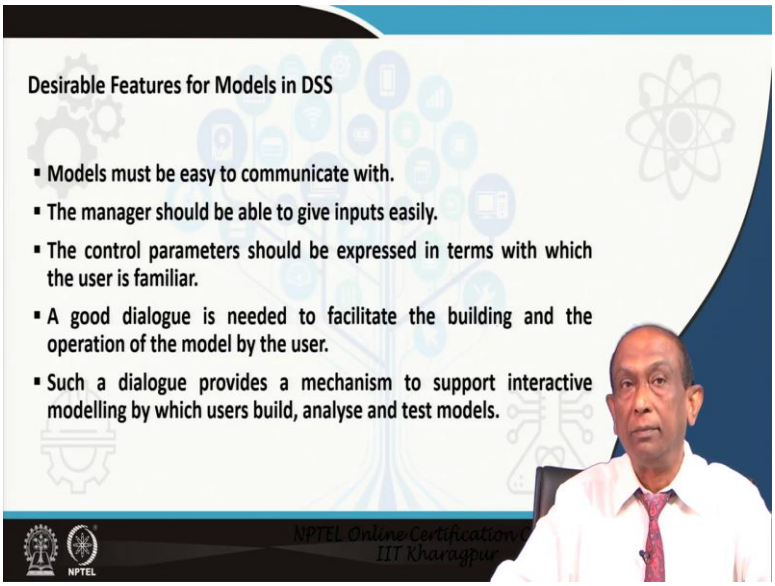

So, desirable features of models in DSS are first models must be very easy to communicate with. The manager should be able to provide inputs to this model without much effort. The control parameters which are required should be expressed in terms with which the user is familiar.

The most important thing is that a good dialogue is needed to facilitate the building and the execution of the model by the user. Such dialogues provide mechanisms to support interactive modelling by which users build, analyze and test models.

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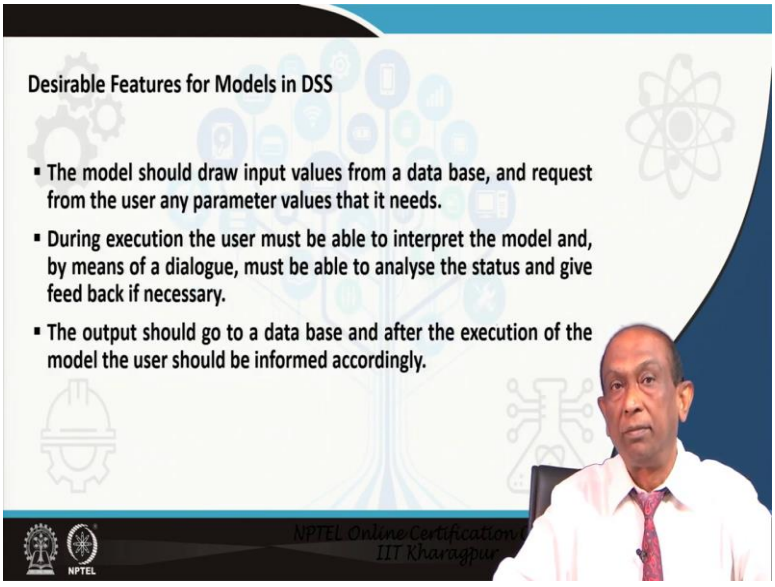

Models should draw input values from a database, and request from the user any parameter values that it needs. So, users they should not bother about you know anything else other than supplying the parameter values.

During execution of those models, the user manager should be in a position to interpret the output generated by the model and, by means of a dialogue, must be able to analyze the status and give feed back if necessary. The output from the models should be captured in a data base, and after the execution of the model the user should be informed accordingly. So, the user can get an idea of the various output that is generated during each stage of execution of this models.

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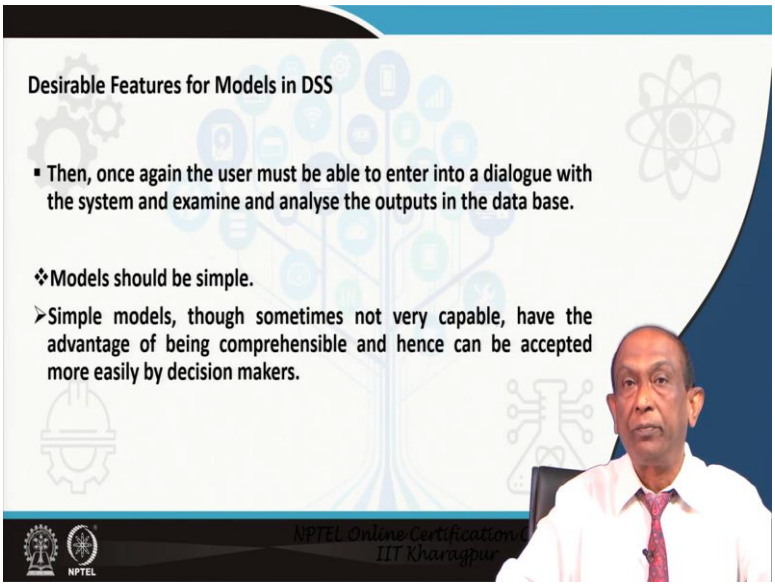

The user can go through those outputs at each stage. And then, once again the manager or the user must be able to enter into a dialogue with the system and examine and analyze those output in the database itself. Among the desirable features for models in DSS, the DSS designer should always keep in mind that the models should be simple.

Simple models, though sometimes not very capable, have the advantage of being comprehensible means those model outputs and the way the model has been built must be understood by the user manager, and hence the acceptability of these models by the decision makers go up.

That means, this models can be accepted more easily by the decision makers if they understand what is there inside this model, how the model functions, and if they can understand the output generated from the model. Otherwise, the users will not accept. We will think that what this model is generating we do not understand anything is like a black box, in that case the decision support systems cannot be implemented successfully.

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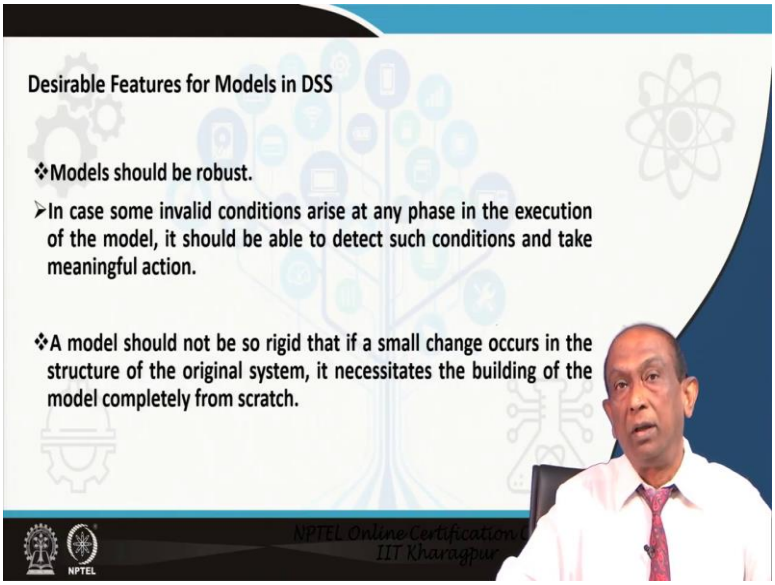

Models should be robust I had already said in my previous module that robustness of a model means that in case some invalid conditions arise at any phase in the execution of the model, there should be inbuilt mechanisms inside the model to detect such conditions and take meaningful actions, that means, this exception conditions must be handled very carefully.

Next a model should have lot of flexibility. Model should not be so rigid that if a small change occurs in the structure of the original system, it will call for building of the model completely from scratch. If that is the sketch, that is the case then the entire purpose gets defeated.

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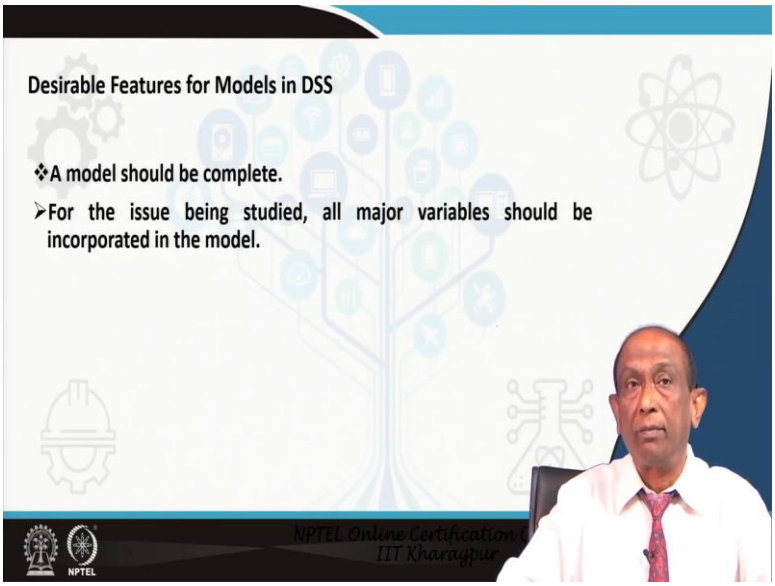

A model should be complete in all respects. For the issue being studied, all major variables should be incorporated in the model.

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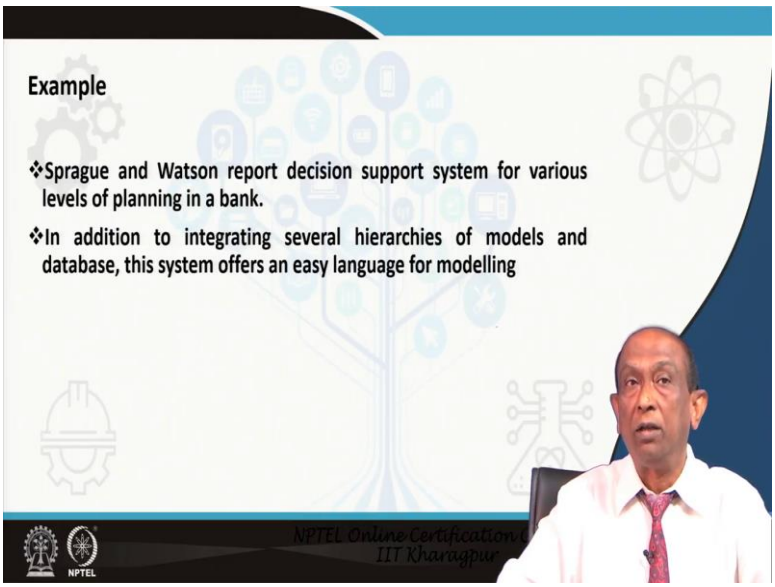

Sprague and Watson report decision support systems for various levels of planning in a bank. And we will tell you the essences of their modelling approach. In addition to integrating several hierarchies of models and database, the system that they have designed and implemented offers an easy language for modelling.

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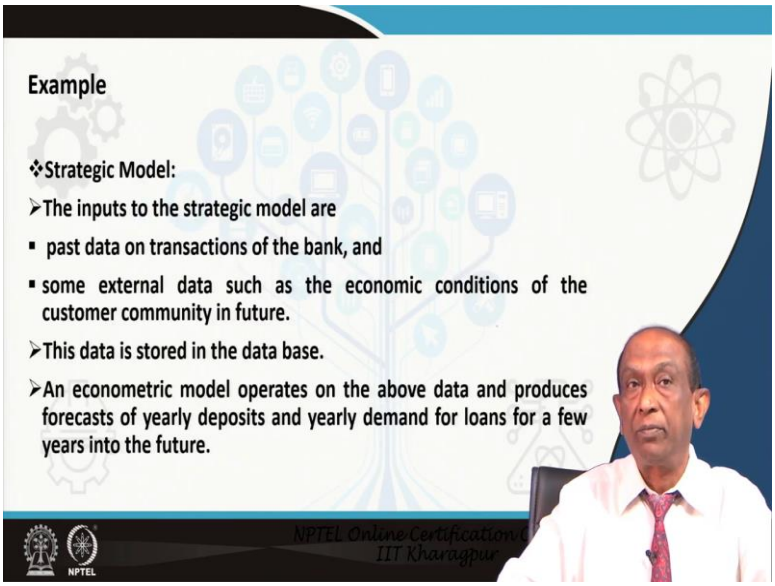

For example, the strategic model that they have designed developed and implemented has the inputs in terms of past data on transactions of the bank, and some external data such as the economic conditions of the customer community in future. The entire data which is required for execution of the model is stored in the database. An econometric model operates on the above data and produces forecasts of yearly deposits and yearly demand for loans for a few years into the future.

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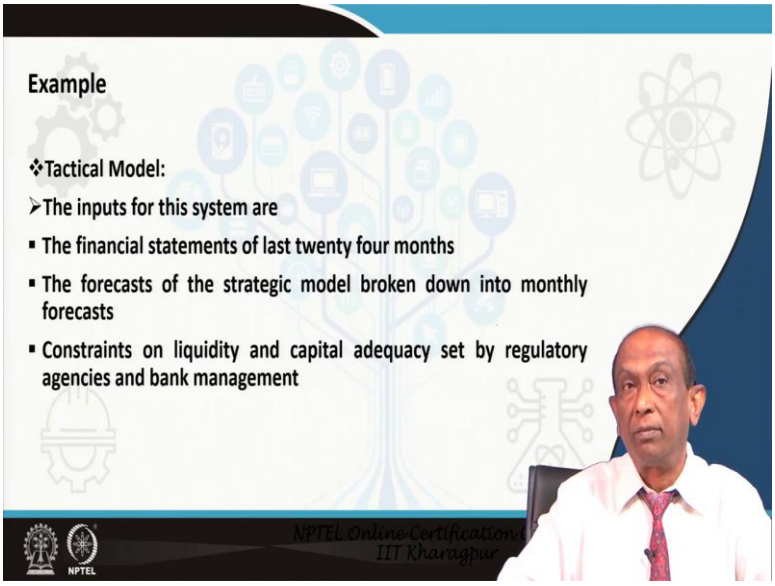

Their system also deploys a tactical model. And the inputs for this system are the financial statements of the bank for the last twenty four months. The forecasts of the strategic model broken down into monthly forecasts from the other set of inputs. The other inputs required are the constraints on liquidity and capital adequacy set by regulatory agencies on bank management.

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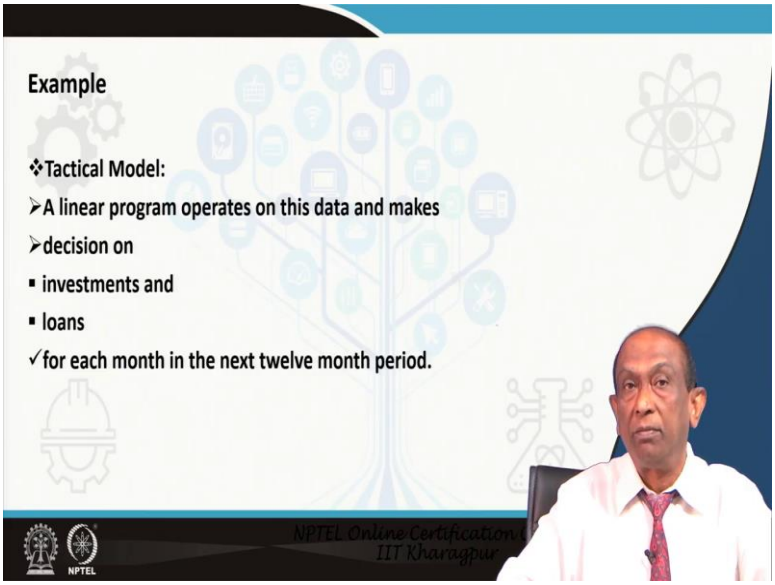

And what is the tactical model deployed in the system? If a linear program which operates on this data and makes decision on investments and loans for each month in the next twelve month period.

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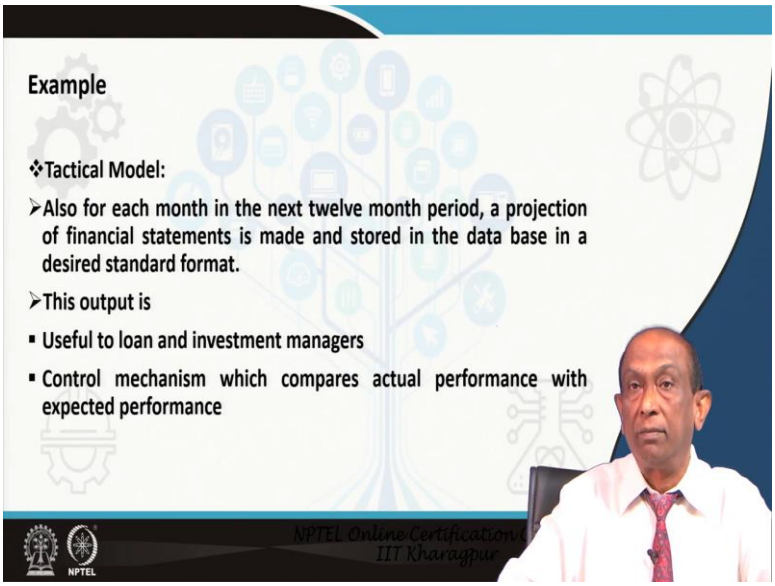

Also for each month in the next twelve months period, a projection of financial statements is made and stored in the data base in a desired standard format. This output is useful to loan and investment managers. This output acts as a control mechanism which compares the actual performance of the banks with the expected performance.

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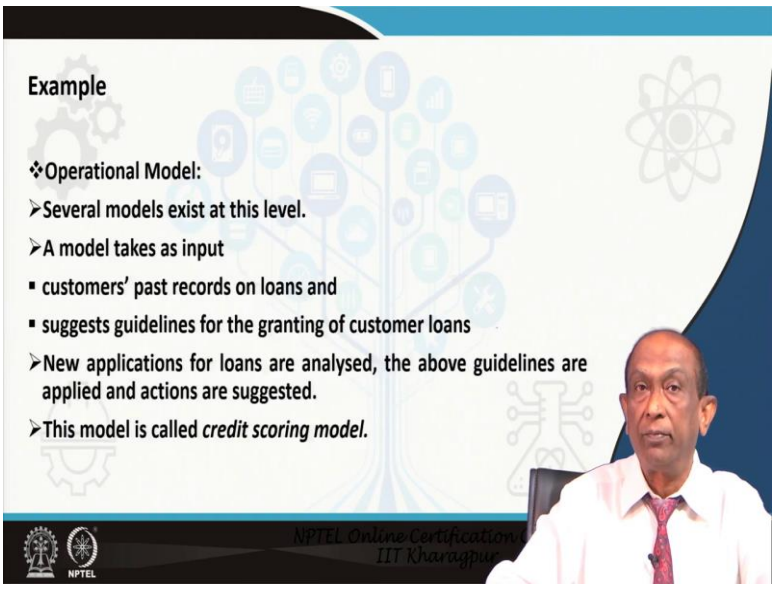

And in this system several operational models exist. A model takes as input. Customer's past records on loans, and suggests guidelines for the granting of customer loans. New

applications for loans are analyzed and the above guidelines are applied, and the actions are suggested. This model is called credit scoring model.

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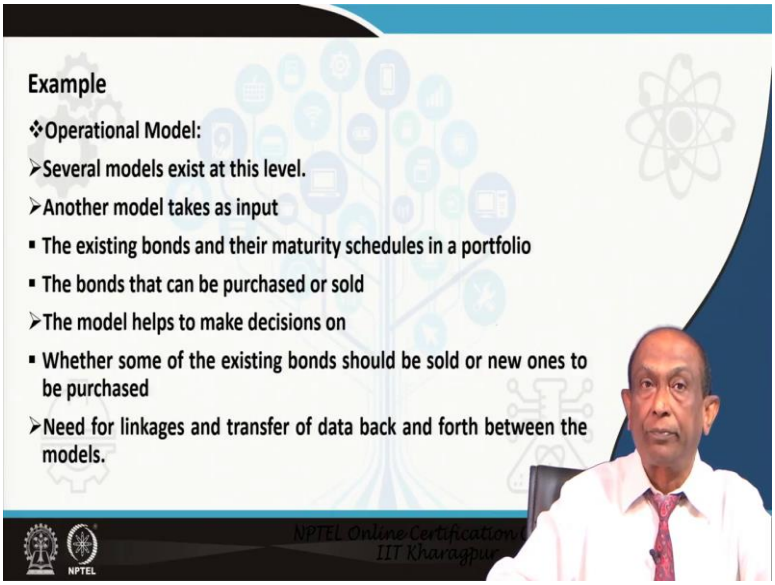

Another model takes as input the existing bonds and their maturity schedules in a portfolio. It specifies the bonds that can be purchased or sold. These are the inputs. The model then helps the decision maker to make decisions on whether some of the existing bonds should be sold or a new bonds need to be purchased. Need for linkages and transfer of data back and forth between the models is very clearly documented.

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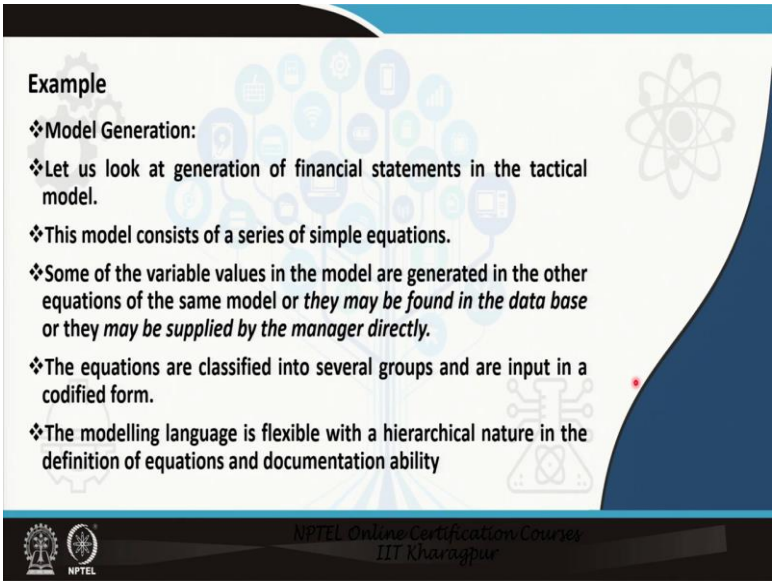

Now, let us look at generation of financial statements in the tactical model that we discussed earlier. This model consists of a series of simple equations. Some of the variable values in the model are generated in the other equations of the same model or they may be found in the database or they may be supplied by the manager directly. Then these equations are classified into several groups and their input in a codified form. The modelling language is flexible with a hierarchical nature in the definition of equations and documentation ability.

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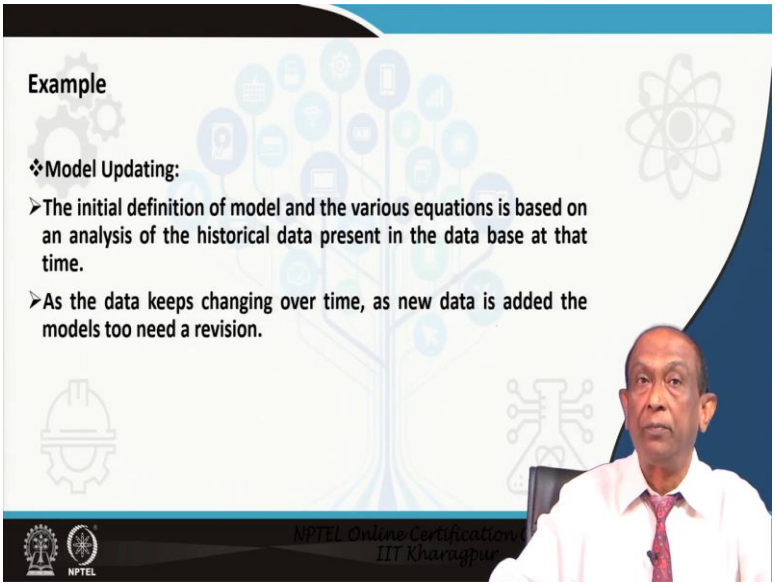

If we look at the updating features of the model, the initial definition of model and the various equations are based on an analysis of the historical data present in the database at that point in time. As the data keeps changing over time, when new data is added the models too need a revision.

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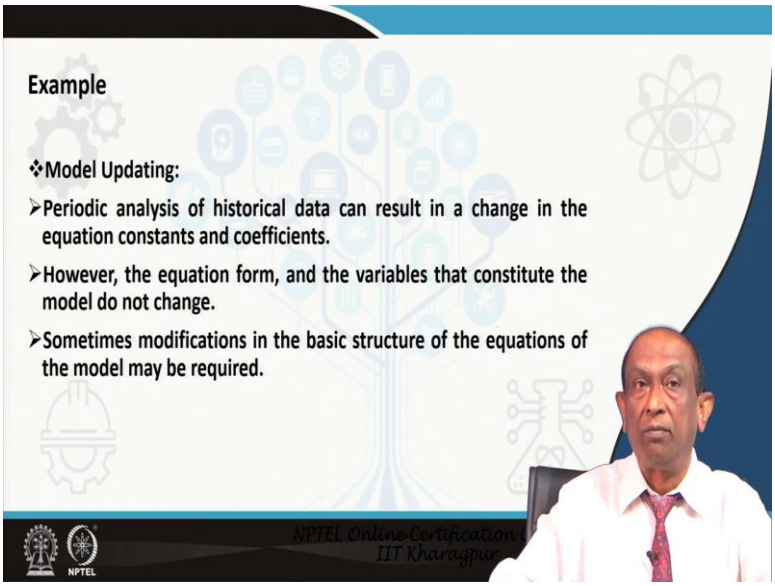

Periodic analysis of historical data can result in a change in the equation constraints and coefficients. However, the form of the equation and the variables that constitute the model do not change. Sometimes, modifications in the basic structure of the equations of the model may be required but they are very rare occurrences.

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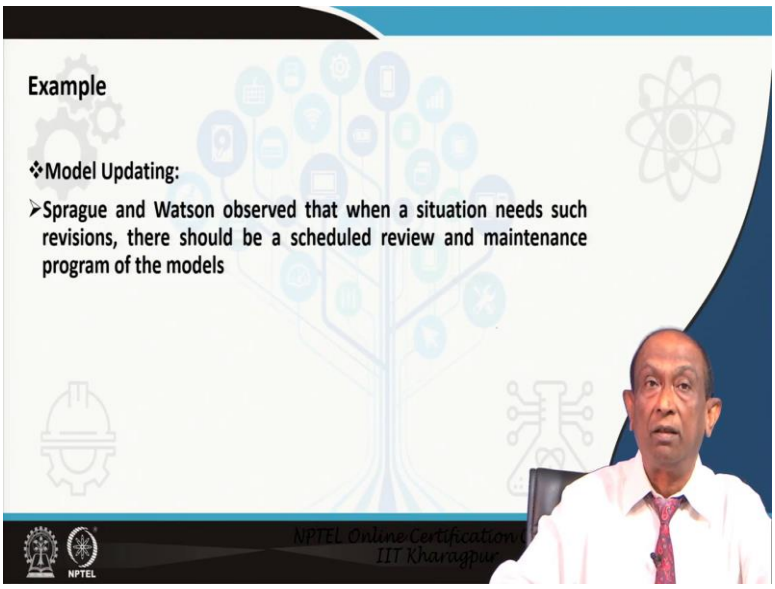

Sprague and Watson, they have observed that when a situation needs such revisions, there should be a scheduled review and maintenance program of this model.

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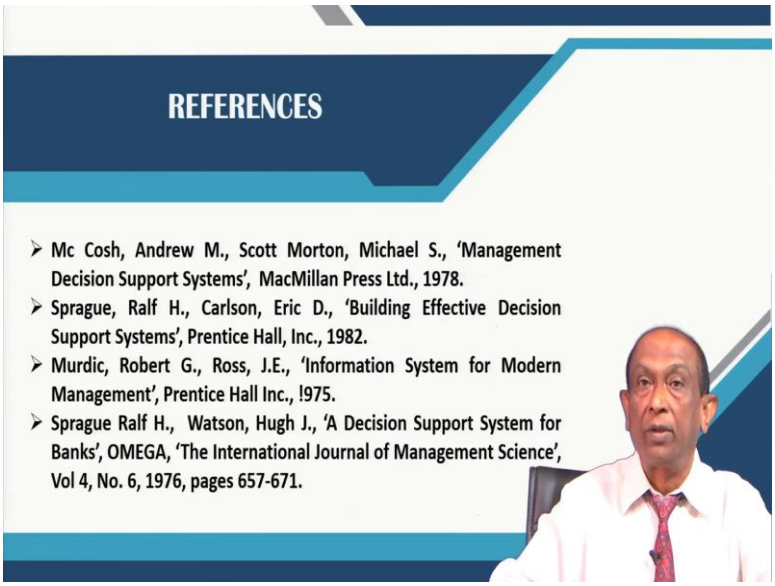

These are the references that I have used particularly, the second one; Sprague, Ralf H., and Carlson, Eric D., 'Building Effective Decision Support Systems'. I do not know whether you will get this book currently in the market but in a good library you will get this particular book. And if you get it, just go through this particular system which is very nicely described in that.

Thank you all for your patience!