

**Advanced Business Decision Support Systems**  
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**Lecture 01**  
**Overview of Decision Support Systems (Part-1)**

Good afternoon, everyone. Welcome to yet another new course in the NPTEL MOOCs. And, I am Dr. Deepu Philip from IIT, Kanpur. Today we are going to discuss new course which is called as the Advanced Business Decision Support Systems.

You may have taken our preliminary course on Business Decision Support Systems. Actually, the Web-based Business Decision Support System, which basically introduced you to the major components of the Decision Support System and its functionalities and how would you design each component.

Now, we are taking you guys to the Advanced Business Decision Support Systems, where we are looking at a very specific business decisions which are mostly imperfect and complete unstructured problems where we will see how Decision Support Systems can actually help in making better business decisions.

So, without wasting much time, I will get on to the topic, but before that, I would also like to introduce that there will be sufficient practical examples in this course which will be demonstrated using python, R, etcetera, which another faculty member Dr. Prabal Pratap Singh will be doing that. And, there will be specific business cases which will also be demonstrated by Dr. Amandeep Singh Oberoi. So, we 3 will be jointly conducting this course.

It is a 30 hours large course, but I hope you guys will actually get to see a practitioner side of the Business Decision Support System. So, without any delay, let us get into the topic today.

It is called the Advanced Business Decision Support Systems. And, as I told you again, please check the Web-based DSS course because at this point, we are assuming that you have gone through this or you have some idea about this. So, the current requirement is either gone through the material of this course or knows DSS.

Otherwise, some of the stuff may be little difficult for you to grasp. And, I said I am Deepu Philip from IIT Kanpur and today's major topic or this week's major topic that we are going to cover will be an Overview of the Decision Support System.

We will do it more towards the advanced side at this point. So, it is building upon what we covered in the previous course and the Decision Supports Taxonomy, the nomenclature, the main words, keywords and in what sense we use them. And, we will talk about Optimal versus Suboptimal decisions.

Optimality is easy to achieve when it comes to simple textbook like problems or well-structured problems but unstructured ill-defined problems getting optimal results are very difficult. So, we need to look into near Optimal or Suboptimal decisions. So, how do we identify which is good, that aspects we will talk about. And then, we will talk about the most important part of this which is called Alternatives. So, let us return to the major aspects.

Let us start with the discussion on DSS Configurations.

- 1) And, the fundamental rule, aspect about DSS configuration is that there exists many Configurations. It is not just one Configuration, there are many Configurations which are based on: How do these Configurations exist on? What are the Configurations?
  - i) The two fundamental aspects of these are Management-decision situation. So, the first part is that situation in which the Management-decision is to be made.
  - ii) Specific Technologies used for decision support. So, we have two angles.

The Configurations are driven by the angles. So, the first angle is Situation, the second angle is Technology. And, you know that situations keep on changing, so, as new situations demand new things, the DSS will evolve based on this. And, the new technology you know that it is coming up.

So then, what happens is you know the relevance or obsolescence is one critical aspect where the technology can angle of the decision support that comes into picture. So, in this class we will gloss over major slash important Configurations. So, we are looking at what are the major or important configurations relevant to business decisions. The relevance is business decisions.

- 2) Second aspect is DSS have 3 basic components:
  - i) Data- In the Data what we say that specific values representing a process. We discussed this in the previous course representing a process for business. And, we studied what we call DBMS and how we have given you exposure to MariaDB or MySQL as part of the previous course.
  - ii) Model- So, Model, in the simplest way to say, it is abstraction of a system. We talked about what we call MBMS (Model Based Management System) etcetera and how these kinds of things are created, we gone through. I believe we discussed certain aspects of it like simulations, Monte Carlo

etcetera. We learned PHP as a modeling language as part of this in the previous course.

- iii) User Interface- The interaction facility for the decision maker with the computer. So, we had gone through User Interface, UI-UX, we studied this and we used HTML and PHP here.
- iv) +optional- It is an optional aspect of this which we call Knowledge. We briefly discussed this in the previous course also, the Knowledge Based Management System. This is the inherent/acquired know how about the decision situation. Some people also call this as in a very very broad terms domain knowledge or something like that, but these terms are used in all weird fashions especially with management people. So, hence for us, this discussion will also talk about how do we represent knowledge and what is the importance of the knowledge in the Decision Support System. And, if you remember we studied KBMS (Knowledge Based Management System) what we discussed in the previous course.

So, the Business Decision Configuration. So, since we are looking mostly or majority at the business decisions. So, in our case business in current scenario is organization that exist, I would not use the word to exist to make profit, but I would say exist to maximize shareholder value. This is the definition that we will be using in this. We will use the word business in that regard.

So, if you figuratively, schematically draw how it is you have one column as Data and you have Models. And, Models utilize the Data.

And then, you have what we call User Interface. So, that the User Interface (the decision maker) interacts with the Models using the User Interface. The decision maker also interacts with the Data using the User Interface. It is a 2-way interaction. Your query get the results or run the Models, get the output etc.

So, where is Knowledge in this? So, as you keep on going or you proceeding here between Data and Models, the Knowledge comes here, where it is a 2-way interaction with the Models and it is a 2-way interaction with the Data. So, this is one way you can think about schematically how the DSS aspects.

So, we studied:

- 1) Data
- 2) Models
- 3) User Interface
- 4) And, here is our +optional which is our fourth one.

So, this is how you can think about the entire system interacts. But with this you also need to understand one more thing.

- 1) Each component, whether it is Data, whether it is Models or something, each component will have several variations. Different variations do exist for this kind of Each component.
- 2) And, most of the time which is presently in the current scenario, are deployed online. So, we are talking mostly on the internet, connected over network.
- 3) And, lot of the systems are custom software developed in commercial mode.

So, just to understand that each component, whether it is Data, whether it is Models, whether it is User Interface or Knowledge, they will have many variations, multiple variations. And, because each decision situation demands one, most of the time they are deployed online. Earlier they used to be legacy systems, standalone systems, but now it is mostly online Web-based Systems.

And, lot of the time this software are custom software or this Decision Support Systems are customized software that are deployed in a commercial mode. That means for a specific purpose, for a business who intends to make profit or maximize the share value, that kind of an organization is driving commercial software development, that is supposed to aid in making better business decisions.

So, the typical types of this. There are so many, but I am just going to talk about 2 in this case.

- 1) Model-oriented DSS- The DSS (Decision Support System) that are primarily driven by the Models.
- 2) And then, there is another one, the Data-oriented DSS. The prime driver there is the Data.

This is how we already covered many basics of this, but this is how we will be getting into the advanced aspects of decision making. So, we will be picking up speed in this.

So, the Business DSS Definitions. There are many definitions depending upon the textbook that you use. There are so many different definitions, but we will take the multiple operation definitions that are relevant for our course. So, whatever is important for our course or relevant for our course, that is what we will be doing.

The first operational definition is that:

- 1) System intended to support managerial decision makers in semi-structured and unstructured decision situations. So, for us, the main discussion at this point is

managerial decision making in semi structured and unstructured decision-making scenarios or situations.

- 2) Systems that are intended or that are meant to be adjunct to decision makers. They are supposed to be adjunct. They are supposed to facilitate. In what sense we do the adjunct here? The sense of adjunct is extending their capabilities to make decisions, but not replace their judgment. This is a very critical aspect for us. It is an adjunct. It is an assist to the decision maker. Main aim is to extend their decision-making capabilities without replacing, not touching. This is very critical word. But not to replace their judgment or their acumen. We are not intending to replace their judgment.
- 3) Systems aimed at decisions that require judgment or at decisions that could not be completely supported by algorithms. So, the aim here is or the intention here is to have a system that facilitate decisions where some individual judgment is required or decisions where you do not have a total algorithm. There is no specific problem-solving approach where you give the Data and the Models put together the decision value, numeric value is spread out to you and you blindly follow that. So, that kind of a scenario does not exist. So, in those scenarios also the business decisions or such DSS is relevant.
- 4) Would be or the DSS would be computer-based. So, we need a computer-based system that can operate interactively. So, it is a computer-based system that should be able to operate interactively with the decision maker. The decision maker should be able to interact with the computer system and should also possess or it should have graphical output capabilities what we call the GUI (Graphical User Interface), graphical output capabilities is also part of it. So, it is a computer-based system that can operate interactively with the decision maker, but it also should have graphical output capabilities.

So, if you look into this, the first definition supports the same is in structured and unstructured problem. Whereas, with the decision maker it also is intended to become an adjunct and assist to the decision maker where it should not be replacing their judgment but it should extend their capabilities. And, this also should help in the places where, there is no complete algorithm available and it should be computer-based interactive system that should be also have the graphical output capabilities.

So, one question lot of the time students ask me is the DSS versus Business Intelligence. and people says what is DSS differ from BI. The main point or the most important aspect of this as far as I am concerned is,

- DSS is typically created to support the solution of a certain business problem. People says this is a certain business problem and it is a big word (as the people

- tell you what the) big thing is. One way to understand this is or to evaluate a specific opportunity that is be intended as part of this, where we will be evaluating a specific opportunity. So, it is more intend to this specific business problem.
- So, the specificity is a key difference between DSS and BI applications. So, DSS is meant for a very specific business problem or an opportunity, whereas BI is the other way. So, let us talk about some important aspects of BI.
    - BI systems or the Business Intelligence systems monitor situations and identify problems and/or opportunities through the use of various analytic methods. So, there is no specificity as such for BI systems. They can monitor multiple situations and can identify problems and opportunities and you mostly use various analytic methods to do this.
    - The user generally must identify whether a particular situation requires attention. So, in the case of BI, the user is the one who must identify whether there is something need to be done or should be ignored.
    - Reporting and data warehousing is the major chunk or role of BI. The reporting or creating reports or warehousing collecting data and aggregating, storing them efficiently etcetera is one of the major aspects of BI.
  - ❖ So, in contrast to all of this, DSS often has its own Database and Models, unlike collecting data and aggregating, storing, categorizing, reporting, charting etcetera which is function of BI. DSS specifically focuses on a specific or a certain business opportunity or business problem and the specificity is one of the major aspects of DSS. I hope you guys understand now that comparison.

The major features of business DSS. What are the major features or major aspects that we need to consider?

- As we mentioned earlier, the DSS is an approach (or a methodology) for supporting business decision making. How does this happen?
  - uses an interactive, flexible, adaptable Computer Based Information System. So, it is an interactive system, within its specificity it is flexible and it is adaptable, it can adapt to the style of the decision maker. So, it is a CBIS (Computer Based Information System). So, if somebody says CBIS then, that is what we are talking about.
  - developed (by end user) by the decision maker for supporting the solution to a specific non-structured (this includes unstructured and semi-structured, we will discuss what these are) management problem. The end user, the decision

maker usually develops this one to support the solution to a specific non-structured problem, that is the other aspect.

- uses Data, Models and Knowledge along with a friendly (often Graphical) User Interface. Whom is it friendly to? To the end user. End user is the decision maker.
- Then, it is also capable of incorporates the decision maker's own insights. It is capable of incorporating the insights of the decision maker. The specific insights of the decision maker.
- Supports all phases in decision making. Whether it is collecting data, evaluating opportunity, alternatives, making a decision, quantifying the decision, this all part of it.
- Can be used by a single user, either you can have single user or by many people. So, either can be a single person or can be multiple people. So, these are the major aspects of Business Decision Support System. That would make it specifically important.

So, again remember as I showed here is DSS is an approach or a methodology for supporting decision making. I would add a qualifier here. I would say it business decision making, that is the important aspect in this place. So, stay tuned for the next lecture. Thank you.