Computer Aided Decision Systems – Industrial Practices Using Big Analytics

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Lecture 02

Characteristics and Capabilities of DSS

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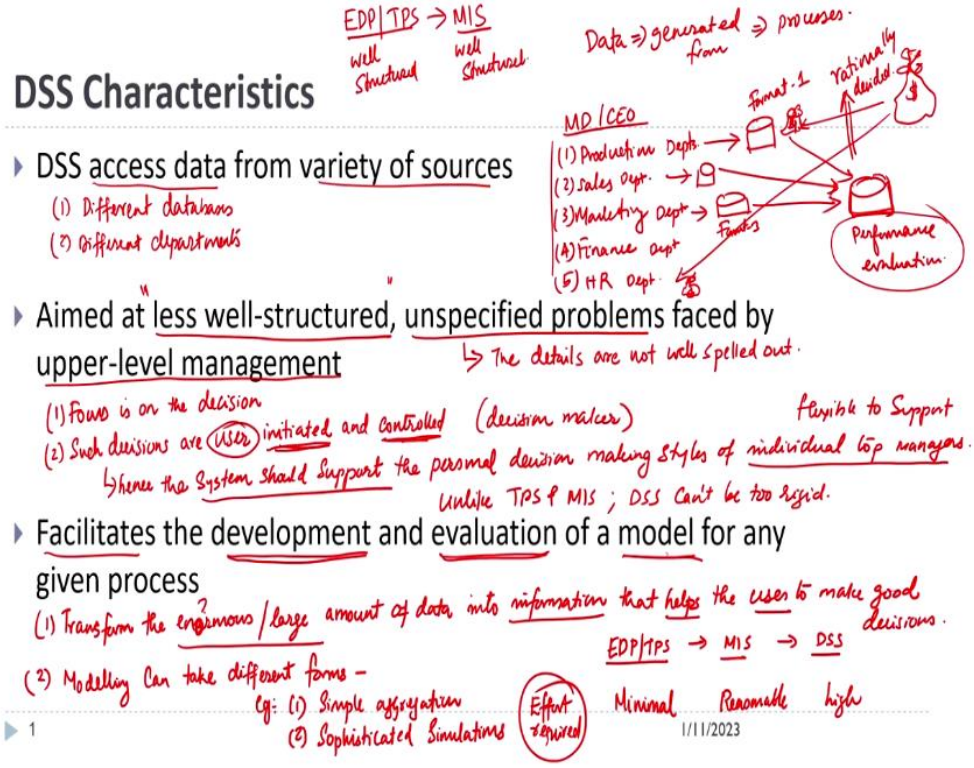

Now we will continue our chapter to the DSS characteristics. The main aspect of DSS is that, DSS access data from variety of sources. So, the first aspect of it is different databases, and second aspect is different departments. So, let us talk about this aspect, at this point, where let us say, you are the MD or Managing Director or CEO of a particular company, and you have production department, sales department, marketing department, finance department and HR department available in front of you. These are all individual departments. Each one of them will have their own database and you would pull their data from their own database. And from there you have a system which pulls data from all these databases. So, you are also pulling data from different databases, in different format.

Now, let us say, you have some amount of money with you. You want to decide how much money is to be divided among these departments. So, you are trying to do the performance evaluation. So, you are going to make the decision of how much money to be distributed to each department. So, it requires you to look into the performance of all the departments from different databases, collect

them together, and do the performance evaluation for each department in your own ways, and then rationally decide.

So, what happens is, this decision process is usually less well-structured. And, the problem is mostly unspecified. Unspecified in a sense that the details are not well spelled out. You do not know the exact details of it, or not all aspects are clearly mentioned. So, the upper level management typically faces this issue, because their problems are very less well-structured and they are very unspecified, because the details are not very well spelled out.

So, in that regard, what is the main thing? Your focus is on the decision, and such decisions are user initiated and controlled. So, who is the user that initiates and controls? The user here is the decision maker. Such decisions are user initiated and controlled; hence, the system should support the personal decision making styles of individual top managers.

Unlike TPS and MIS, DSS cannot be too rigid, or it should be flexible to support the individual top manager, or flexible to support the personal decision making style of the individual top manager. So, then the DSS also facilitates the development and evaluation of a model for any given process.

It allows you to develop a model, and it also allows you to evaluate the model. If you are given any process, and can you create a model to capture that process? Usually, processes generated data; and once you have the data, then you can use the data to create information, from which you can develop model, and then you can evaluate those models for that purpose.

So, how is that done?

The first step is, you transform the enormous amount of data, or large amount of data into information. What information? Information that helps the user to make good decisions.

Then second part is, since you are able to model this, then you can say that modelling can take different forms. So, there are multiple ways you can model forms. For example, simple aggregation is one model and the another one is sophisticated simulations. So, just take the data, and then just aggregate them, or you can just create sophisticated simulation out of it.

An another aspect of this DSS is that if you look into the EDP or TPS, you look at the MIS and the DSS. And if you look at the effort required for each one of this category, the minimal effort is required for EDP and TPS, and for MIS you require reasonable or moderate effort, and the DSS requires high effort or large amount of effort to realize or make these decisions in the appropriate fashion.

The DSS, in a way, is something that is an evolution of MIS. But with the intention of getting relevant information from different databases, different departments, different sources, and in different forms, bring it together to one place, collide it in such a way that the top-level decision maker can look into it. So, the decision making process in the DSS is initiated and controlled by the top-level decision maker.

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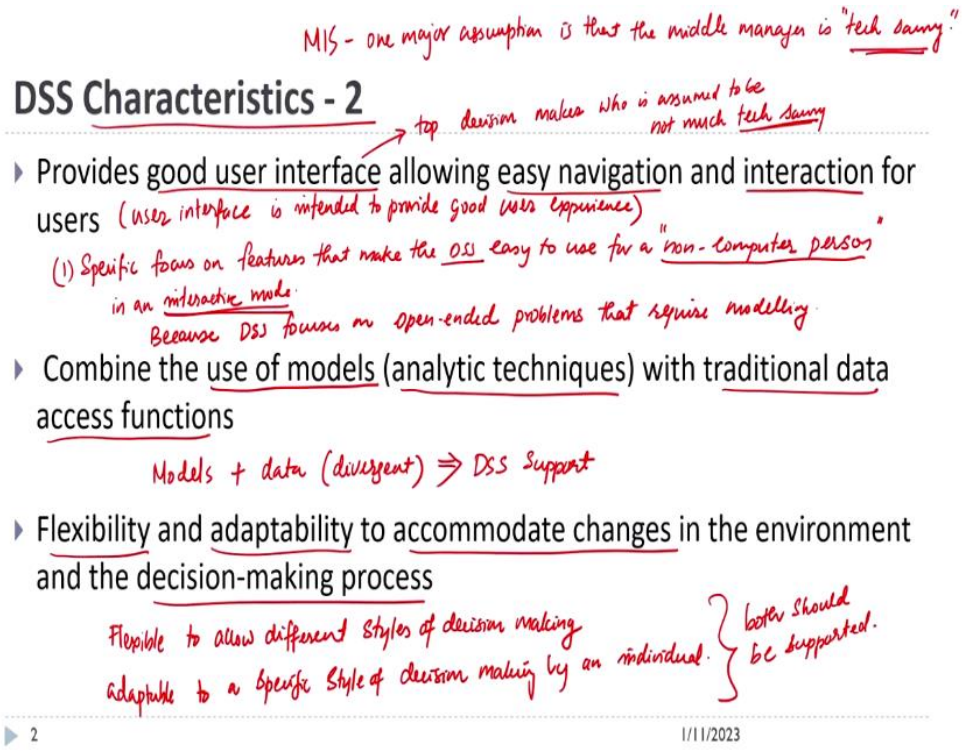

The second part of DSS characteristics is it provides a good user interface, which will allow for easy navigation and interaction for the users. So the user interface is intended to provide good user experience. Why is this very important in the DSS? In the MIS field, one major assumption is that the middle manager is tech savvy; which means the middle manager is not technologically challenged. He is capable of learning and handling technology. So, the user interface need not be too simple. Whereas, the good user interface for the DSS is intended towards the top decision maker, who is assumed to be not much tech savvy. Even though, this assumption need not be true reasonably, but earlier, this decision or this assumption holds good.

The major aspect is specific focus on features, that make the DSS easy to use for a non-computer person in an interactive mode. So, a non-computer person is the critical aspect here. A person who is really not tech savvy, or not really comfortable with the computer. The DSS should have enough features to allow the non-computer person to easily use the system in an interactive mode. So, the thing is why do you need this? Because DSS focuses on open-ended problems that require modelling.

For example, if I am a CEO of a company, and let us say, I am making cars and I want to decide, whether I need to invest 100 million dollars in building a new factory, which can produce more cars. It is a long term investment, for maybe the next five years, which involves a lot of money and lot of risk, purely because of the fact that I am going to invest in a particular technology, and I am hoping that in the next five years, I will be able to produce so many cars from that plant that I can sell, and I can make money out of it. That is my assumption at that point.

It is an open-ended problem. I am not very sure, whether a new company will come up in between, and they will come up with a phenomenal new car, which has a brilliant design, good mileage etc, and then nobody will buy my car.

So, these kind of decisions, which are open-ended. So, the person who typically makes this. If you take big business leaders, they might not be tech savvy, they might not be able to write programs or code. They may not do Python Programming, or anything like that. So, they would be dependent on their very easy to use user interface to interact with the system, to still see what will happen if a new competitor comes into picture. What will happen if the technology will change away from diesel or petrol to electric or hydrogen, etc.

In all these aspects, these complicated what if scenarios, need to be analysed, and appropriate feedback to be given to the decision maker, to make sure that a decision can be taken, which will minimize the financial risk or damages to the company in the near future. So, if you take a look into this, what does this require? It requires the use of models. We can say analytic techniques in this.

So, in one way to think about these models, it can be analytical models, it can be quantitative model, or it can be simulation models. And for this case, qualify this data with the word divergent. We are not using the word big data, We are using the word divergent data, purely because of the fact that data is coming from diverse sources. It is not diverging data, but we are talking about is diverse sources, and diverse formats, etc, all those kinds of things. So, we are calling this divergent data, will give you the DSS support.

The main aspects of the DSS characteristic is flexibility and adaptability. It should be flexible enough to accommodate different decision making styles, and it should adapt to the style of the decision making to accommodate changes in the environment and the decision making process. So, both aspects is critical for the DSS. Both should be supported. So, that is an important part.

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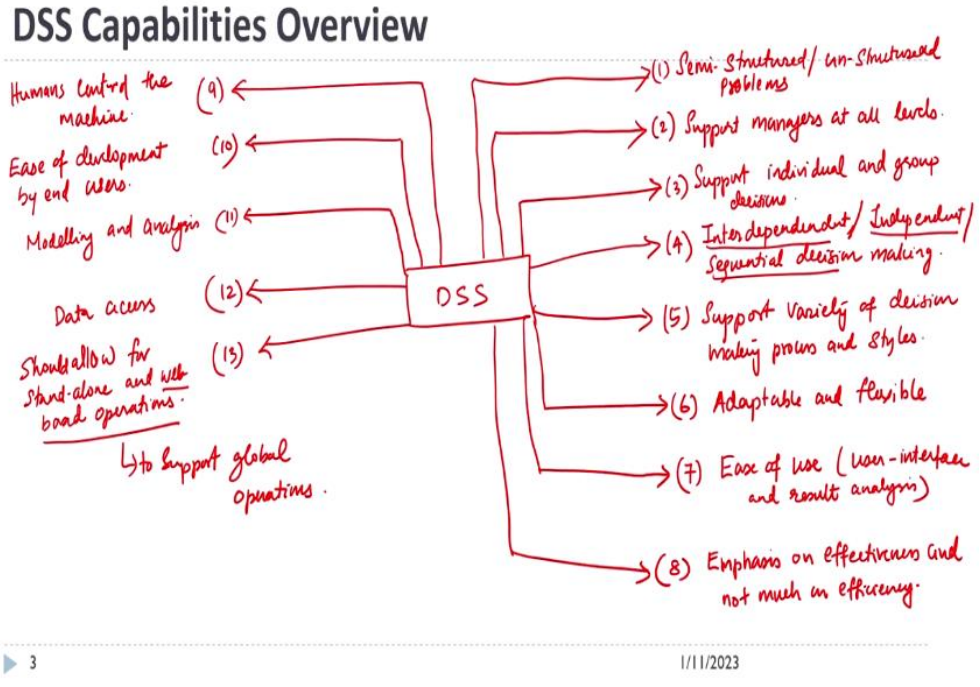

Now, we have seen two different characteristics of DSS. So, now with that, let us look at the capabilities.

1. So, I will just use DSS as semi-structured or unstructured problems. We are talking about either semi-structured or unstructured problems, as part of that. That is one aspect of DSS.
2. Then we talk about the second one, which is, it should support managers at all levels.
3. Then, the third one is support individual and group decisions. So, the DSS should allow an individual to make a decision, or a group should also be able to use the DSS to make a decision.
4. Then comes is the, inter-dependent, independent or sequential decision-making. So, it is like, I as a decision maker, I make a decision, and based on my decision somebody else make a decision, that is called as the inter-dependent decision. Independent decision is as the CEO of the company, I make a decision and that is it, nothing else. So, that is all done by itself. And then, the sequential decision making is that there is a decision that is being made by one individual, and that decision results in another set of decision by another individual or a group, and then that decision leads to another decision kind of a thing. So, it is a chain of decisions, what we call as the sequential decision making.
5. It support variety of decision making process and styles. It should allow variety of decision making process. People should be able to make different type of decisions as part of it, and different styles of decision should also be supported.
6. Then one of the other term that we used earlier, i.e. adaptable and flexible. You should be able to adapt individual different decision making style, and it should also be able to be flexible enough, for people to make different type of decisions.
7. Then comes is the ease of use, i.e. user interface and result analysis. The system should be very easy to use, and you should have enough capability within itself, so that the decision maker should be able to use the user interface to make decisions, and the result should be presented in such a way that the decision maker can look into it, and easily do alternative analysis.
8. The other aspect of it is emphasis on effectiveness, and not much on efficiency. The problem with the DSS is that most of the time during decision making, you would not have the right metrics in front of you, so you may not be able to evaluate, whether the decision made is very efficient decision or not. But you can reasonably variate, whether the decision is effective. So, the system should allow you to focus more towards effectiveness, rather than efficiency.
9. Now, let us take the ninth aspect of it. Humans control the machine, the main thing here is that the decision maker, the individual, the human being is the one, who should be making the decision, and not the computer. And it is not that you are checking a check box, and say yes, I agree, kind of a thing.
10. Then another aspect of it is ease of development by end users. As the end user, whoever it is, should be able to develop and add more features and functionalities to the system.
11. Then another aspect of it is modelling and analysis. It should support modelling and analysis.
12. It should also allow for data access. We mentioned this earlier, complicated data from divergent data, from different sources, it should be accessed.
13. It should allow stand-alone and web-based operations. If you want to use it in a stand-alone mode, then please use it. Web-based is usually to support global operations. Now, factories

are all across the globe at different parts, so it should allow for global operations in this regard.