Management Information System
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Lecture - 03
Introduction – III

Welcome to all. Today let us begin the third lecture on the Management Information System. This is the third part of the introduction in which we shall cover the various types of information system number 1 and number 2 the competitive advantage that we shall get with the use of management information system.

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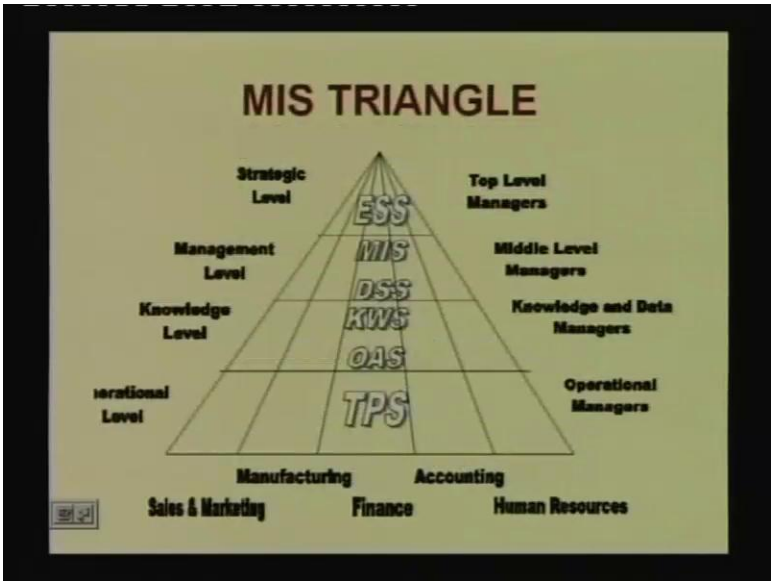

We have already shown the MIS triangle and we have already discussed the various kinds of information systems that we have: the transaction processing system, office automation system, knowledge work system, decision support system, management information system and the executive support system for various levels of management.

As you can see that the various levels of management carries out various kinds of work in the context of an organization. The first and foremost the operational managers they carry out the day to day activities of the organization basically taking care of the transactions. The transactions

can be said you know something like whenever let us say in the context of payroll processing if we have to process our salary then on everyday basis we have to know the attendance of the employees, know whether the people are present on every given day then we may have to say whether there are some special kind of allowances like in a factory set up people earn various kinds of incentives and these incentive will depend on the kind of work that people do on a day to day basis; something like the standard man hours booking SMH booking, whether they have... if someone books a lot of SMS sorry that standard man hours SMH probably this particular worker will get more incentives. So all these transactions they are to be coupled together and they are to be processed so this is basically our transaction processing system.

Then the knowledge and data manager is a class of its own. Basically although they are put on the second level of hierarchy but they have little in common with the operational level managers or middle level managers. The knowledge and data managers they work on their own and they basically try to solve problems of the organization and try to create an environment so that the operational managers or the middle level managers can work in a better environment tomorrow. And these kinds of knowledge work and office automation type of work basically they are more of you know scientific type of problem solving, the building of expert systems, building of knowledge systems, creating an environment of the office something like say paperless office you know those type of systems they are coupled together at the knowledge level of management.

At the third level we have the decision support systems and management information systems for the middle level managers. See the middle level managers their purpose is to plan and control the operations. They have to see that operation level managers they have the resources. Basically it is with the middle level managers the operational managers will ask for the resources and these resources that will be obtained that will be given to the operational level managers by the middle level managers.

Now this resource bargain process naturally they have to obtain... I mean you cannot just give the resources to the transaction managers just like that, you have to see their work, you have to see the plan, you have to see the utilization of resources, the efficiency, the effectiveness all

these things so you have to make decisions and these decision making can be helped with the help of the decision support system helped or supported with the help of decision support systems and the management information system which basically would look at the summarized information and the exceptional information particularly so that control process can be on and also the summarized reports can be sent directly to the executive support system for strategic level of decisions at the top level of the management.

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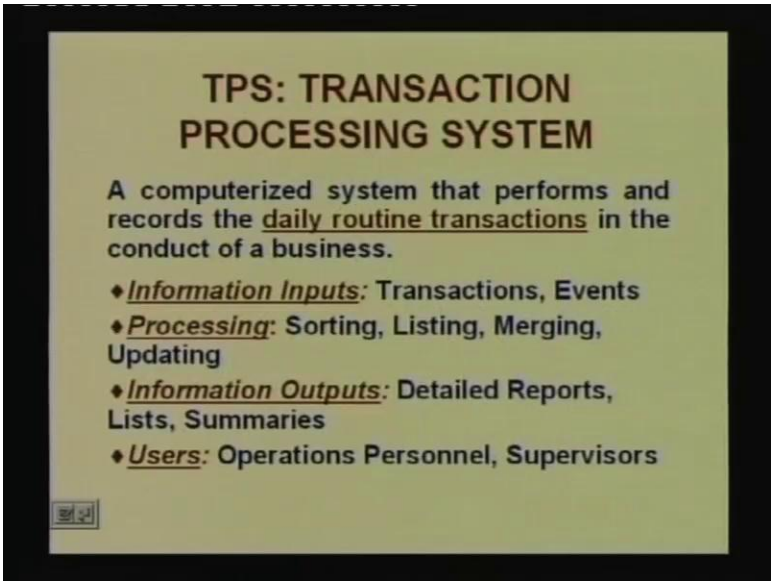

So let us begin with the transaction processing system. The transaction processing system is a computerized system that performs and records the daily routine transactions in the conduct of a business. So here the information inputs are transactions or events.

Processing: sorting, listing, merging, updating.

Information outputs: detailed reports, lists and summaries.

The users could be operations personnel, supervisors and so on.

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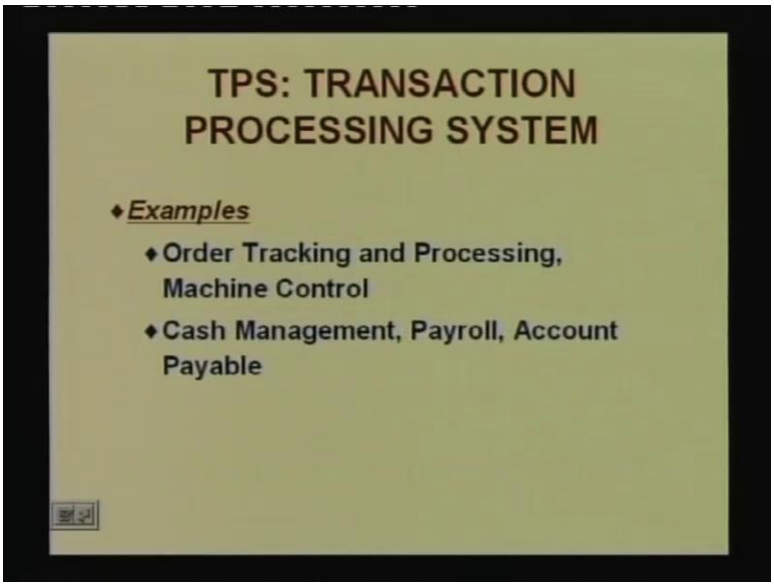

So we can see that, we can think of an example later I mean detailed example later. At this point some simple examples like order tracking and processing, machine control, cash management, payroll, account payable and so on of transaction processing system.

Transaction processing system as you can see here in particular TPS transaction processing system let us think of a simple payroll system and as we have said that the various inputs for them the inputs for the payroll system could be the attendance, then the basic and DA, increments, promotions etc., incentives, earned deductions such as provident fund, loans, society, membership etc. So there could be so many different kinds of inputs which we may like to capture for a payroll system.

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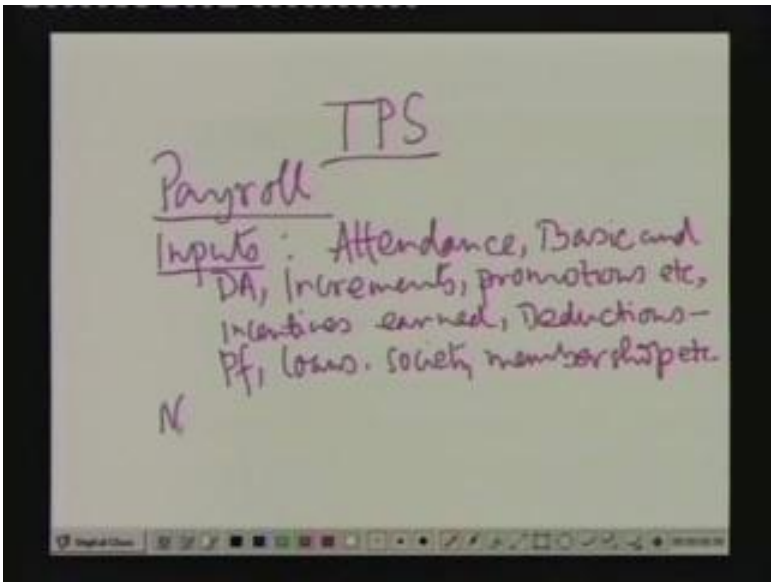

Now we require a set of master file such as the employee master where we have the details of the employee, we may have the PF ledger where the employees' PF earning may be put into then we may have various small small master files to capture the changes in the basic pay, the DA structures and so on so different kinds of master files can also be thought of and also the outputs. Large number of outputs can be thought of. But most important ones could be the pay slips, the pay bills etc.

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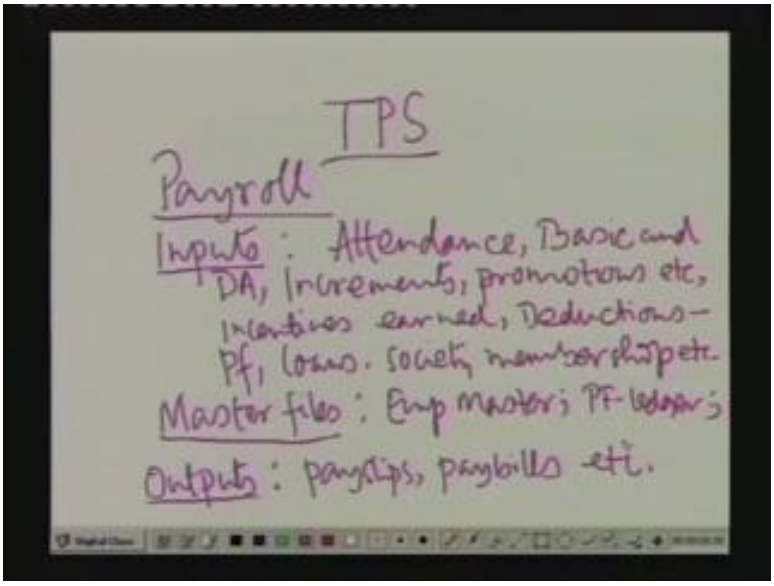

So, for a simple transaction processing system such as payroll we have the different master files and the inputs we can think in terms of transactions.

Attendance transactions are generated almost every day. Whenever the attendance records are kept these attendance records are to be updated, the changes in the basic and DA through increments, promotions etc. are to be taken care of, the incentives earned for the particular month has to be calculated on the basis of various information like standard man hours booked etc., the deductions are to be taken care of with regard to provident fund, with regard to loans, with regard to society membership and so on and at the end of it all after the transactions are taken care of may be online or may be through batch processing; online means as and when data is available update the master files or may be at the end of the month in the form of batch processing; all transactions are taken together and the master files are updated.

Finally the outputs are to be produced; the pay slips individual pay slips for the employees and the pay bills which will be required basically to find out how much money we require to pay this particular salary for a particular point of time. So that is about the.... a particular... very simple kind of a thing for a transaction processing system and these transaction processing systems therefore... you can see that there is a huge amount of data and these data has to be captured in the form of transactions we have to make a decision of a batch or online.

So here are some of the important questions about transaction processing systems. Batch or online, then master update, data capture. So validation is very very important and obviously data integrity. The validation and data integrity they are highly connected. So all these are very important questions that whether to process that batch at the end of the period or update it as and when available or we have the data capture, the master update process, the data capture process, the validation of data therefore the integrity of data that means suppose we are collecting some data.

Suppose we have the data about someone is present 35 days in a month it is impossible, you know it just cannot happen. So naturally this is this data is not really correct. So whether there is a way by which we can actually capture data.

Someone is a group D employee and therefore his salary cannot increase a basic pay beyond a certain level. So if you find a basic pay for a group D employee which is much higher than what it should be or even higher than what it should be that means the data is... there is something wrong with the data integrity. So there are large number of questions, these are only four representative questions I have put here. All these questions are to be answered. Data is to be captured, validated, updated, processed and finally the output is to be generated. So these kinds of challenges are all most always true for a system whenever we are dealing with a transaction processing system.

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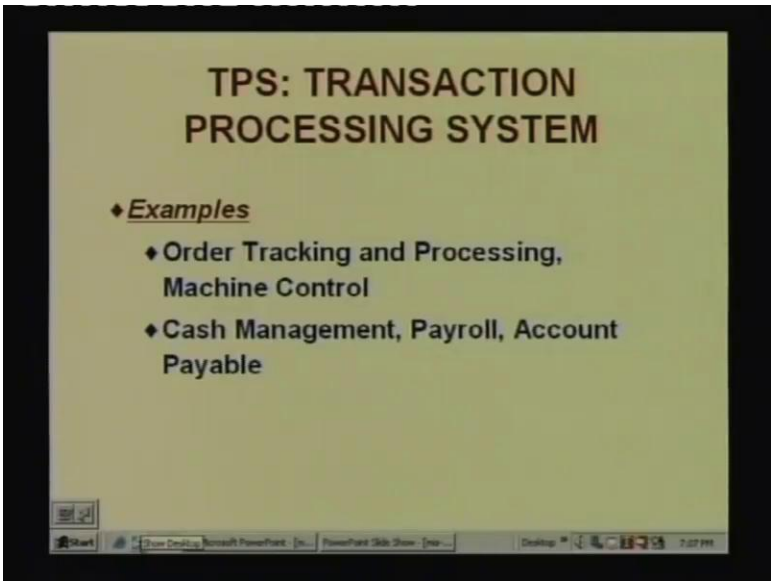

Now naturally the entire system analysis and design which we shall cover largely covers the transaction processing system. The transaction processing system one can say are like pillars or backbones of information architecture of an organization. So if the transaction processing systems are not in place the higher level information systems like DSS, management information systems, executive support systems they simply do not work.

Now, from transaction processing system let us make a quick review to your office automation systems. We have seen the transaction processing systems. Now let us try to see the office automation systems.

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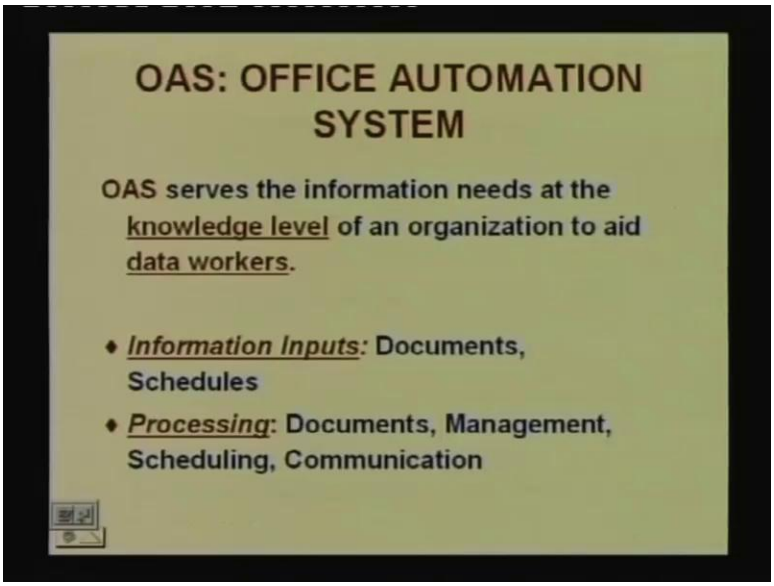

The office automation system servers the information needs at the knowledge level of an organization to aid the data workers. See data workers means anybody who is working with data; not really processing of data. So, in that sense a person who writes programs, a person who does information processing obviously is a data worker in some sense. but mainly this is meant for the kind of people, basically the office people or even the people at the management level who are using data on a regular basis, who are using documents, who are using schedules and you know processing documents, managing them, scheduling, communicating.

Say for example; if we have to take leave for one day in a particular organization the manual system would require that we fill up a form then we put it in the office then from the office it goes to the appropriate manager, the manager sanctions it or does not sanction it, goes back to the person concerned and you know the entire process is manual and it can take time particularly if the concerned manager is not available.

We can think of an alternate system where the whole processing is taking taking place in an electronic manner. If we can do it we can call it is a kind of office automation system.

Say suppose you can think of a library system where you can have books online available at the click of a button. So this is also a kind of office automation system. Suppose you have prepared a particular timetable or a schedule and if the schedule is made available to all the managers along with a white board and in this white board everybody can put a comment about this particular schedule or the timetable then basically we have done some kind of office automation.

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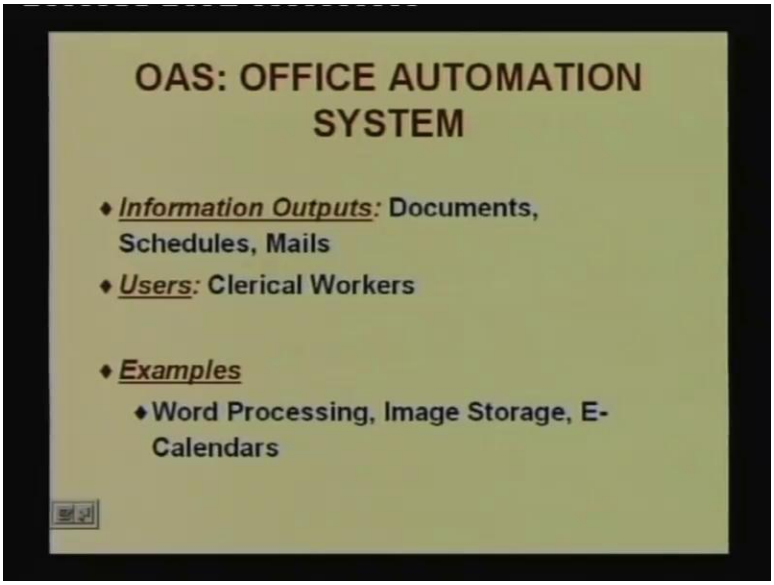

So information outputs in the form of documents, schedules, mails. Users are usually clerical workers but not necessarily, you may also have managers. Examples: word processing, image storage, E-calendars etc., so these are all examples of office automation system.

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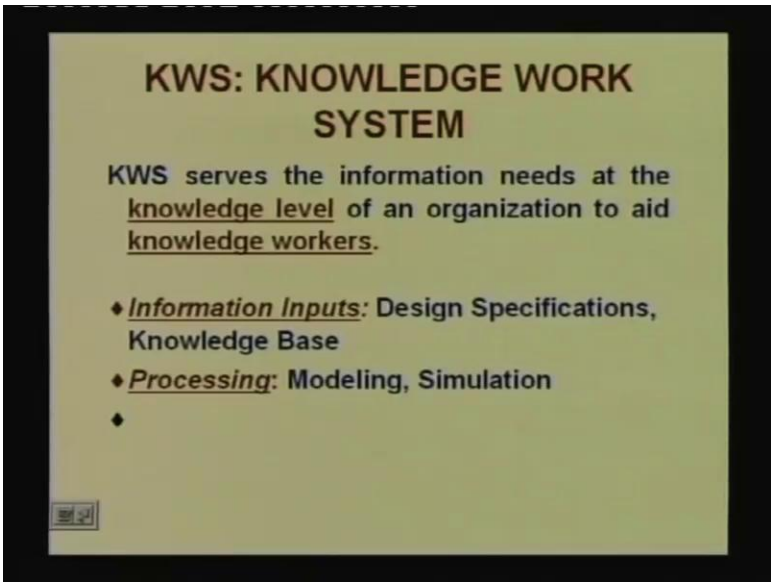

Now knowledge work system: the knowledge work system serves the information needs at the knowledge level of an organization to aid knowledge workers. You see the knowledge is something different from information. Information is something which is processed data and useful for decision making. But knowledge is you know at one level up. You may even say it is a kind of processed information. So something becomes knowledge only when you know it is something that gives you an etc., capability to process information.

So if you do not have this particular knowledge probably you will not be able to process information in that much better fashion. That is the basic difference between information and knowledge and knowledge essentially therefore works with information but not just information whether you can build a structure in the information. When you are able to build a particular structure in the information then probably you can say that okay we have gained knowledge about a particular thing.

As an example; think of a doctor. How a particular doctor basically diagnoses a patient. The doctor actually hears certain what you say that symptoms or complaints from the patient and probably does certain tests. So through the test reports and the observation of the patient, the symptoms, he actually analyses and comes up with a solution to the problem of the patient.

Now the typical doctor patient relationship you can also translate into let us say a machine diagnosis. Suppose you have equipments equipment in your organization which are not working as there are faults, so the people the experts they actually look at the equipment, find the machine condition through a set of probably you know vibration measurements or some other measurements they find out certain criteria about these particular machines and through all these they find out what is the condition of the equipment and comes up with a prescription as what should be done. So it is a knowledge work in the sense that this particular process how it is how it is how this particular expert is processing this set of information to come up with the prescription. If we can get something through which we can predict the process then we can say that we have gained knowledge.

Now you see this is a very ambitious kind of thing if we can really get the knowledge of a doctor then we can be doctors ourselves. If we can get the knowledge of you know fault diagnosis of equipment we can also do the fault diagnosis. Now we here probably mean the computer. So if we can put all these things in the computer and we can have an information system through which we can translate this knowledge so instead of the doctor a software is the doctor, instead of the person who does the machine diagnosis it is the software which does the machine diagnosis; if that can be done we can say that we have been able to develop a knowledge work system. So this is the basic idea of knowledge work system.

I gave two examples from doctor patient and machine diagnosis. But you can translate these to almost any kind of systems any kind of systems say for example with design specifications or any other those type of systems where we can say that using these scenario we can build a situation through which we can build a software which can help us in coming up with a better design, coming up with situations where the previous design faults can actually be eliminated. So definitely there has to be... like a data base we have to have a knowledge base where we can keep all the bits and pieces of information and the structure we build around them. The processing could be modeling, processing could be simulation, processing could be any other model which might be used for let us say expert systems.

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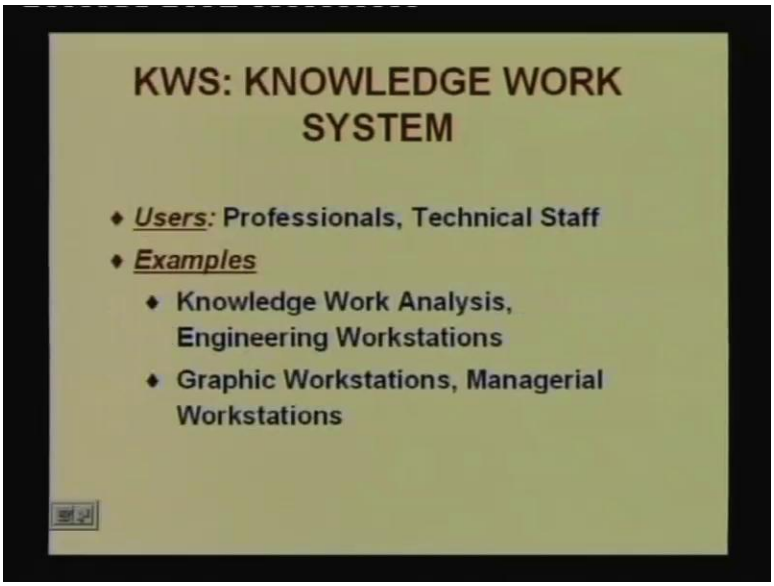

Users here are professionals, technical staff and we may require support in the form of various kinds of workstations like engineering workstations, graphic workstations, managerial workstations and so on. So these are very important in the context of knowledge work.

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Now moving over from knowledge work let us try to see the basic characteristics of management information system as it appears for the middle level management. So the basic idea of MIS is planning, controlling and decision making at the management level.

Characteristics: reporting and control, rely on existing corporate data and data flows, have little analytical capability, aid decision making using past and present data. So you see MIS is not really to support decision in the sense that we are doing analytical we are doing analytical work, we are doing an analysis type of thing not really, it is basically depending on the past and present data and through this data we are making our processing. Okay. So what kind of processing we are doing in case of MIS? Basically we will come to this, the processing, that...

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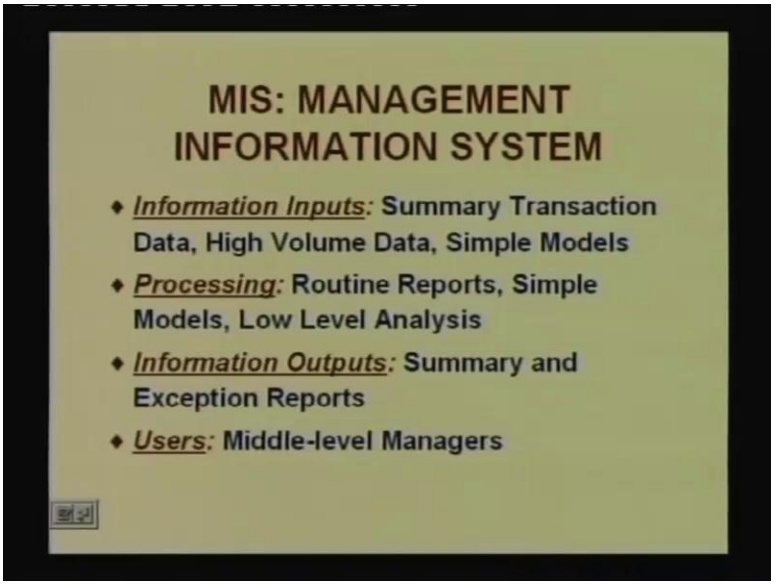

What we are doing is basically summary, summary kind of the thing and exceptional reports. Summary reports and exceptional reports. These summary and exceptional reports, exactly what we mean let us try to see through an example.

So let us see MIS what exactly we mean by the summary and what exactly we mean by exceptional reports because this term is coming back again and again. So let us say we have collected some information with regard to performance of a set of workers performance of a set

of workers. So we have the machine shop workers and we have the plate shop workers. So machine shop we have so many workers: employee 1, employee 2, employee 3 etc so maybe we may say machine shop employee ME.

Plate shop employee: PE 1, PE 2, PE 3 etc so all these details. So employee, employee name, employee name then after employee name we gave some kind of say present attendance of say 90 percent attendance, 95 percent attendance, 55 percent attendance etc. Then we can say the efficiency in a scale of 1. So 1.2, 1.1, 0.8 so some kind of efficiency and so on so all these measures.

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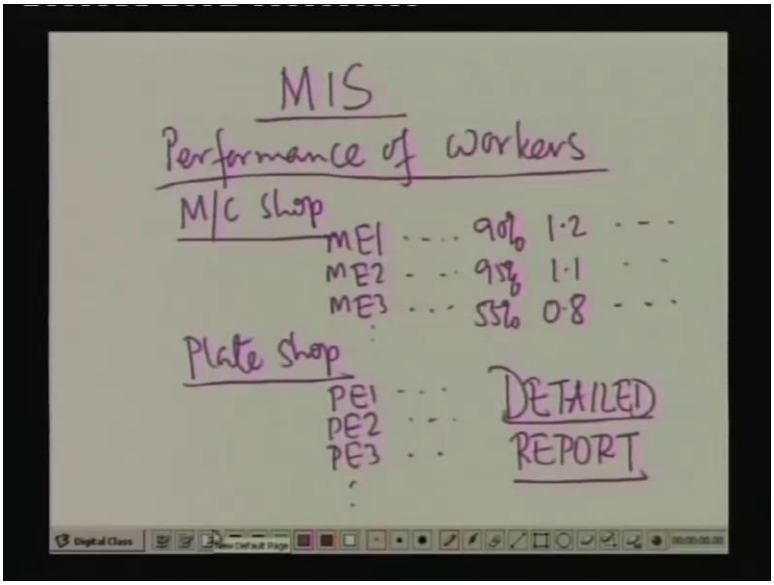

Now you see usually the machine shop and plate shop can have a very large number of employees. So giving the entire set of report could be called a detailed report and this detail report can be called as you know... this is like you can call this a detailed report. So this is a detailed report which gives all the details about all the employees in the machine shop, in the plate shop with regard to their performance, with regard to their attendance, with regard to their efficiency, with regard to their probably effectiveness and many other such features. So this is like a detailed report. But after we have got this detailed report we may like to have what is known as a summary report.

So a summary report will be... a summary report will be let us say machine shop say there are 250 employees and some other detail about them and then we can say the average attendance for them is 90.5 percent and average performance is 1.10 whereas for plate shop there are say 3 say 35 employees and the average attendance maybe 97 percent very high but their performance is really not that good, 0.95. So this is like a summary report right. Here we give basically the summary of the information that we have. This is one kind of summary. But we may also give... within the machine shop different bays are there so you may give bay-wise summaries as well.

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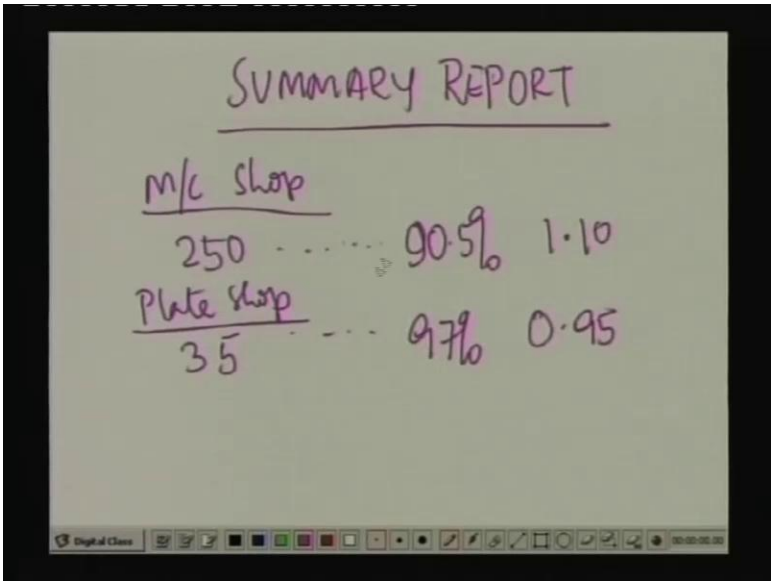

The other report that is important to us is so-called exception report. The exception report is actually is required when we say that, who are the employees, who are the employees with with best performance or who are the employees with worst attendance. So please understand the exception report is also a detailed report, it is not a summary report; it is a detailed report with a criteria. So it is a detailed report but with a criteria. So an exception report like who are the employees with the best performance or who are the employees with the worst attendance. So here we require complete details. So when we say that management does not have too much time they cannot really study the complete information in full detail probably but they are interested in detailed report in full detail about a certain class of employees; certain class of employees who are having best performance, certain class of employees with let us say worst attendance, so for

these kind of employees we are really interested in complete details. So these are actually my exception reports.

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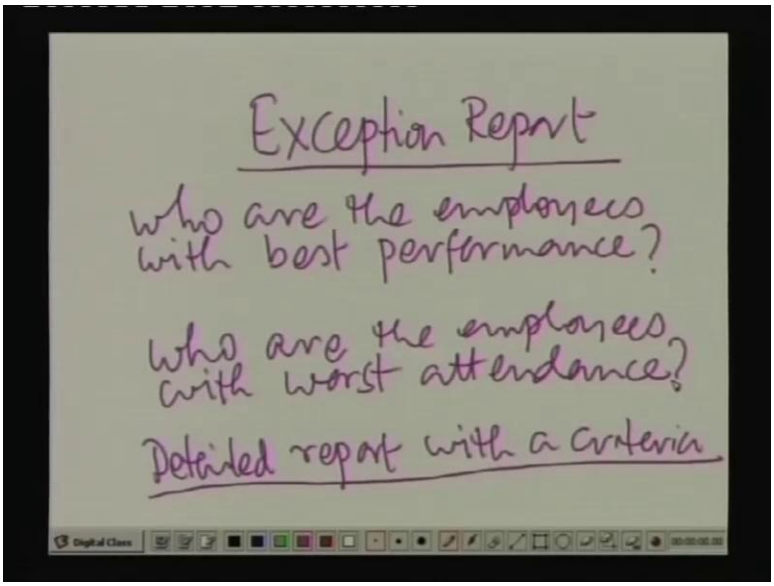

So both these summary reports as well as exception reports are important in the context of MIS right. So that is why what we would like to stress here that is that MIS requires summary as well as exception reports that is information output.

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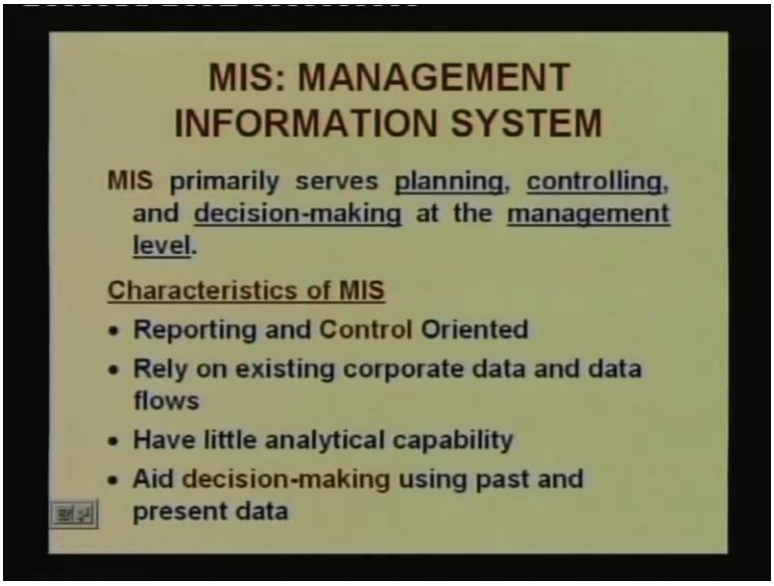

Now we were talking about the characteristics of MIS. We have told some of them like they should be reporting and control oriented, they should rely on existing corporate data and data flows, have little analytical ability capability, aid decision making using past and present data.

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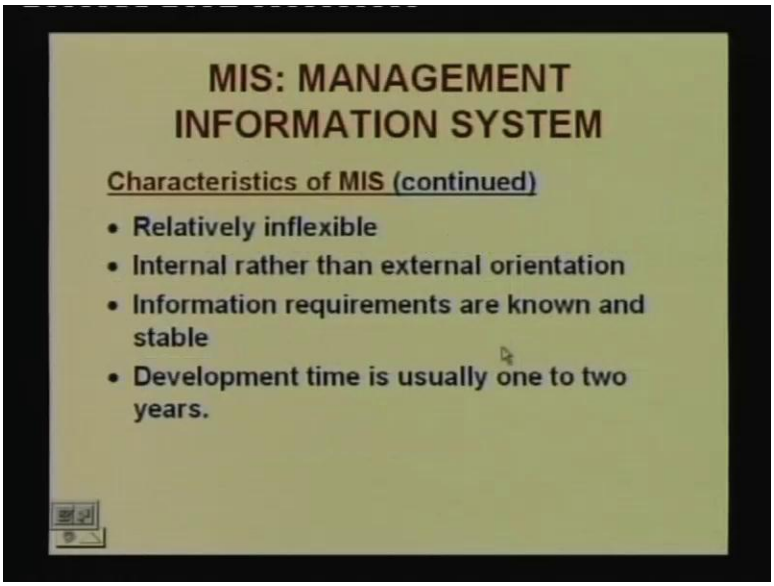

They should be relatively inflexible, they should be internal rather than external orientation and information requirements are known and stable and finally the development time usually is 1 to 2 years right. So those are some of the characteristics of MIS and using these particular characteristics the inputs summary transaction data... so where from we get the summary transaction data? We can get the summary transaction data from the transaction processing system.

For every therefore a management information system to be useful to be working we should have a transaction processing system available. Basically the transaction processing system will provide us with the detailed data. From that detailed data we create the summary report as well as the exception report which then we utilize for what purpose; for decision making purpose. So that is the important thing. Then processing should be in terms of routine reports, simple models, low level low level analysis. Summary and exception reports are outputs and the users are the middle level managers.

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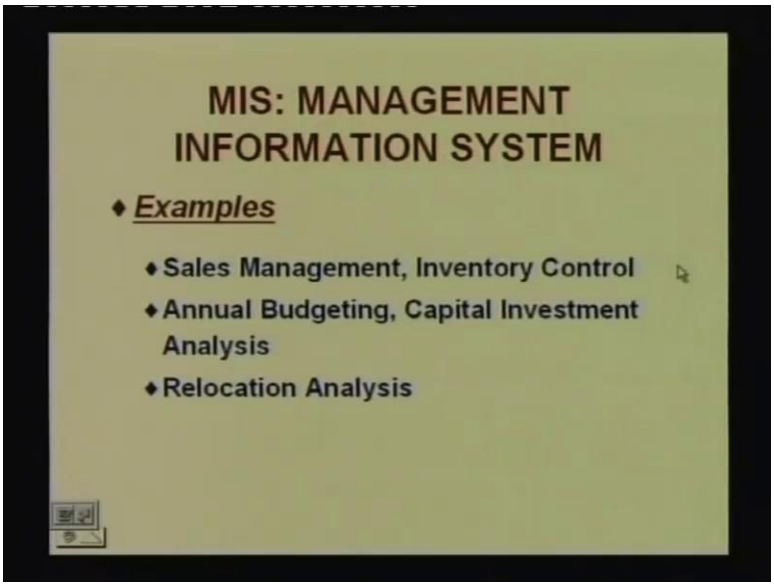

Some examples are like sales management, inventory control, annual budgeting, capital investment analysis, relocation analysis. So specifically because we are talking about the payroll example, with regard to payroll the MIS example could be the processing of the pay bill and further from processing of pay bill basically what kind of decisions that we have to take with regard to payroll. That means how to make the cash available. This is the kind of decision which is at the MIS level; how to make the cash available so that how much so the management would process, what was the cash requirement of payroll over the last few months. So this is an MIS report, it is a kind of summary report. Then probably the management may also like to know who are the employees on which the maximum amount of other than standard pay has been given. for example the highest incentive earnings, highest overtime earnings all these details exceptional details, who are the employees who have not got any salary because they are not present at all, perpetually absent, right; so all these things are going to be important in the context of MIS.

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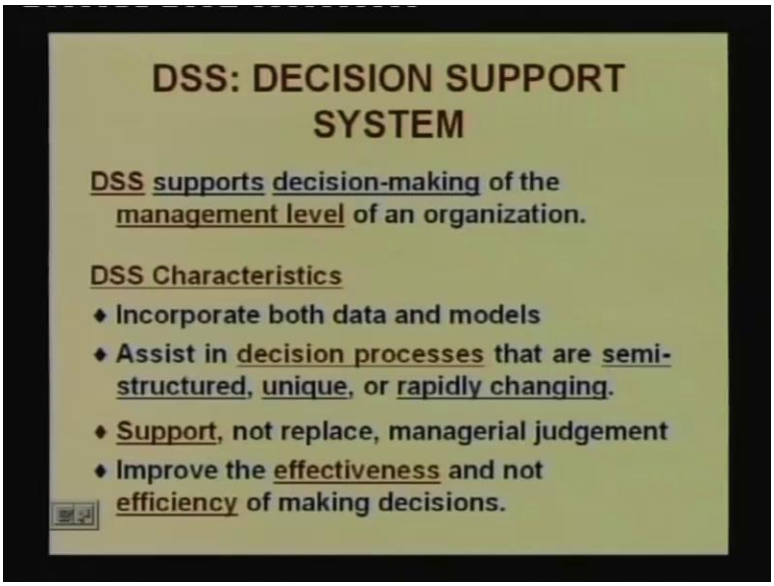

Now, coming to the decision support systems the basic idea of decision support systems is to give a support to the decision makers at the management level of the organization. Some characteristics of DSS: they incorporate both data and models, assist in decision processes that are semi-structured, unique or rapidly changing; support, not replace, managerial judgment; improve the effectiveness and not efficiency of making decisions.

So basic idea is supporting the decision makers to make their decision. Now we know that the decision process is essentially three essentially three activities, quickly let us see them.

The decision making process the decision making process: essentially there are three basic processes: the first one we call intelligence, then we have the design process and then we have the choice. Now these phases are actually in a feedback process so you can go always go back from intelligence to design, design to intelligence, design to choice, choice to design, choice to intelligence these processes are having a feedback mechanism.

Intelligence essentially means collection of the data, the model, the information regarding the decision or any bits on pieces which will be important in the context in the decision making context. So entire gamut of models the data, the details, the modeling parameters everything are

part of the intelligence. On the basis of the intelligence we carry out the design; design means design of different alternatives, design of decision alternatives.

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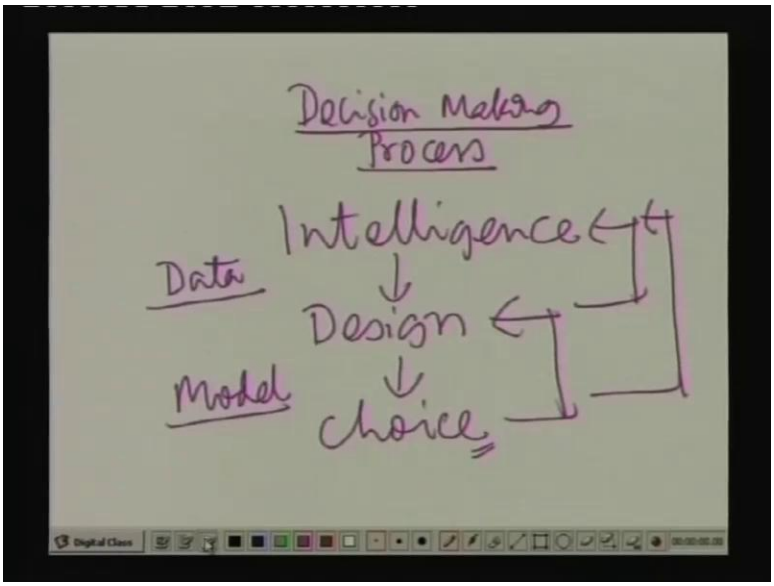

Now, from the various decision alternatives we have to make a choice. How do we make a choice; basically through a model. So we can see that we have the data here for intelligence and we must have a model. that means three very... and all these processes because whatever model we build it has to be through a process of interactive dialog because we cannot expect the managers to know the nitty-gritty of our particular modeling process.

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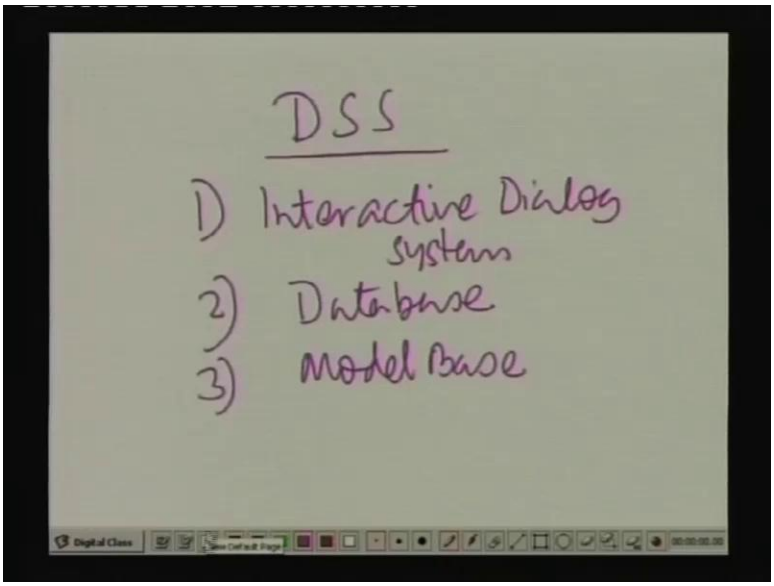

So basically whenever we talk about decision support systems we must talk about three simple things: 1) is an interactive dialog system, 2) a data base and 3) a model base. So there should be an interactive dialog process basically a dialog system through which the manager or the person who is using the DSS interacts with the system interactive dialog system a data base and a model base. So these are the three important components of a decision support system.

What is the basic idea?

The basic idea is not really... so going back to the previous one previous slide, so in the intelligence, design and choice it is really not... the purpose is that we we mechanize the choice no not at all. The idea is design the various decision alternatives, make them available to the manager to make the choice.

Let us give a simple example. Suppose we are making a decision support system for making the choice of a particular inventory control model. So we have different kinds of inventory control model like the RQ system, RS system etc. Anyway let us not go in to the detail of that but let us at least understand that there are various inventory control models and we have to make a choice of a particular type of inventory control model.

What we need to do here we need to collect data about all kinds of inventory situations and then we design the various alternatives. What are the alternatives before us? Either we follow an RQ system where we have a particular reorder quantity and an UOQ where the ROP the reorder point and UOQ they have certain fixed values or we can go for a periodic review where the periodic review period is something and we have an order up to level rather than a UOQ. So these are various designs. Now which design will be best with the given data?

So the various models that we have, these models will actually evaluate the various decision alternatives and tells us that these are the values. But the final choice should not be done by the DSS it should be left to the manager, why? Because you see apart from the model that we have built because no model can be 100 percent realistic the mangers mind may have many other points which we might have missed. So it is always preferable that we should not try to automate the decision in managerial situations.

Obviously in some ordinary situations we can automate the decisions like real time systems very specialized class; operational decision probably we can automate like our automatic teller machines which gives the cash automatically. But when you are taking a decision which inventory modeling models to follow this is a managerial decision and implications are far reaching do not take the decision, the decision may be taken by the manager the system will only give us various decision alternatives. So that is the basic idea.

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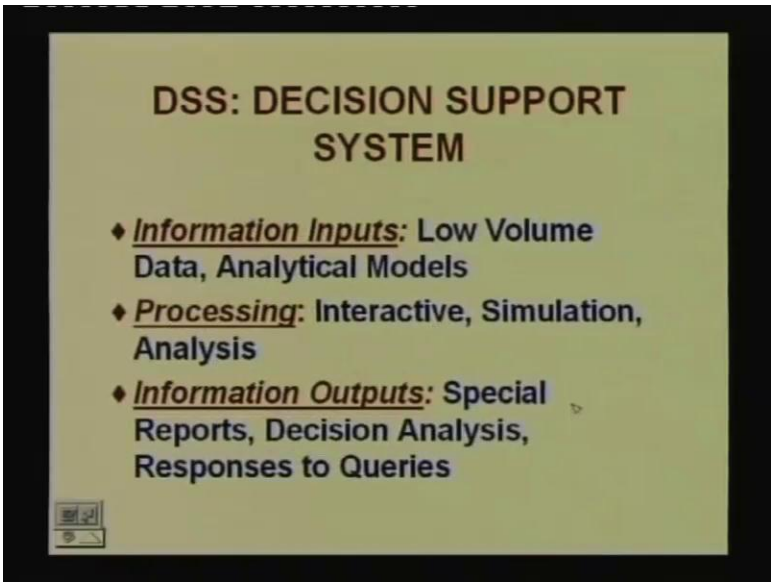

And we can see here that in in case of a decision support system that is we can see that we have different kinds of information inputs like low volume of data, analytical models. The processing should be interactive like simulation, various kinds of analysis. The output could be special kinds of reports, decision analysis and the responses to queries. So that is the basic idea. So that is the basic idea.

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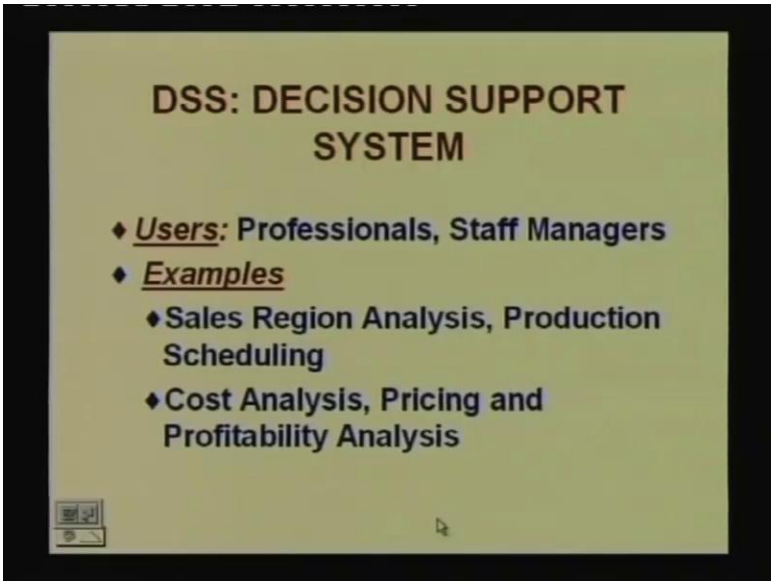

And the users of the decision support system will be the professionals or the staff managers. So it is at the middle level of the management for whom the DSS is useful. Some examples: sales region analysis, production scheduling, cost analysis, pricing and profitability analysis.

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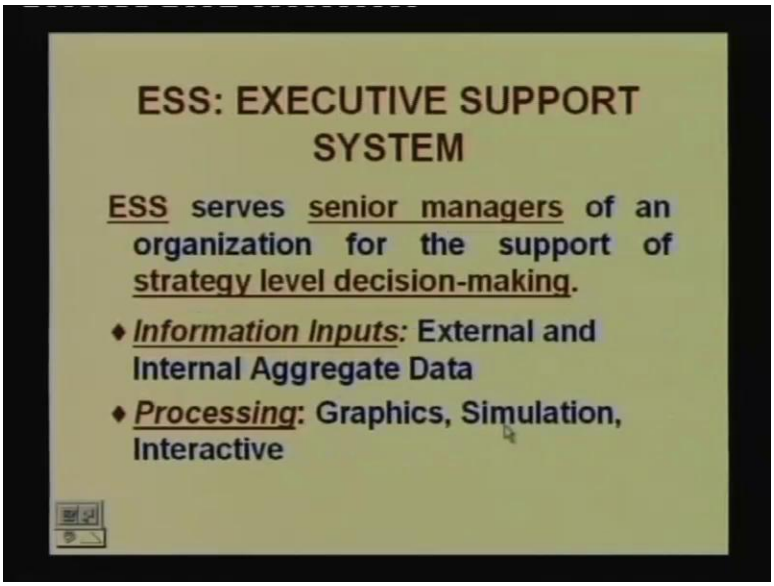

Then executive support system they serve the senior managers of an organization for the support of strategy level decision making. Information inputs could be external and internal aggregate. Data processing is through graphics simulation and interactive processing.

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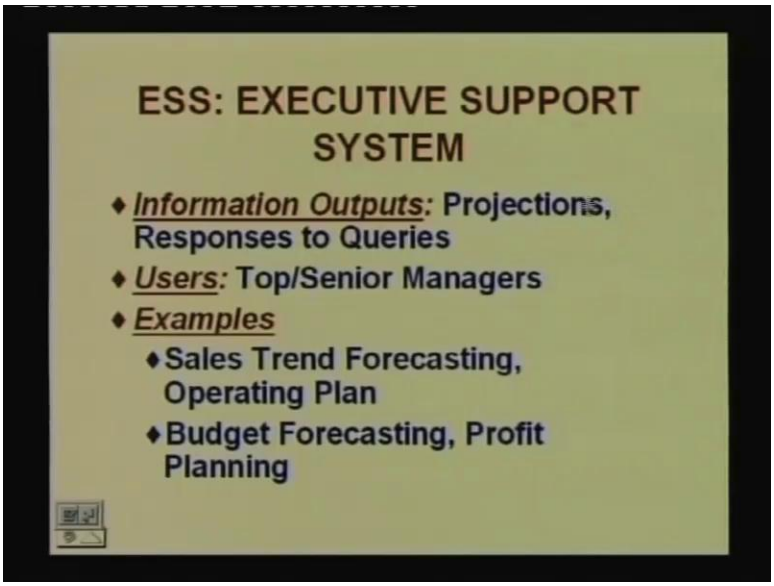

Outputs: projections, responses to queries. Examples like sales trend forecasting, operating plan, budget forecasting, profit planning etc.

Now basically the executive support system to understand we have to understand the executive support system in a slightly different way. The basic idea of an executive support system is like this. Say think of a large organization and the corporate managers are sitting at the corporate office and they are trying to decide on a particular product launch, a new product launch and you see you have the various kinds of old products already available. Since you already have the old products already available you would like to see their sales trend over the past so many months or years or something like this and then decide on a particular product launching what you say the capability of the new product. Basically you are making a decision whether to launch the new product or not; it is a highly top level decision that is to be decided at the board level meeting of executives at the very top level.

Now, down the line you have got various kinds of reports, various kinds of very broad summary reports of sales district-wise analysis and various products etc, etc. But then someone points out that this particular region: region A or region B this particular product has not performed as well

that means we are going to launch a new product and the specific characteristics of this new product which was there in the previous product in spite of that it was unable to capture the market and it is not clear whether this new product characteristics will be really useful in this particular region.

So when this was pointed out the other board members would immediately like to know okay if that is the situation what is it that we should do under the situation, what we should do. That means can we get more detail about this particular region about this particular product characteristics.

Now if you have to depend on manual reports, manual processing then you know it may take long time before such information could be made available. But board meeting you cannot schedule again you know you have to make the decision today. So if you have the information support through let us say local area networking, wide area networking, connecting through communication links and you can you can actually find out may be from the local computer or from the remote computer the particular information about the sales trend of this particular data then you can actually have a forecast of this particulars sales trend the details you can obtain and you can have a better decision. This is actually an executive support system.

So, executive support system is not only the information at the summary level or exception level or only those which are available at a given point of time. But it is the complete capability the communication capability, the networking capability and everything that are required to really drilldown you know that is the word drilldown to the bottom most level of the organization.

Suppose in a situation like in Coal India where you want to find out the production schedule of how much or you are deciding on the production targets of the various coal companies but then while deciding you decide that okay this coal particular coal company within this coal company there are so many areas, within the area there are so many coal mines; now in these particular mines the particular production is very very high, you want to know the details you want to know that whether the target can be set to even higher levels because it is doing exceedingly well.

So you want more specific information of that particular mine under a particular area of that particular coal company. If you have the network connectivity, if you can really reach that particular computer, if you have the facility you can actually see or drilldown details to that level. if this capability is available it is a kind of executive support system. So executive supports are required in that way, alright?

So it is not simply that you do sales trend forecasting and it is executive support system. But you have to give a complete gamut of facilities so that all these things can actually be used in a boardroom scenario and a quick decision can be taken.

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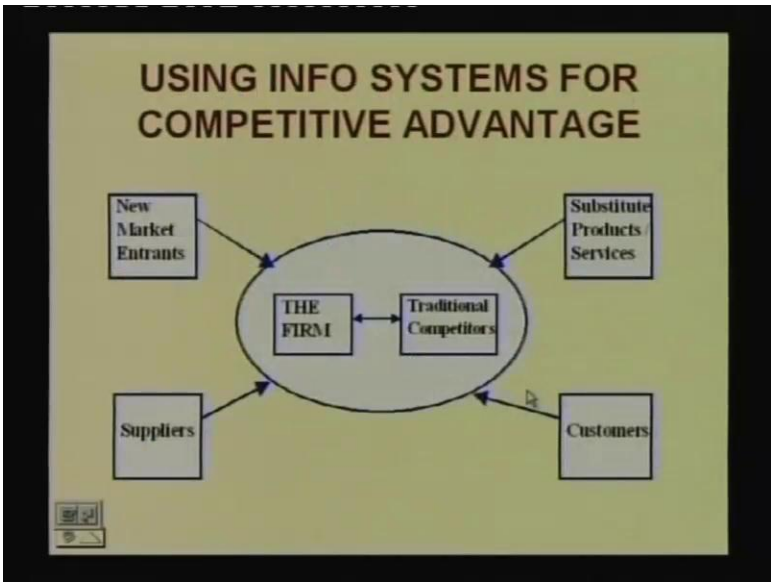

Now our next thing is using information system for competitive advantage. The basic idea about the competitive advantage is that you know when you have the form and we have the traditional competitors you see this is the complete situation. The situation is on one hand we have the suppliers, we have the new market entrants, we have the substitute products and services and we have the customers. So when you have all these different kinds of you know setting that is the firm has to not only compete with traditional competitors but it has to compete with the new market entrants with the suppliers with the customers; not really compete but in a situation where they are bound by all these constraints alright. So you have to think in a bigger manner that what

are the substitute products and services, who are the customers, who are the suppliers, who are the new market entrants and how exactly we can combine the whole thing to use the information system as a competitive advantage.

Now basically the competitive force model essentially gives three basic ideas.

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One is through product differentiation that is creating unique new products and services that can be easily distinguished, focused differentiation: creating new market niches by identifying a specific target for a product or service or developing tight linkages to customers and suppliers. Creating ties with customers and suppliers to lock customers and tie suppliers. So basic idea is that create products which are really new; product differentiation.

Focused differentiation: creating new market by identifying a specific target that is give products not only to set of customers but let us say you know suppose you target on IIT community and this IIT community basically because it is an academic institution you basically give a high value pen you know a writing instrument which is really very different from the others and the academic community will love it. So even if the price is little high you know that people will go for it, so it is a kind of focused differentiation.

The other idea is you have a very good customer relationship; the linkage. you know it is like you know even if I know my newspaper I get very late but since I am buying from the same newspaper vendor for very long time may be for the past 10 years and i have a very good tie with him; even if I get my newspaper late I will not change my newspaper vendor. So it is like creating a tie through a beautiful customer relationship, long term relationship has been created and therefore my customers and suppliers will be with us even if irrespective of my product. But again in the new market scenario this is not working anymore. You have to really create customer relationship through a different set of parameters.

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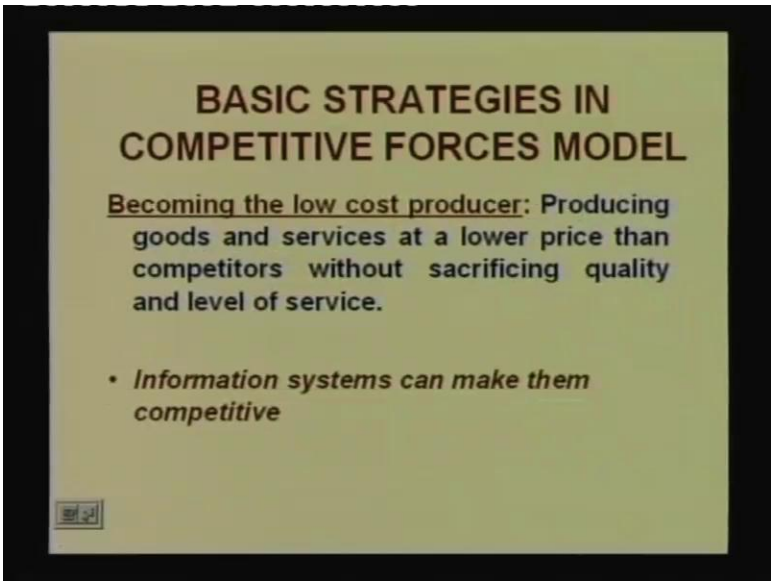

Ultimately become the low cost producer; producing goods and services at a lower price than competitors without sacrificing quality and level of service. So information system can actually make them competitive that is what we have to build.

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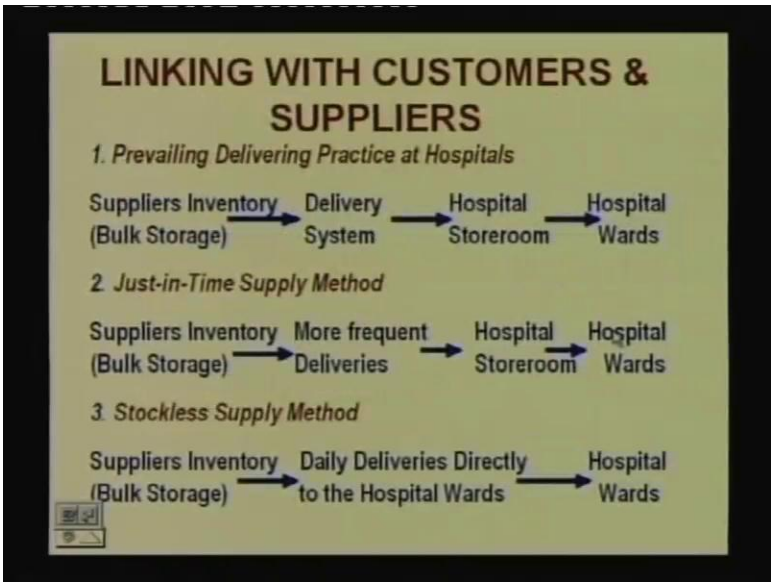

So some examples: Suppose we have the supplier inventory, we have the delivery system; let us say an example of prevailing delivery practices of hospitals. So we have the supplier inventory, we have the delivery system; we supply it to hospital storeroom to the hospital wards. Now in just in time method what you can do is that you can have more frequent deliveries and instead of a bulk storage the supplier inventory you know through a bulk storage system you can give it to hospital storeroom to the hospital wards. What will happen is because you are giving more frequent deliveries the storeroom can have actually very less amount of inventory. If the inventory falls naturally the performance also improves. So that is one idea.

But even a better idea could be a stockless supply method where you have the supplied inventory and directly you actually supply to the hospital wards. So your inventory is not carried by you your inventory is actually carried by the supplier. So that is the idea of supply chain where you do not even require a hospital storeroom. That will give you a very basic advantage and that kind of linkage if you can create you can always gain in a tremendous manner okay. So that is the basic idea of information system as a strategic resource. And I think this is a very important point, we need to delve into it further and we also need to see the linkages between the organizational situations and information support in our next lecture right, so thank you very much.