Management Information System
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Week - 01
Introduction to MIS
Lecture - 01
Introduction - Part 1 of 2

Hello students. Welcome to the new course on Management Information Systems which I will be taking along with two other colleagues of mine. To begin with, let me introduce myself. My name is Professor Surojit Mookherjee. I am a graduate from IIT Kharagpur; this institute and I have done my PhD in Material Science from IIT Kharagpur as well. I worked in various industries; core sector, metal cutting tools, powder metallurgy and then switched over to IT and business consulting, having joined Pricewaterhouse Coopers in 1998 and then worked 5 years in business consulting. I joined IBM India Limited, for global outsourcing and IT consulting and business process outsourcing type of job which I did for about 13 years and then I retired in 2016. Subsequently I joined here as a visiting professor at Vinod Gupta School of Management, IIT Kharagpur.

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So, with that brief introduction let us move over to the subject which is of interest to you. Now, management information system is a broad area of subject which covers really the

various areas required to run a modern business and all of you know that it is all information driven. Here, we are all talking about data and data leads to information.

Without data we are actually very helpless, like without electricity we are helpless; data is something very similar in today's cyber world data you can say is somewhat equivalent to electricity in the real (core) world. In the Core sector what is "Electricity"in the cyber world, or in the digital world it is "Data".

That is why you see so much of stress on everyday everywhere its data, data and data which leads to information. Managing this data and generating or converting it to information and knowledge and finally, wisdom is what is covered under the subject of Management of Information Systems. So, with that I would like to set the learning objectives of this course. How are information systems transforming business and why are they so essential for running and managing a business today?

It is all about running a business, so that is where we will be focusing on. Although we need data for everything even healthcare, you are seeing what is happening today in the corona situation. It is all about generating tonnes of data every day. We see some vital data and information everyday in every newspaper, in every magazine; what is happening, how many patients are becoming positive and how many are recovering etc.

So, it is about collecting data and people are converting data into graphs to predict. And why do we need graphs? Because, we need to forecast and predict what is likely going to happen in the future, in immediate future; 1 week down the line, 2 weeks down the line, 3 weeks down the line, next month what is going to happen. In other words, what the situation will be like for this disease.

Decision makers need this information so, that they can plan accordingly. So, the main thing is what information is doing is management information science and this is helping the decision makers to take decisions and plan their activities. So, it is very important for a management student to know what is planning, because after all a manager is always planning a situation such that he knows how he is going to handle the situation .

The main job of a manager is to manage any situation, manage your work, manage your work force, manage your resources; since management of all these things is required for any business and for that you need to plan. You start everything with planning and to

start your planning you need information because without information you are nowhere, you are simply blank.

So, what is an information system? And, we will talk about what is a system, and how does it work? So, the basics, are its management organization and technology components as the various component levels. Because this a preliminary level course , you should know what are the basic components and how it is constructed for the whole information system.

It is not like a cloud sort of thing where there is lot of hardware, but softwares are also involved. Practical things, physical things are also required and we will talk about those. And, then what are some complimentary assets essential for ensuring that information system provides you a value for the organization. Ultimately you should position or think yourself as a manager in an organization and you have to take business decisions.

You need the help of your information systems. So, your CIO or your CTO needs to provide you or your IT team or the IT support team needs to provide you on everyday basis information regarding the business performance. What is happening in the enterprise. And what academic disciplines are used to study information systems and how does each contribute to your understanding of information system?

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Moving on; goals of MIS I have already mentioned. We will use this acronym MIS very frequently.It is nothing, but Management Information Systems. You should become familiar with this acronym. We have talked about how it starts with data, then it leads to information. You need information from data. This is the starting point of MIS. From data and information you finally, generate knowledge by which you become knowledgeable and the last stage is of course, the highest one , which is "wisdom". So, where you are really you know you have become a guru sort of thing. So, that is what we say when we have wisdom means you are an expert. So, you are a guru, but normally in our daily operations we stop at information and knowledge level.

We restrict to these first three levels for daily management issue a manager needs to know. Start with data, get the information and then also generate knowledge. Because like for example, if I give you again this corona example now the people are discussing whether wearing mask is good or bad, is it useful or not useful (Knowledge).Some may at a different time say it is useful then somebody will say it is not useful. So, you can see varying opinions are still coming. Even after 3 months 100 percent people are not committed or confident as to whether wearing mask is helping or not helping; e.g.like the president of US himself does not acknowledge wearing masks. So, that is the knowledge level we need to reach where everybody will agree to a certain fixed norm. We decide fine yes we should all wear masks in public or something like that; anyway this is just an example. Because nowadays this is the hot topic so, that example easily comes to my mind .

Now let us move to what is an information system. Now, we are coming to the basics. What is an information system? Information system is set of inter related components. It collects, processes, stores and distributes information. It supports decision making, coordination and control.

I have already talked about little bit that how it helps in decision making, because that is what we are doing every day; we are taking decisions right? Whether to do this or not to do this; that is a decision making process.

So, for that we need information that if I do this, this might happen, if I do not do it I might lose out. So, this what-if scenario we keep on doing analysis in our everyday life. Not only in business environment also even in your personal life, in your house, in your residence when you are interacting with your family, you are taking decisions. If you are head of a family you are definitely taking lot of decisions regarding your family children's schooling and many such decisions we take every day in our daily life.

That is what is managing information systems. We really manage information system in our residence or in our domestic or our home atmosphere as well. But, here of course, from a course perspective we will mostly be referring to the business environment.

Now, information versus data; data are streams as we know and this data is the starting point. The raw fact is , today my body temperature is 98 degrees , that is a data.

Tomorrow my body temperature is 97.8 that is a data and day after tomorrow my body temperature is 99, now that is also a data. But, what is the information? The information is data shaped into a meaningful form that if my temperature is 98, the information is that I am healthy, I do not have any physical problem. But, if my temperature is 99 that data tells me the information that I am not well. So, I should either go to a doctor or should at least take some medicine.

So, that is information. You need to understand what is data and what is information because throughout this course we will always be talking about data and information. Information is an ordered set of data that you can understand and act on. "Act" means you take the decision. When you can take a decision it means you are acting on the information.

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This should be very clear to you at the beginning because this is a very fundamental concept. Here is an example : suppose this is a sales data region wise North, West, South, East and the sales volume in rupees is: 50 lacs, 40 lacs, 22 lacs and 10 lacs respectively. This is data. Now, what is the information? Information is sales is best in North region and worst in South and East region, where the target was 40 lacs for that year has not been met. Target has been missed.

So, South and East are not doing as good as North and West; North is of course, very good; so, that is my information. I am a sales manager of that division, I am in charge of

this sales. Now, based on that information ,what decision I am going to take. Some of the decisions I need to take is : we appoint more sales engineers in South and East region, probably they do not have adequate sales engineers. So, they are not able to sell or spread out to various districts and towns to sell more. They are under staffed. So, that could be a decision.

Increase advertisement budget. So, we advertise more; so, that people get aware of our product. Probably in rural areas they are not being getting the information regarding our products. So, they are not buying it .

Another decision could be to offer more discounts to dealers. If I give discounts to dealers they will promote my product instead of the competitor's product. So, probably in the eastern region or south and east, for the dealers probably we need to increase the discount, so that they can push my product and sell more.

Now, you understand we start with a data, we generate a information and then as a manager we take a decision.

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Three activities of information systems produce information organization needs. The three activities are : <u>input</u> which captures the raw data from organization and external environment, <u>processing</u> converts the raw data into meaningful form and <u>output</u> is the transferred process information to people. Now, the processing part can be manual in

many case like the previous example slide I showed, we did the processing in our head itself.
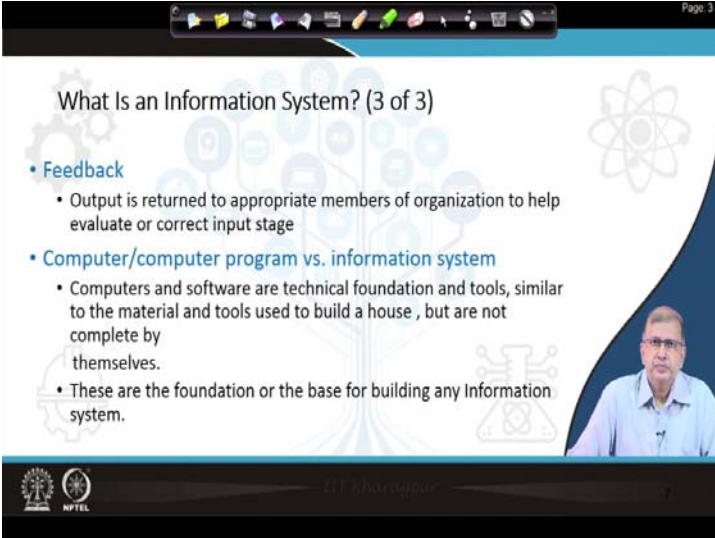
And, we saw the data and we could process and we could find out what is the information. But, in many cases when there are lots of data and etc. then you need computers to do the processing for you and it comes out with a report. And, in the report you will get all the information that is based from this data.

So, that is important, here in the previous slide we actually created a report, but mentally because it a very small four pieces of data and I could do a mental map; this is better, that is better. So, my report was done mentally, but a report was made.

So, once you have a data you have to convert this into report either manually, if it is simple very few data points and if there are large data points of course, you will have to use computer. And, then computer will give you a table or a chart or a graph like what you are seeing in the newspapers today about corona virus etcetera. You put data in a excel file or somewhere and you generate a chart or a graph, and you can see whether it is going up or its going down on month to month basis and what is the variation that you are seeing.

So, all that is an output from a computer, but it is nothing, but a report. So, that is the output. So, there are three thing : Input, Processing, Output.

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The feedback: the output is returned to appropriate members of organization to help evaluate or correct the input stage. Now, sometimes from the output you need a feedback because the output you may not like or may be the data information is not right or may be the analysis was wrong or the formula used was not right.

So, there are some mistake and you can see some mistake. You need to give a feedback and the feedback will correct the loop. So, that the input will again get changed, correct the processing part or some change will done; so, that you get the right output.

You always need a feedback to find out whether the output desired output was right or there was some error in the calculation, because after all it is a calculation; you are using a formula or something like that. So, there could be mistake; so, you need to check it. Now, computer and computer program versus information system. As I was talking about computers, computer and software are technical foundation and tools similar to the material and tools used to build a house, but are not complete by themselves.

Just a computer and a software you need for information system, but they are not complete. So, you have to utilize them like as an example is you need components to build a house like bricks and cement material, but they are not complete by themselves. You have to build a house, then you have to do a furniture then you have to go and live, people have to start using it then only it becomes really a house. These are the foundation or the base for building any information systems.

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So, computers and softwares are the foundation or the base for building any information system. So, to start with you must have this minimum thing.

How information system are transforming business? Global networking on real time, mobile digital platform, systems used to improve customer experience, respond to customer demand, reduce inventories and more. Growing online learning and leadership, expanding ecommerce and internet advertising; banking, finance and stock markets, new federal security and accounting laws.
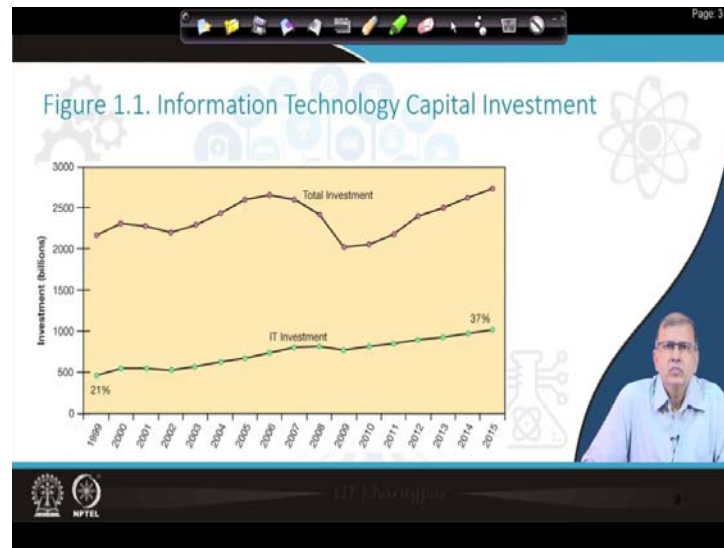
You see these are the various areas where information systems are transforming business. Transforming business means they are helping business to run, grow, modernize, change, improve. So, that is what all transformation is about because you know it is a changing world. So, every business has to keep changing. So, they need to really get into this management, managing their information system which helps them to change their business. Because, they are continuously getting continuously information that my product is doing well, not doing well, a new competitor has come, a new product has been developed which is threatening my business etc. So, I need to change.

So, all that is because of information system, I need information. Without information I am in an island. I will be completely lost. Someday I will find that my products are not selling, my business is down and my company has to be closed. So, these are the various areas where information system actually helps you in running your entire system.

Information System is so relevant in all functions starting from areas like finance, banking, manufacturing, digital platforms, networking, government departments that is very important, all the statistical department which generate so much of statistical data like the census for example. So, much of data is collected regarding population, demography, health, education etcetera and based on which the government can take major decisions in their budget for example. So, we need to provide more money for healthcare, we need to provide more money for education etc . All that information comes from data collected during census and such other service.

So, these are all nothing, but managing the information system. So, anything, any area anywhere the government, private industry, hospital, bank, sports etc. it is all about information, information and information.

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Figure 1.1. Information Technology Capital Investment

So, information technology if you see a simple graph of capital investment is the line here it shows that the lower line IT investment, that its continuously increasing over time. Whereas, total investments also sometimes it dipped in some years, but then it keeps increasing, but investment in information system is a continuously increasing function. So, companies give so much of value that they spend lot of money on computers and softwares; so, that they can generate information regularly.

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What is new in management information system? Technology - nowadays you are hearing lot of things because technology changes, its changing very fast the typically computers, internet etcetera. So, what you aware of may be 5 years back, today it gets outdated because the computer technology changes so fast. So, nowadays we are currently talking about things like cloud computing for example, big data and internet of things, mobile digital platforms.

So, these are the terms which we will hear and see in newspapers, magazines everywhere. And, all of these are playing a very important role in managing information system. All information systems are using these technology, that is the technology part. From a management part, the changes are new things like online collaboration and social networking software.

So, nowadays you see social media is playing such an important role in so many things, you know it could be political, it could be anything, it could be even business etc. So, social networking is something which is being given very large importance by all concerned like Facebook etc. I mean these are big advertising platform, e.g Facebook . It is the new management style.

Nowadays we are moving over to digital advertising. So, we are advertising more in the digital media not so much in the print media. Because, digital media is very easy to spread across the world, whereas, print media you know it is a physical thing. So, in print media you have to shift and move material (newspapers, magazines etc.) and that is a cost , but here there is no movement of any material in digital advertising.

So, you can now publish anything anywhere, write a blog, give some ads etc. It can spread out all over the world. it can become like we are saying it is becoming viral. So, you post something very interesting and it becomes viral means you know it spreads like a fire across the world. So, today you have posted some video from Kolkata, and probably in few hours people in New York or China or Tokyo or wherever in UK they are seeing that same video. This we say, is "going viral".

Another topic is business intelligence, which is nothing, but another smart way of extracting information from basic data. So, it is again another tool, it is a IT tool. Many IT tools are available for business intelligence. BI tools can slice, dice and give you

various types of reports which are , more intelligent reports from the same set of data. So, that is why it is called Business Intelligence.

Virtual meetings like you are seeing now its post Covid-19 it has become essential. Prime minister is addressing his chief ministers for example, over virtual meetings as there is no physical meeting. The chief ministers previously used to travel to Delhi to have a meeting with prime minister, but no more. Today in corona situation everybody is sitting in their office, in their states and prime minister is having a video conference with all the chief minister. So, similarly everywhere now it has become video conference, video conference and video conference, virtual meetings are being used by government, business etc.. So, it has almost completely replaced physical meetings after the Corona incidence. So, today it is beginning of July - 2020 and you know what is happening. The situation changed from say may mid of March or probably say beginning of April, , May, June; just in 3 months the way we managed things have got completely changed.

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So, these are the changes which is happening very very fast.

What is new in organization is that we are now globally connected enterprises. So, nowadays enterprises are all globally connected and not isolated. So, that is called globalization. An organization may be headquartered in US or any other country will have spread or reach in every country in the world and they are interacting on a real time basis.

It is not that you do something and they come to know of it tomorrow not like that, its actually instantaneous, real time. Changing business models, driven by new technology: example Uber and Airbnb. This example I will be repeating many times Uber the taxi service you all know and Airbnb which is something like a hotel. It is a new model completely, since Uber as a taxi service company, do not own any car.

Similarly, Airbnb they do not have any hotel property like any other hotel you know. Airbnb just have a platform and people like you and me who have a house and we have maybe a house to spare or may be a room to spare, or two rooms to spare we register in Airbnb. Guests they contact through that Airbnb platform through internet from anywhere in the world. And, we agree and they come and stay in the house. We make arrangements to give the key to the guest. So, it is a very simple business model and Airbnb does not own any property.

This is a completely new business model which has come up in the last may be 1 or 2, 2 or 3 or 4 years. These are all very very recent development, just last 4-5 years. Completely different business model and the entire existing companies are feeling threatened by this.

Rapid change in technologies, we have already discussed that previously that so many technology changes are happening, Cloud, IoT etc. And, this is impacting information system management.

Time and speed to market is something we need very fast. Time is very essential. You have a new product, but it is very important ,how soon can you send it to the market, because if you do not send it soon somebody else will. You will lose the business. Now, if you see this race for vaccines; countries are racing against each other or companies who will produce the first vaccine for Covid-19. I mean that company; obviously, will become a very rich company.

So, it is all about speed and that is where information system plays a big role. It helps you to bring out products to the market in a shorter time. Social business example like education service, is a new kind of business we are talking about also nowadays in a big way. People are getting into social business where apart from typical profit there are other very good motives like you are helping the society. It is a not so very profit driven business. I mean the main idea behind social business is not to make just profit, but to

help the society as such. There are many sectors of society which need lot of help. For example in education in India, we still have plenty of gap. Our education level is very poor in many states and many districts; so, we need to spread education across the country. This is one kind of business which is coming up and which is helping the society to develop. These are called social business.

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The emerging digital firm; is all about using digital technologies. So, we will talk about digital, digital and digital. What is happening in this field , how is the digital firm of today is coming up and how does it look like? So, in a fully digital firm how does it work ? Significant business relationships are digitally enabled and mediated.

The example I give you with the prime minister interacting with chief ministers, it has now become digital today suddenly in last 3 months. Before that it was all physical, people used to travel; I mean important meeting everybody has to travel, sit in a room, have a meeting face to face, board meeting etc. But, nowadays it has just become opposite. As you know nobody wants to travel and nobody wants to be physically present in one room because of the Corona virus scare.

They said let us sit in each of our rooms and we connect through video. That is a digital firm or a digital enabled organization. The entire country's management is being now done using such digital techniques. So, what to talk about individual organizations, even entire education system is moving over online.

Why? Because, we are still not being able to get the students into a class room because of prevalent conditions. Hopefully these things will change, but now we are learning things. So, this will become an alternate method definitely, even if things change and there is no virus etc. This has got lot of advantages. So, we will have probably mix of both in the near future; physical as well as digital.

That will give you the best of many things. In many cases you can spread you can now talk to more people say like a course in a class room . I can accommodate may be 20, 30, 40, 60, 100 students but in a digital mode I can teach any numbers 200, 300, 400 and no geographic limitation. The student can be accessing from anywhere in the world. We also talk about time shifting, space shifting etc. Time shifting means you know it is a multiple time zones across the world but we can work together by working from home. This type of working has been made possible by working from home. So, we are becoming very familiar with this concept of working from home. Previously it was typically IT industry in which many people, for various reasons were working from home. But, now this has become common in many sectors.

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Strategic business objectives of information system are growing interdependence between ability to use information technology, ability to implement corporate strategies and achieve corporate goals. So, it is all about an interdependence between corporate objective and goals. So, I need information system. That is what I had talked to you

earlier why MIS is so important to achieve business objectives because the whole business runs on information.

Speed to market is very important to firms introducing new products. How can IT help achieve that objective? - It is a question you can think about and if we get time later on we will discuss, but you can also read on your own. You can do some reading by yourself. Go to the internet where lots of material is available and try to find out. I gave you an example about the virus vaccine development, how speed is becoming very important, all of us can see.

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Strategic business objective - Firms invest heavily in information system to achieve six strategic business objectives. Operational excellence, new product, services and business models, customer and supplier intimacy, improved decision making, competitive advantage and survival. These are the six objectives which I will discuss in the next session in details one by one.

These are the areas where the firms invest heavily in information systems to achieve their strategic business objectives. So, that they achieve operational excellence since, that is what business is all about. We must be very productive and efficient, so as not to make loss, or make mistakes. That is called operational excellence in business.

We should produce the best quality product or service whatever we are involved in and develop new products and services and new business models as it is a changing world. Unless you are competitive, unless you are coming up with new products, new services and business models you will become outdated. There will be other competitors which will come like Uber and Airbnb and then they will knock you out.

So, you have to be on top of the things and keep on developing new things. Customer and supplier intimacy is something related to having better relationship with customers and suppliers. Improved decision making is of course, the core because everything about management information system is for decision making.
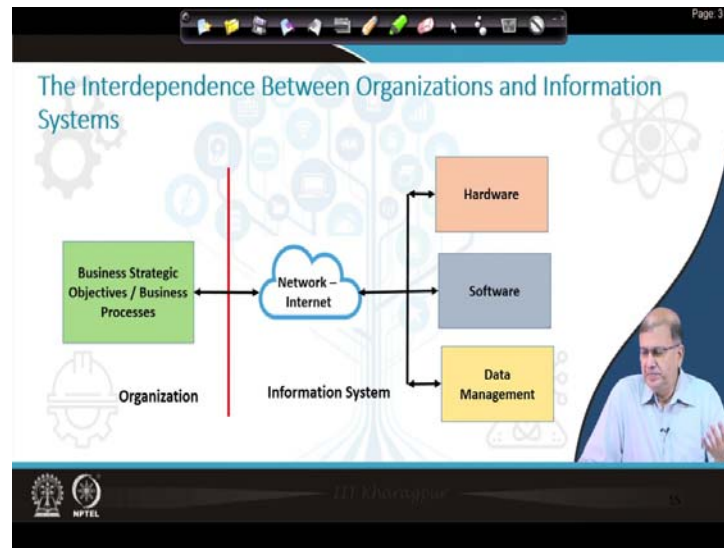
Why we need information? Because, we need to do decision making which is our one of the most important job of a manager. What you are doing from morning 9 to evening 6 is you are taking decisions and based on your decisions your business is moving or working. So, if you take a right decision its good for that business but if you take a wrong decision or you do a mistake in making a decision or you delay in making a decision that will be bad for the business. Sometime the timing is very critical.

If you delay like in a war situation you know that the army leaders or the managers, the generals, the colonel and the brigadiers and the timing of the decision is very critical, it is very important. The whole thing is about timing, of the decision. If you delay then you have lost the battle.

Competitive advantage is of course very important as everywhere we always compete against each other in business terms etc.

Finally , Survival as I talked about this example of the hotel business and the taxi business, where Uber and Airbnb they really shaking up the conventional organizations. They are feeling threatened that they may not survive with their old models so, they have to change.
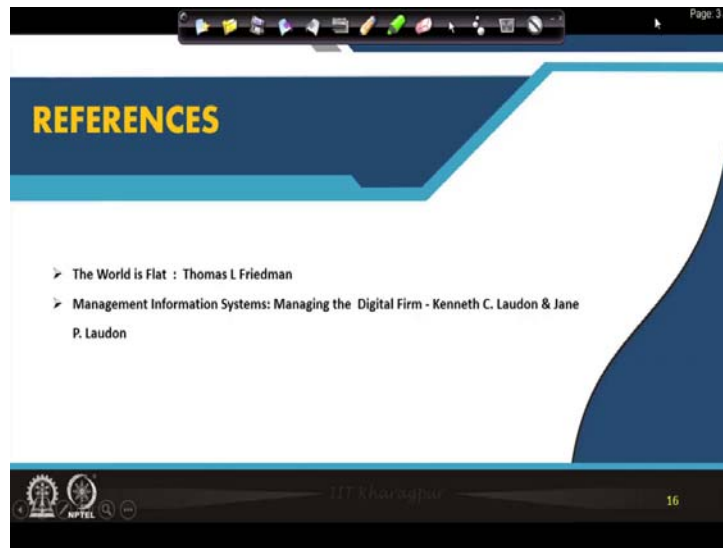
The interdependency between the organization information system.- You have business strategic objectives of an organization and you need network or internet. And finally, on the right extreme you have the hardware, software and data management.

This is a simple model of how management information system works with organization and with the help of network and internet along with hardware, software and data management tools. Without any connection the things will not work. So, these three core elements; the organization, the information system which has three parts viz. hardware, software and data management. the hardware part, software, data management type equipments and then the internet or the network which is ubiquitous. We need the internet to do anything in the digital world.

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These are some of the references. There is a book by Thomas Friedman - The World is Flat which is about globalization. It is a very interesting book and written on the Indian IT scenario modeled on the Infosys success story. You can read that book. The textbook for this course is - Management Information Systems: Managing the Digital Firm by Laudon and Laudon; Kenneth Laudon and Jane Laudon.

This is a standard textbook in many business schools. You can follow these textbook of course, other than that there are plenty of literature available in the internet. Nowadays there is no dearth of information. You just have to search it, it is there somewhere.

Thank you very much.