

FOUNDATION OF DIGITAL BUSINESS

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Week 01

Lecture 01

Lecture 01 : What is Digital Transformation

Good morning, everybody. We will begin with this course, which is titled Foundations of Digital Business. I am Professor Surojit Mukherjee. I am a faculty member at Vinod Gupta School of Management, Indian Institute of Technology, Kharagpur. Now, this course will have about 8 modules. I will show you the details, and we will start with Module 1, Lecture 1 session.

The modules are as organized as follows. Now we are in currently on module 1, today we will do 2 courses on this, 2 sessions on module 1. That is introduction to digital business and then followed by Overview of emerging digital technologies and we will go on as we progress. We will talk about each of these modules in details. With that we can begin the course Introduction to digital business transformation that is module 1 and we move to the next slide. The basic concepts that I will touch upon on this module today is fourth industrial revolution and understanding what is digital transformation.

Anything to do with digital must begin with the history of say the industrial development if I can say. I will not go back to what you can see here is the first phase up to me may be 1200 BCE or whatever was related to transforming material. It is very important to understand the basics of what we mean by technological cycles. Once we started, initially iron was discovered followed by, copper, bronze, etcetera all of you must have read in your history classes and then we came to what you are saying next discovery as energy. It started with water power and then hydro power and then the first major

The biggest invention to begin our industrial revolution was as you all know the steam power with James Watt the steam engine. That is what we call as industry 1.0 and then we came to electric power that is a late 19th century. Alexander Fleming and others they

contributed to discovery and today we know how ubiquitous, how powerful, how everything is all about electric power. Most things come to a complete standstill without electric power. That we call it as industry 2.0.

These are all generations. Industry 1.0 steam, industry 2.0 is electricity and then we come to industry 3.0 which is about Communicating and storing information. This really started with the invention of computers and electronics. You know all of you know how important today's world of electronics and computer is all about. We call as industry 3.0.

What is industry 4.0 where we are now and we are all talking about. It is all about information, networking, internet, knowledge sharing and knowledge development. The advent of internet has literally opened up the knowledge world because today all of you appreciate that anything is available at the fingertip literally any information you need today. you just have to type certain few query in Google or whatever in chat GPT or whatever and you get it within a less than a second it takes fraction of a second to purge out that information from The repository which is residing in innumerable servers across the world. The whole worlds, library is at our fingertips and we can even use a simple telephone what we have.

The smartphone is good enough for us to get any information that we need. This is as we all know that information is actually knowledge and knowledge is power. Equivalent to how good we are in our work, how smart we are in our work, it all depends on the information that we have, the knowledge that we have and for that we have this tool, this internet. These are all giving us, that is what we call as industry 4.0 With that this is what the technology the cycle or the generations 1.0, 2.0, 3.0, 4.0 is going on now we are stepping into industrial industry 5.0 with artificial intelligence .

Taking over many of the things and in future most of the things that we will talk about AI quite a lot. In this course because that is now one of the fundamental thing about digital transformation. Any digital business cannot work without electronic devices equipments and then AI is also joining the fold. Roughly we are here with the new wave of rapid disruptive technology innovation unfolding. We have autonomous vehicles, the driverless cars, then we have something called quantum computing which is again bit futuristic. And when it comes in it will completely disrupt the way we do use computers today.

Then we talk about cyber security that all of us are aware of and then we have blockchain, voice recognition, virtual reality, augmented reality and artificial intelligence that I was talking about. 5G communication and internet of things and various other things are also

there. I have not listed all of them, but I will talk about each of these gradually. The fundamental element of this course is that this is not for technical person. This is for prospective managers and management students and people who want to run the business. Digital transformation is required to survive in today's world because today if you do not go digital, it will be very difficult for businesses to grow and survive. Purpose of this course is to give you the overview you should know you should be aware of what are the various digital technologies currently in vogue and people are starting to use .

And here the future is 6 months, 1 year, 2 years, not more. We are not talking about the future like 10 years, 15 years, or 20 years. We are talking in months, quarters, maybe 1 year, maybe 2 years, 20, 26, or something like that. I will gradually explain why I am talking in this language of this short, very short future life cycle. You have to be very smart, very quick in adopting new technologies as it comes because these are going to be very disruptive.

The theme and the basis of this course again is disruption due to digitalization. We will go gradually into this world. This is all which is leading to the fourth and fifth industrial revolution. Now, I was talking about disruptive disruption. Any disruption is stressful.

Why is it stressful? Because it is changing the way we work, changing the way we think, or in this case, changing the way we do business. I am very comfortable in doing my business in whatever way I was doing for the last many years. Some industries are 100 years old. Tata steel etcetera companies like that running since early 1910. More than 100 years old, there are several companies like that. Now the ecosystem or the environment is forcing me to change, to adopt new technologies.

I am not comfortable, I am not an electronic guy, I am not a computer science person and I am not being able to visualize the importance of these technologies. , I am stressed. , the question comes to my mind is can I adopt to these changes? Will I be able to understand and use these technologies for the purpose of my business or if I am the CEO, most of this lecture I will cover as if it is from the CEO's perspective. Then my responsibility is also that will all of my employees, people who are reporting to me or working for this organization, will they be able to adopt to this changed

environment or the changed opportunities or this new technologies. If not it is a stress and if you can manage that or if you can utilize that smartly then it becomes an opportunity. , you see there is an interesting point here. , what is stress to somebody can be an opportunity to somebody else. it depends on you, how you see disruption?

Do you see it in negative way or a positive way? We will talk more about it gradually as we move. disruptive stress comprises you can see its technology is causing problems that which I have already talked about. Its established companies are threatened. Because newer companies, younger companies they are already more digitally conversant, they use digital technology freely, I am not, I am the old fashioned person.

I was not trained in computer science, I am uncomfortable, I am being threatened, my business is being threatened and the business models are becoming irrelevant. By business model, is the way the business runs, how the business is constructed, how it operates, how it makes revenue, how it sells, how it is managing the cost. We will talk about models in module 3. more about business models etcetera digital models. ,then you will understand what I mean by business models. That is the construct of a business how it will work like Tata steel will make steel this way or we will sell it to this consumer or export.

All that is part of their business model where they will source their raw materials from who will be their customers and how will they interact with customers etcetera. Anyway more of this much later. And then we talk about disruptive opportunity. Never before in history has much opportunity and technology tools be available to many people at such a low cost. Again I will talk in that next session about the cost angle.

This phenomenal change or transformation or exponential growth in digital technology. or in adoption of digital technology or in application of digital technology all across everybody, every industry, every educational institute. Today I am taking this class or recording this course that you can see it online at your own time is because of digital technology. It is made possible like we manage the COVID-19 situation that all everything was stopped all educational institutes. We used to take classes from home or from our department.

And all students were spread all across the country 150 plus students and attending classes giving exams. All of this has been made possible because of digital technology. , that is the opportunity part. Technology is there and people are developing technology can I make use of that if I can then I am the smart pern. Today's world it is all about smart you know we talk about smart phone, we talk about smart city.

We have everything is smart. We add a word smart then it becomes you know the internet enabled and digital enabled and it can do many things, do analytics, do AI. All of us we have to be smart in me way or the other. With that brief introduction I move to the main topic and define what is meant by digital transformation. Business transformation or digital

business transformation refers to the integration of digital technology into all areas of business.

We have technology one side which we can buy with money, I can buy computers, I can buy you know servers etcetera etcetera, I can buy software. Hardware and software is all about digital technology. And then I am applying to all areas of business resulting in fundamental changes to how the business will run and deliver value to customers. End of the day we are running a business because we want to deliver value to the customers and in turn we earn me money make me profit because if I do not make profit my business will not survive.

For my business to survive that I can continue to deliver value to my customer I have to make profit. Now, one of the things if you have—I do not know whether you have heard about mething called an enterprise reurce planning ftware. This is the software which is used to capture all your business transaction in your organization. These are called ERP software and there can be the commercial names are SAP, Oracle, etc. But generically we call it as enterprise resource planning software.

Every transaction which is happening in a business or an industry starting from receiving planning for the production, creating purchase orders, creating sales orders, delivering goods ,wherever any operation in which cost is involved gets captured through a transaction in this software. When you want to generate reports like profit and loss statement, or your balance sheet which are statutory requirement you have to give it to the government, shareholders, board of directors etc. All of that will come from report generated from this database because it has captured all the financial transactions which has been incurred by anybody and everybody of the organization. That is one the first stage of digital transformation. This happened.

primarily in 80s and 90s. It is still going on because new companies are there, but most of the large companies have already implemented their ERP. This process also involves the use of technology to automate and improve business process. When you think of digital technology first thing is can it automate the operation, can it make my life easy, can it help me in my work. There are lot of manual work can be handed over to maybe repetitive type of work can be very well done by such machines. May be a robot can do just a repetitive work.

If you go to an automobile company—the modern ones—if you go to the assembly line, you can see hundreds of robots doing welding, fixing up things, assembling the car. You

would not see much people there, but you will see a lot of robots doing this work repetitive work the same work they are doing it over and over and over and again. Such digital equipment are very adapt of doing repetitive things, much better than human beings because one they do not get tired, two they do not need a break tea break or a cigarette break or whatever a lunch break and they can work almost literally 24 by 7. That is what we have been using it exploiting using and using it using such technologies for such digital work digital work in a conventional industry like say manufacturing of automobiles.

Digital transformation can also help businesses to improve their efficiency, reduce costs and increase their competitiveness in the market. It can also enable them to supply new and improved services and products to their customers. This is pretty obvious because they are more productive as I said. They will reduce cost, they can do things continuously without a break and 24 by 7 like your chatbots for example. These are all robots, digital robots.

Soft robot not the hard ones like one you can see. Chatbots are just field where you type the query and you get a response. Bot is a robot because there is no human being answering your question. And whatever you are asking the computer is answering your question, , and it can do 24 by 7. It is always on whenever you log in you can go. and that is how bring down the costs.

Now, continuing on that more about transformation, there are three layers. One is the operational transformation, then the business model transformation, and the strategic transformation. In the operational level is like those welding and the shop floor what you see and you introduce technology and it does automation and doing something better, more accurate etc. All those things improve when you are doing using digital technologies in your operations, in your factory, in your shop floor or in your directly in your business. Now, when you are talking about business model transformation,

it means the way you are doing business—now you are doing it completely in a different way. To give you an example to help you understand what it means, a very simple example is Airbnb. I am sure all of you must have heard about Airbnb. We know all of us know what is a hotel business. There is a hotel, there is a building—you walk in, you have a booking or you do not—you go in, you ask, 'Can I get a room?' and if there is a room, they will give you one.

This is the price and then you go to your room etcetera. Standard hotels are all over the place. Now comes Airbnb. They do not have any hotels; they ask people, 'Are you willing

to share your room, rent out your room, spare room, etc., or your spare house—if you have a second house, can you spare it?' , all that is now available on the platform.

I want a hotel room, I want to stay, I am going to Mumbai tomorrow and I need a place to stay and I do not want a hotel because hotels are expensive in Mumbai. I go to Airbnb site and they tell me that there is a house here, there in Radha, Chembur, etc. Wherever I want to go maybe Kandivilli, Borivilli or Andheri East or wherever I want there are me houses maybe me part of the house rooms etc. available for whatever the cost price etc. I like one of them I select and I go and stay and pay online to Airbnb or owner gets the money etcetera. Hospitality industry if I take I say hotel industry is a part of hospitality industry has undergone a sea change because companies like Airbnb introduced a different way of doing the same business.

What is the business? That anybody—when people travel, they need a place to stay—that is the hospitality business. Some are doing by building hotels and me are doing by this using software and a platform to link up. The user—that is, a customer like me, the traveler—and the house owner. That the customer—the traveler—can stay in a particular house.

, this is called a business model transformation. Another example is your Ola or Uber—the taxi. We will talk about that later again, not now, but I think you have understood what is meant by a business model transformation. The way I am doing business today—I am doing it in a different way. Strategic transformation is fundamentally changing the essence of the organization. If you do it badly then it can be a problem. If you do a major change like Tata steel for example, says steel is no longer our main business we will do something else, we will get into hospitality.

Like if you take ITC, ITC was famous for cigarettes. But they said no cigarette is problematic product government has lot of you know consideration there is me you have to give me info message advertisement people are discouraged from smoking all over the world. This business is at a risk to mitigate this risk I must start something else. I am into hotel or I am doing masala cooking masala etcetera or food industry.

That is strategic transformation that it may succeed it may not succeed it depends on your whatever luck expertise etcetera. ITC was lucky in something was not lucky in something else. Some of the hotel business is doing very good. But the food business is probably not doing good etcetera. It can be you know this is what is meant I just wanted to explain what is a strategic transformation.

Everywhere you will need the help of digital technology because today you cannot do any business without digital technology. That is why we have to understand how digital business transformation, digital is playing a role in different types the whole business transformation in the multiple dimensions. If you take operational the business model itself or a strategic investment you want to do you have to first think of digital technology. Now if you have heard of a product called Metaverse, Metaverse is something one of the popular one is created by Facebook that is you put up a lens something virtual reality and then you can see things your digital twin for example, you can have meetings, conversation, discussion all everybody is sitting in different place or in different location, but they are virtually connected.

Because all of them are using a technology called metaverse. You can as if you are in that meeting room virtually in somewhere all of you have come and sitting in a meeting, but actually physically you are not. Physically you are wherever in your office and then you can conduct meeting as if you are all sitting together. That is one of the applications of metaverse there is various applications of metaverse you are calling yourself as an avatar. You create a digital image twin of yourself avatar.

and then that avatar can travel virtually and meet people do business etcetera. This is also again a technology which is just very young not yet fully matured it is becoming popular, but it is expensive the gadget the tools etcetera is expensive. Some large companies have started using, but it is not really mass based, but it will take me time. Like for example, here like city of Singapore has digital twin project to develop 3D replica of the city based topographical and real time data.

It uses twin to test solutions to urban planning problems etc. Like if you create a new transport system then how will it work? You first do a digital version, you have a replica of Singapore's in a digital format. You have the all the streets like the road maps, the traffic, the crowd, the population, the buildings everything is there digitally and then you try to test it, it is like a simulation. Where it is a new train or a metro or special route, the new thing which is coming up small taxis which will fly kind of thing and then you want to test it out how it will behave in a real situation

and that you can without actually physically launching it before that itself you can test it out. It is a simulation thing or where pilots for example, are trained how to fly the plane in different conditions specially the fighter pilots and the commercial pilots. They can do in a simulation technique. That is also something like a digital thing. This real time digital

modeling and this immersive experience that is you become a part of that virtual reality as if you are inside that when you see 3D movies for example,

and you put on that glass and then something happens on the screen and it you feel as if that thing is happening around you. And you get you know surprise, shock, react etc. Many people enjoy that I personally do not like that. That is a different thing and the children might like that and many people like that. This is something very similar to that 3D movie experience. You feel you are part of that screen a part of what is going something is going around you.

It is you know you are immersed as if everything is happening around you. Dimensions of the information society are like the various things are digital collaboration, electronic commerce, digital education, digital information and digital communications. All this is comprising within your what we are calling as the digital business domain or the ecosystem you can call it. Now, this is again a subset of what we are calling today is an internet economy, where everything is running on internet.

That you are ordering food on Blinkit or Swiggy or Zomato is because of internet. It is a part of the internet economy, it would not have been possible for us to order food and get food by delivered by Zomato unless there was internet. And finally, the broader bigger thing is our information society. We are in an information world. That was the industry 4.0, but it is going towards industry 5.0.

That is the fifth generation where it is a we call it as an information society. Why digital models? Increasing globalization regulation of entire market sectors. faster innovation cycle, the digital transformation of business transactions and everything is accelerating. Fast economic integration has made the markets are more dynamic, more competitive, more digital and above all overall we can say it is becoming more complex.

Although life in a way is becoming easier for us, but things are all becoming very complex for everything you do you have to have an OTP for example. You I mean things you know sometimes you do not feel very comfortable about. But you have to live with it because with much of digital and the security problem digital technology cyber security all is all making life easy at the same time making life all a bit complex. Companies striving for global competitors have to adapt continuously to the changing market conditions. All of this is leading to a pressure for change in order to be successful in this market environment.

You have to be on your toes all the time. The diffusion of the internet into all areas of business activities has brought particular focus to what we are saying is digital models. All embracing process of digitalization of the business process is the driver of change in company strategies, management practices. Everywhere it is digital, which is why we say digital technology is the enabler. All new processes or whatever you want to do.

It is an enabler. Without that, you cannot really be successful. Online markets have brought about a multitude of new business models. You know all of us—Amazon, Google, Facebook, eBay. And we are using them day by day; e-commerce has completely changed the way we buy things.

We do not go to the shop; internet banking. These are all changing the way we live, the way we survive, the way we are here. I do not go to a shop; I just sit at home, and things come—now things come in 10. The rapid economy, the quick economy—that is another thing, but everything is because of these new digital business models. We will talk more about it later.

Quickly moving on—what are the things which are defining digital transformation? The basic elements of digital transformation. You have to understand that this is strategy-led, which is top-driven; strategy, of course, is always taken by the top level. It is data-driven. Without data, you do not have anything in digital technology. Innovation-driven.

Why innovation-driven? Because every time your people come up with new ideas and new ways of doing things. That is what innovation is all about. Business models are changing, and I have already discussed this quite a lot. You know how the models are changing; the way we do business is continuously evolving.

And this is impacting all parts of the value chain. Value chain means start to finish. If you think of a business, it starts with manufacturing—starting with raw materials. You buy raw materials, then you make a product, and then you sell the product. You also sell me services—products and services—that comprise what your business offers. Finally, at the end of the day, what the customer gets from you is the last stage of the value chain.

Incorporating network technology because, in today's world, everybody is talking to everybody technically. Everything is connected—that is what is known as network technology. We are all connected through whatever means. LAN, WAN, Wi-Fi, whatever NFC's. In various ways all devices are connected, devices talk to each other etcetera.

I can talk to say this Apple Siri or the Google thing WhatsApp all agile technologies where I can talk and they can respond, I can ask a question, they can get an answer. There are various things networked because that equipment is also connected through the internet to rest of the world and the information from where they are sourcing things. Orchestrated by leadership and people and we need leadership and finally, we need people. Whatever digital we say it is being led by people and led by people. The last section I will cover bit about digitization and digitalization there are two different things completely.

Digitization is about introducing digital equipments or electronic equipments which we all know how it works. But digitalization is about the transformation. All of this by using all these technologies we want to change the way we work, change our business model, change our strategy model that what I have been talking about. It has to be strategy led and incorporating the technologies and have to be connected because digital technologies are also not cheap. They are expensive.

We must have a plan. That is what is strategy all about. We make a plan that what I want to do with this technology or equipment. Once it is strategy-driven, then it becomes digital transformation or digitalization in short. A definition from Forrester is exploiting digital technologies to both create

new sources of value for customers and increase operational agility in service of customers. This definition is very important to understand: to both create new sources of value for customers and increase operational agility in service of customers. The other definition is to adopt digital technologies and business models to improve performance, or you can combine both definitions to make one single definition. And the last part is understanding digital transformation: it talks not just about technology or digital equipment but also about culture, practices, processes, and of course technology. This is again another aspect that we will also cover in the subsequent sections.

We have like 'adopt' and 'adapt'— Adopting means you take the technology, accept the technology, and it might help you incrementally. But when you adapt— what we say—can you adapt the technology? What it means is that it is getting into my DNA, into my whole system, the whole ecosystem. It will help to change the culture of the organization, the practices being followed, and the different processes that are also being followed. All of this will change if I introduce certain digital technologies. That is called adapting, as different from adopting.

By adapting, I am not only adopting but also doing much more because it is going to change my organization, change the way we are working, or I am working, or my team is working. And we finally have to evolve a digital ecosystem encompassing all this: technology, culture, practices, processes. That is the final goal—we must have a digital ecosystem. I am leaving some discussion questions for you to think about—read an example like schools and colleges going online for all admission processes. What does this adopting or adapting digital mean? And this you all offer, you are using UPI.

The question is, the discussion question is: what and to whom has digital transformation been brought by UPI? Think about it. We can probably discuss towards the end, finishing, etcetera, and I will probably try to explain, but I want you to do it as a kind of self-study. That you understand, we have to appreciate what I have been talking about and what is really meant by digital transformation.