Indian Institute of Science

Bangalore

NPTEL

National Programme on

Technology Enhanced Learning

Global Supply Chain Management

Lecture -13

Innovation in Emerging markets

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Actually what we are going to do in the last lecture what we did was to basically look at the emerging markets and what are the characteristics of innovation in emerging markets in other words the products and services that you basically produce in emerging markets and if you want

to market it to the people what should be the kind of characteristics it should have and what is the use of this ecosystem framework if you want to a visit useful in co evolution and in convergence of making it may and creating blockbuster industries .

So there are several industries which can be highly useful to the emerging market people as well as it can create blockbuster industries for example we include food security in other words food security is providing nutritious food to all the people there are lots of poor people in the emerging markets billions and if you produce food at accessible points and at affordable prices which is nutritious which meaning not only grains but it has vitamins all the minerals and other things that are needed for healthy humans.

So then you are basically reducing the disease burden and you are making the world more livable place so the food security is one of the things where we are going to consider this in this course of lectures how to create using the ecosystem because food is one thing which is highly government controlled which is necessarily so and also delivery is important in a place where it should not be adulterated it has to be hygienic and also there are lot of resources that are needed land water and the so-called agriculture and also the small scale industries and so on.

So it is a combination of all the three sectors of the economy which uses all the resources water, power ,finance and the human resources so the food security is one of the important issues that one need to consider so it is such issues like power, water and food there will become blockbuster industries if done properly and a lot of attention has not been given to these sectors so far so let us look at each of this and let us look at the supply chain and how to redesign the supply chain .

A for example in terms of product innovation we are talking Hyundai customized small car Santro to suit Indian market with 90% local components well is it innovation certainly it is innovation.

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Because from a big car to small car to suit any market conditions the roads the poor condition of the roads and so on and also source so that it is locally acceptable local components 90% of the components from local companies is an issue well. Nano for example which is produced by Tata's use a fuel efficient one lakh car one lakh is basically this in those days it is equal to 2500 but now it is less than two thousand dollars and it is a car which is fuel efficient as well as a very cheap car .

So basically this was innovations because we are going to look at it what does Tata's have to go through to create a particular car of this .Cummins produces diesel engines and power generators for small retailers, regional hospitals and farmers .So these are because the power generation is important everybody has their own generators particularly if you are a small retailer and also in hospitals because you cannot go without power but power security is not very good in countries like India.

So basically that is where Cummins has come in to the needs of the locals of providing cheap diesel engines and power generators diesel and for small retailers, houses and so on and of course the another one that is frequently talked about the General Electric has done in the healthcare division and $1,000 handheld electrocardiogram it is a device and a portable $15,000 PC-based ultrasound machine.

So these ultrasound machines and others they used to be very huge so what these people have done is to invent these things that a cardio electrocardiogram as well as the ultrasound machines and where they were basically there is an innovation blowback there was generally developed for in emerging markets like ECG device for rural India and ultrasound machine for rural China but now they are being sold in the US pioneering new uses of such machines.

Now for example in the hospital where surgeries are going on if they want to have these things it is very easily locatable in the in the surgery place instead of having in the diagnostic centers so

basically the new products that have come in from the emerging markets well in health care in Auto as well as in power sectors have been phenomenal .

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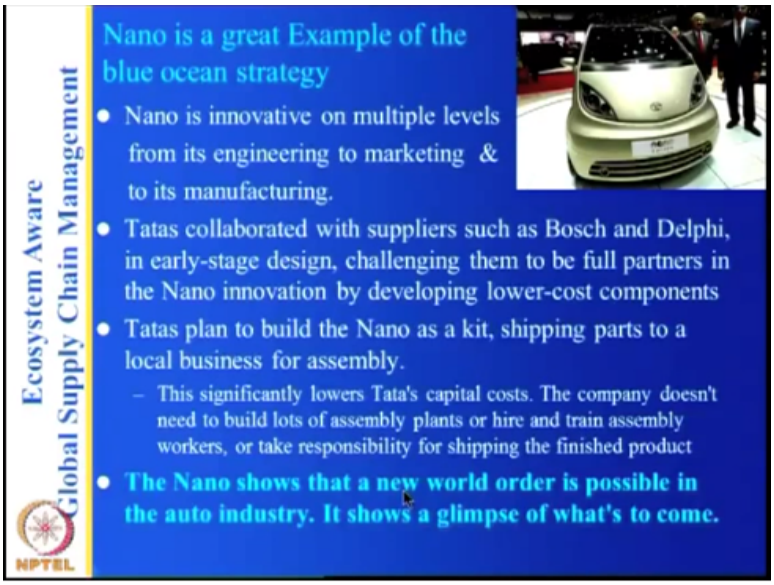

Nano is a great example of a blue ocean strategy there are two kinds of strategy so one is the blue ocean strategy another one is the red ocean strategy we will talk about it in the next slide the Nano this nano is an innovator of multiple levels from engineering to marketing to manufacture the idea is to produce a car that is affordable in emerging markets and this is the car that is there and there is Rattan Tata standing by who is the owner of the Tata's and it has to be produced in 1 lakh of Indian rupees which is less than $2,000 today.

Now how to produce a car which caused several thousands of dollars in less than two $2,000 so it requires cheaper component but high quality it requires multiple levels of coordination marketing and so on so basically all this was achieved .Tata has collaborated with the suppliers like Bosch and Delphi in early stages of design, challenging them to be full partners in the Nano innovation by developing low cost components .

Tata's planned to build the Nano as a kit they originally planned to took to build nano as a kit shaping parts of local business to a local business for assembly the assembly now happens in the plant and the full vehicles are transported by transport so transport costs a lot of money it costs 7% of the cost of the vehicle so if you want to save either and everything so what you have to do is you may happen to want to ship the parts as a kit you know this is one of the innovations that no automobile has thinked thought off earlier .

Although they have not done it already but they basically wanted to make it as a kit so that they can send the kit by trucks to the dealers or dealer can assemble and give the car to the purchasers so this significantly lower starters capital cost the company does not need to be lots of

assembly plants or higher are trained workers and take responsibility for shipping or the final product and so on.

So although this has not happened I mean this is one of the plants that Tata's had which is highly innovative one instead of sending a product which is fully assembled the final product you assemble the sub assembly you send the sub assemblies are basically they can be assembled in a local dealership shop so the Nano shows that a new world order is possible in auto industry. It shows a glimpse of what is to come in other words the auto industry is 100 years old and well at the time it has the doors it has an Internet has nothing significant these things happened although efficiency has increased .

So Nano is the first example where people have thought of several innovations they are actually manufacturing the car.

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So what are red and blue in ocean strategies markets are made of both red and blue innovation strategies what is red the red ocean represents known market space it is a known market space in other words whatever existing market where all industry is currently exists in this space the potential for profits growth decrease as the market becomes congested and companies try to outperform each other so how do you inherit this one .

Where if you have a lot of cars there is lot of market for either cell phones or cars or whatever and if you want to enter your another player so you know I am congested marketplace how do you outperform so you give discounts you do dealers you sell services and sell products so there are several things that people do but that is the red ocean strategy.

Blue oceans are untapped market spaces opportunities for highly profit growth by opening up a larger point that is new demand creation so you have a new demand that is created how do you create a new demand in other words if you have telephone market landline market you have opened the cell phone market wireless then you have created a new demand for this then you have ordinary cell phone which is used for just speaking to each other but on the other hand now you could do several things using this cell phone.

So cell phone is becoming a part of life so you are basically expanding the horizons of your increase in demand and once you increase the demand you have a cell phone basically giving voice and now you create a cell phone to get your emails get the or this one so basically you are differentiating yourself and to a larger pie and so that is where becomes another way of getting profitable is we basically the car or automobile is supposed to be a middle class vehicle this if you want to get target those people who have motorbikes .

So you should be you should be make it affordable and price it almost like a motorbike or twice that so that is what Tata's have done in terms of pricing and that has created them following the bluest strategy company shift productivity frontier outwards by reconstructing market boundaries to create bigger economic pie. How do you create more economic pie another this one that the economic pie has been created is in terms of the cell phone market reliance when it started it asked one simple question if you are starting a cell phone company and how do you estimate the market the market you are basically consists of the landlines in those days .

So you can say if you go to your marketing specialist he will say only half of you can estimate the market saying at half the landline users will be using that and half of them who are going to going out often they cannot use the landline so they go to the cell loss and so on so you will get as much as the landline market but on the other hand if you want to create a economic pie of a lot bigger pie you can ask the question how big can I make the market it now.

How can I make a the market this one can I make it affordable to people everybody can speak now people are using the there and they do not communicate they use letters them so on so can I make a telephone call as cheap as a letter as a postcard so if you want to increase your market size to make it a bigger economic pie.

So what you should do is how much what is the market that I can make is what is it but what are the barriers for making it an economic pie is it the cost is it the instrument so can I make those instruments which are cheaper and can I make the call rates cheaper so that I can get this one so you can see that the Indian telephone market which is the tele density now is almost like 80% that means 80% of the people of 1.2 billion people have a cell phone .

So this is unimaginable in without the kind of thinking that the people have so one thing is the regulation by companies by the country's another thing is having visionary companies partners who basically have used follow the so-called blue ocean strategies to gain the market.

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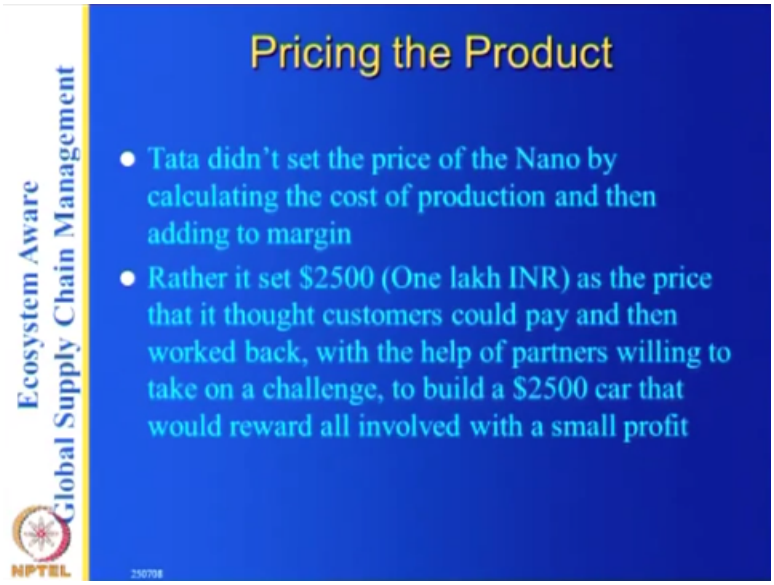

And then this is what I am talking about the pricing of the product Tata did set the price but Nano by calculating the cost of production and adding the margin usually if you are pricing a product how do you price it you say cost of production + add the margin 10% to 15% to various stakeholders and so on that is how that is how you get in to the total price but on the other hand you set up the prices to $ 2,500 as one lakh and then work back with the help of the partners to build a $2,500 car that would reward all involved with a small profit .

Now you are not giving anything free so when you are giving $2500 since you should still make profit but how do you actually do that so that is the point that is where they collaborated with to make cheaper components and so on so basically they were thinking where are the cost elements and how do i change it and what are the new things that new procedures new business models I should follow .

So there you take the ecosystem you have this Nano this one you take the ecosystem look at the resources look at the government policies look at the labor this one and look at the delivery mechanisms where are the costs in what and how do i change it and how do i reduce those costs to make it at $25,000 car so that is the kind of thinking that you should have in terms of in making it a blue ocean strategy and blue ocean strategies are very important in emerging markets because the economic pie is the market is very huge .

But people cannot pay the price so there is scale that is available so how do you use that scale to get to the market so this is how people have to think and do it do the pricing properly for example there are sachet's available the shampoos, the soaps, the another and other things which are available as in small packets rather than in big bottles so people may not have the

money to buy big bottles of shampoos and body washes and so on but then they basically whenever it requires they pay a small amount and get sachet use it and throw it.

So that is basically the pricing of the product in terms of scale so people have to see out how to get it get to the reach in the into this so this example is a is a very important one in terms of the emerging markets .

How to price a particular product.

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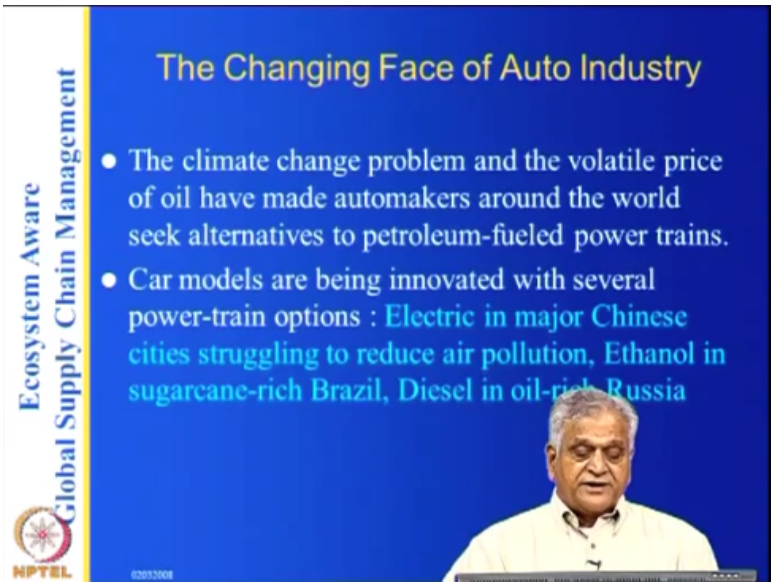

Well with the start of nano and several other things and also the climate change the greenhouse gases and the transportation basically contributes about 18% of the greenhouse gases so and the volatile prices of oil has made automakers one on seek alternatives to petroleum fuel power trains so the engines that you use in the automobile or petroleum fuel now. How do i change this trend because the oil has becoming expensive and oil is becoming the oil resources are becoming scarce so because of all these factors is it possible to reduce the one thing is to reduce the use of automobiles and second thing is to find alternate means of powering these things.

So there car models which are being introduced and it depends on the condition for example in China they want to use electric cars that is because we are struggling to reduce the air pollution air pollution not only because the cause transportation increase and the middle class they can afford the cars so that it has more greenhouse gases and so on and the second thing is there are more industrialization and that is creating problems in China.

So basically there several cities in China which has basically had this pollution so the best solution there is to get to the electric cars not so they are interested in the power generation too and also battery companies which will do basically which to power the automobiles ethanol in sugarcane rich Brazil ,in Brazil is a country with agriculture and it has basically highly productive agriculture and there is sugar carriage this one so they want to use biofuels ethanol to basically drive the cars .

So diesel in oil-rich Russia so I did I mentioning only a few countries depending on this you had each country has to decide whether decided car whether it is a gas driven car whether it is oil car or whether it is diesel ,petrol or electric or whatever or some other means of driving the car so this is where the car models are being innovated and so on .

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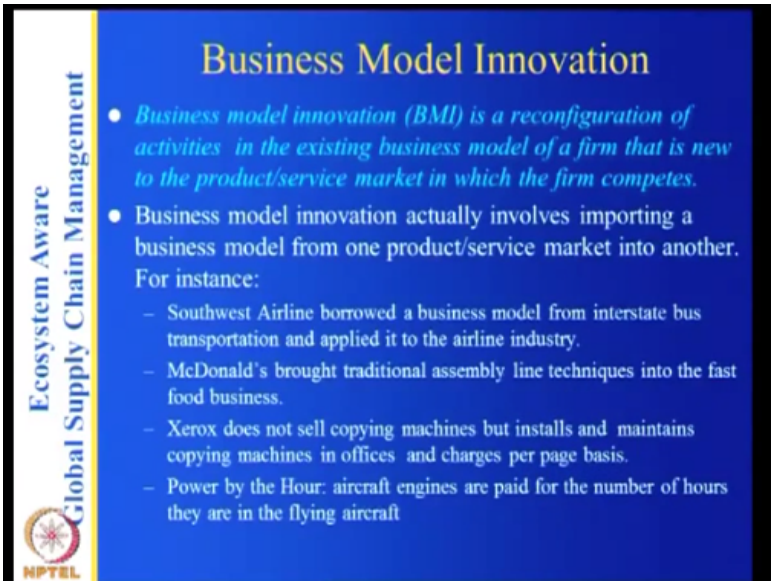

The other one is the product and service innovation second one is the business model innovation this is another thing that the supply chains need to follow business model innovation is reconfiguration of activities in the existing business model of a firm that is due to the product or service markets in which firm competes. So the firm competes you know this one and what is the so to gain an advantage can you follow in this different business model there are several companies which follow their business models.

Business model innovation actually involves it can involve important business models from one product service market to another in other words you need not have to it is new for that vertical but you could have followed from another vertical for example Southwest Airlines is one of the cheap airlines after the liberalization south worth island it swallows borrowed a business model from interstate bus transfer and apply to the airline industry in other words in southwest Atlanta you can book a ticket online when you go there where they will there is no seat allotment so first and first served.

So you can go into the aircraft and take any seat there and the other thing else is out sourced you have to pay if you have check-in baggage you are encouraged to travel light and so on so there is no they do not want any of the infrastructure in the headlights and there they do not they have minimum amount of staff there is the except the pilot and nobody else and they do not serve any meals or etc inside the aircraft so probably they will give you water so that is the kind of thing that a business model and once it is a direct flight from one place.

To the other and when so this is like interstate bus transportation and Mc Donald's brought tension assembly line ,techniques to the fast for fast food business if you go to McDonalds what happens you go there I pay the money and whatever you have ordered it will be flashed on to the kitchen and they will assemble it and they have a menu so you can order only from the menu and they have the standard projects the products and depending on what the product is they will just heat it up and then or if it is Fred fries they will write fresh and then give it to you in standardized boxes everything is standardized including the outfit where we met Donald is this one so Xerox does not sell copying machines.

So if you want to rock this one but installs and maintains copying machines in offices and charges per page basis so it is providing solutions rather than products ,so this is this is one of the things that this one if you buy a copying machine you know you had to buy all the things like the paper they cartridge the ink or another things and also you may have to maintain it this one and a maintenance expenditure could be large but instead of all this j-rocks all this does all this for you and you have to pay a minimum charge + / charges so for each pH you pay so this is this is very convenient.

If there is a new j-rocks machine that has come with a new technology then you can always replace it for free so there are several innovations that are oxide done in this and powered by the either if you travel by the air aircraft engines are not owned by the aircraft owners aircraft engines are paid for the number of hours they are in the flying aircraft if the aircraft is not flying then they do not get any money this is called per hour by the hour so that is the kind of service business models that people follow so these innovations depending on.

The vertical you have you can innovate your own models for example sir you still tear selling a product through the retailers you can sell direct that is an innovation that you can follow so there are several innovations that in turn terms of their business models that you follow another company.

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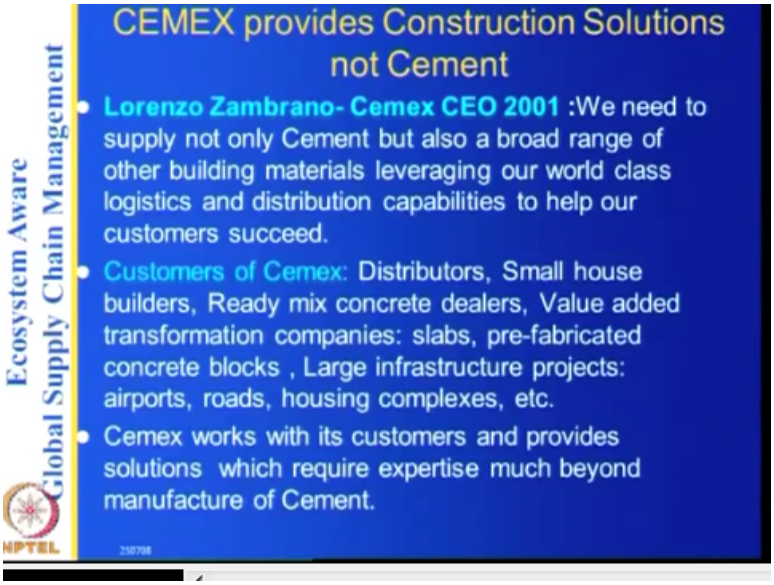

I would just want to mention is MX some axis I mixable based company and it became the fourth largest cement company in the world and what their CEO said in 2001 is we need to supply not only cement but also broad range of other building materials leveraging our world-class logistics distribution capabilities to help our customers succeed so what they are saying is you know cement by itself does not add any value it is used in construction and for construction you require other materials along with a cement so your requests to you require the others and you require other materials.

To make to use this to mix it and useless so why not become a building materials company and the idea is our customers this one so let us do whatever our customers want in other words if some customer is building an air crew at port and cement is only a small portion of whatever they spend but you help the customer in terms of procurement of all the materials that are needed which is steel which is cement which is the gravel and other kinds of things and also you help him in architecting the airport the architecture also becomes a part of your this one so when if you do all this then your cement.

It becomes incident because cement is only a very small part of your this one so that is how this one who are all the customers of some eggs yet distributors this ultimate so for the distributors

of cement or basically distributors for the household materials or building materials there is like steel Bravo likes and on other kinds of things so you help your distributors to get steel so what happens if you go to STL company and you say I am buying on behalf of all these distributors all these small holders all these large infrastructures builders and so on so similarly the steel company is going to give you at a discount and it is going to give.

You a high quality this one it is going to deliver to your distributor sites so your distributors small be house builders small house builders the request meant all right we require other materials are more importantly they require finance so can you provide finance or help them get financed through microfinance organizations and so on so ready mix concrete dealers value-added transformation companies like slabs be fabricated complex bills and infrastructure company the airport's roads housing complexes etcetera.

So you find out what the customer wants make a list and use your influence use your connections with all those people with all the dealers all the manufacturers and all that so that all these people are successful so that is what some X does so some ex works with its customers and provide solutions which require expertise much beyond manufacture of cement well if you want to do all the things that I have just said then it is not just cement but sem x gets the four or five times the cement this one if you have been there by gravel when the boys steel and other kinds of things so they are working capital they are working.

This one menu is four times that of cement so basically they make lot of profit and also they become very popular in terms of in terms of in the distributors and so on and they become basically highly connected to all the stakeholders in the industry and that is enough to sell this event so selling the cement from sub X is just incidental so that is what we have seen in terms of when you talking of product and supply chain. So what matters are just that the product on the services it also matters the business models you want to innovate so that you could you could get the more connections you can get more you offer more services story this one.

But of course I mean it involves a lot of work when you are having for example ,for Senate so if you are offering to all these be only all your customers to distributors a variety of services well it involves a lot of work but it also gives you more profits so it also expands your horizon you know one thing is to increase your mint plant capacity go to global and establish this one another way of expansion is getting to the services.

Which you use the cement and expand into them which probably is much more profitable than such as selling the cement so one has to think carefully about their products are with

innovations that have possible so the second thing that we are going to look at is the innovations in the delivery service.

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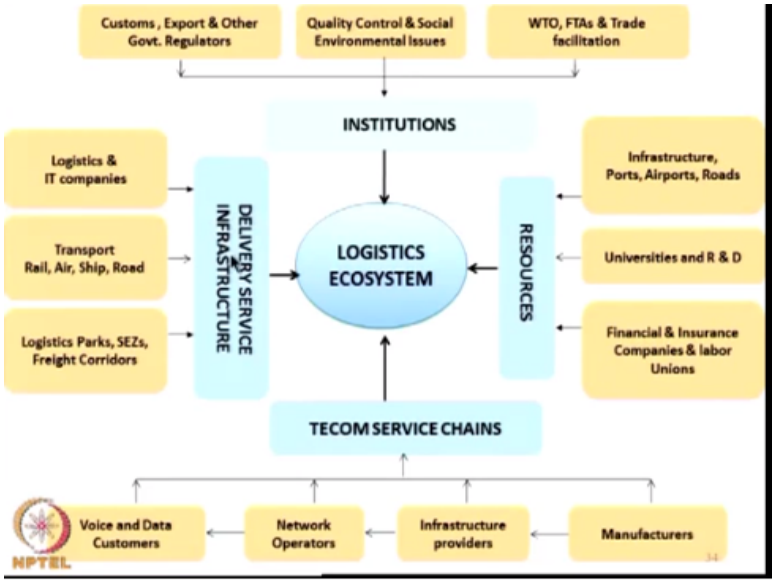

Let us look at the logistics one of the things that oh god so let us look at the telecom or logistics one thing is I think I have the wrong slide so here this is just the logistics service chain you have the manufacturers infrastructure providers network operators wise and dot this one I had to replace this slide so you have the resources the institutions and this one.

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So what are the innovations in logistics so in terms of product and service animation you have containerization transshipment supply hubs cross-docking outsourcing modularization standardization and so on and of course you have packaging late customization merge.

In transit customs sensor networks for visibility these are all the product service this one in terms of regulations you have basically in transportation you are worried about green because transportation contribute 18% of the green gas classes across the world you have to worry about customs because you are crossing continents and you have to worry about trade you have to worry about the knowledge you have to know about both the countries where your shipping is connected you should have connections with the government with the authorities with the companies were foreign exchange.

We should worry about foreign exchange of this and also free trade agreements and trade facilitation so actually if you're a logistics company then you should be able to help your customers in terms of their foreign exchange as well as the others so basically is not just transporting it is basically providing other services like telling the detailed knowledge of this but also they are connecting services and technologies like that it would be like RFID then radio frequency devices GPS 3pls for pl's data integration and mining remote monitoring.

And execution IT services and cloud they are basically both logistics and IT services execution as we have seen in case of remote monitoring and execution using BP was it becomes a very big issue for logistics companies because when you are crossing continents your container may be sitting in a port and you may not know about it so basically if you have RFID tags or sensor networks you can enable them using GPS and using remote monitoring , you can know where

your containers are and put up with take appropriate action to speed their delivery to the customers and so on of course there are resources and management.

Their innovations like training and HR approaches efficient operations with poor industry inputs this is one thing that where lots of innovations are this one people may complain that at no roads are there poor roads and people may compliant that it is there is the there is no truck one full truck load that is available so I cannot transfer it, I can transfer only once in month and the goods have to wait till .I get a full truck load and so on so but in such cases is it possible to transfer goods why are the passenger buses or passenger vehicles, what I mean is 80% of air light travels through passenger aircraft eighty percent.

So they are only companies like FedEx we will just use this for fright right of this express delivery of letters and so on but most of the fright it travels to passenger aircraft is it possible to replicate that in the bus industry if you have a bus that is passenger bus that takes people from anywhere to anywhere say from a state headquarters to a village is it possible to have to load some fright into that which is destined to that village and can it be delivered to the post office and the customer can they can collect it from the post office and post office takes the responsibility.

Because it knows all the customers in the village and they are hundreds and one lakh 36,000 post offices in India almost every village has a post office so use the existing service instead of trying to tell people that you want to have the very efficient industry input so I don't have roads I want to have a truck services and so on in stuff that you want to use with the existing inputs can you use this and of course Supply Chain Finance is another issue that is of importance and innovative governance models so they are all used for the resources and management in the large industry.

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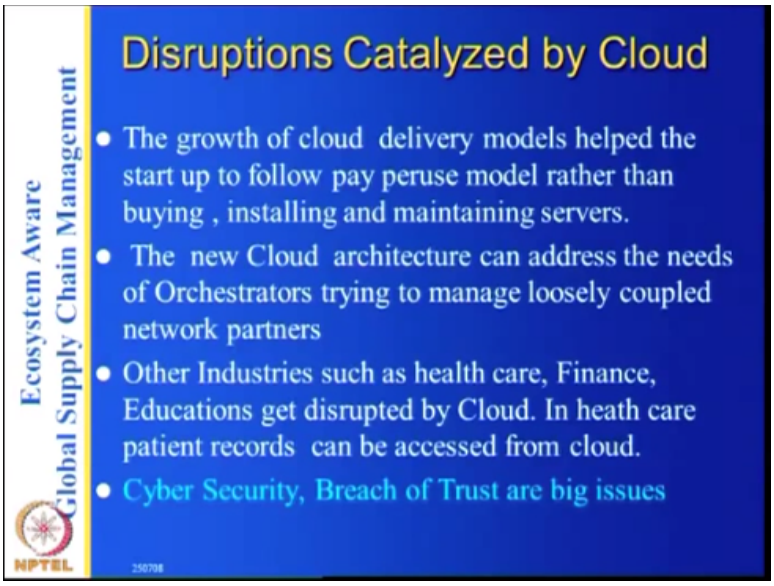

And there is the in terms of delivery there are also disruptions. Which are catalyzed by cloud so the cloud computing is one thing that is coming in a big way in into the industry this growth of cloud delivery models help startups to follow pay-per-use model rather than buying installing and maintaining servers if we are a small company you have several. I imply and they have all their computers you have to communicate store all your data at some place and maintain it for audit it can be financial industrial data and so you have to basically by install and maintain all the servers so that becomes a capital intensive work.

So instead of that there is the there somebody maintains these services and you just read them and you follow what is called peruse model so depending on the GB of data stored and how long they are stored and other services that you require you are charged so as I said before this is like you know you were charged for the warehouse space you are using you are charged for if you are traveling on a bus you are charged for your seat not for the bus and so on so the new cloud architecture can address the needs of orchestrators trying to manage loosely coupled network.

Now one thing that that happens here is there are several small scale industries all over the world and they contribute to the production but the small scale industries do they have the capability to maintain all the PRP systems so PRP systems are now going on to the cloud where several SMEs can basically use the PRP ASAP and other and Orchestrators systems to manage their this one suppose you have a several such SMEs like in April or in small toys this one in several of these small scale industries and supposing one wants to manage all this in other words.

They have their individual cloud databases stored inside the cloud but can somebody orchestrate these loosely coupled network partners and basically take them integrate them into the global value chain so it is now possible using a new cloud architecture that is because integrating and them into the global value chain and selling it to the big partners in the in the network it requires lot of information exchange and that is possible through the cloud because everybody is a small player here and they cannot afford to have the kind of cloud delivery models that are required.

So the delivery models that are required by themselves so they can use the cloud to orchestrate who are to manage this loosely coupled up brace so it becomes an enabler a very important enabler for our castration of small SMEs into the global value chain networks and finally there are industries like health care finance education who get disrupted by the cloud what I mean is supposing in the health care that is the stock of patient records now these patient records they can be accessible from the cloud of course with a password access.

So today with the patient records is in the hands of books or maybe it is on scanned and put somewhere or this one and you require the patient's permission the hospital permission and the government permission to access the records very rightly so but still with all these permissions once I have these permissions is it possible to access these patient records in an emergency if the patient is undergoing a surgery and something that is required and so on and is it possible when the patient shifts hospitals safe remember jersey hospital due to a franchise hospital near his house is it possible.

The doctors access instruct the patient carrying these handwritten records which are sometimes eligible and unreadable so the patient records the digital patient records basically they standardized or they are more readable and they are more standardized vocabulary so that the doctor can understand what is written and what is the idea behind the treatments and so on so you can this these disruptions can be catalyzed by the cloud services so the delivery service is creating a lot of innovations like cloud is creating a lot of innovations a lot of industries and so on so this cloud is like tears.

Become like making the internet accessible or the not only internet services but other services like data storage and data access accessible to small players so cyber security and breach of tasks are big issues here in other words when you are talking of cloud you are believing in a third party and you are storing all your data there so either there is how there could be a breach of trust or there is up somebody you can hack into the cloud and there is a cyber security maybe they are the big issues which are four o'clock another big thing that is happening.

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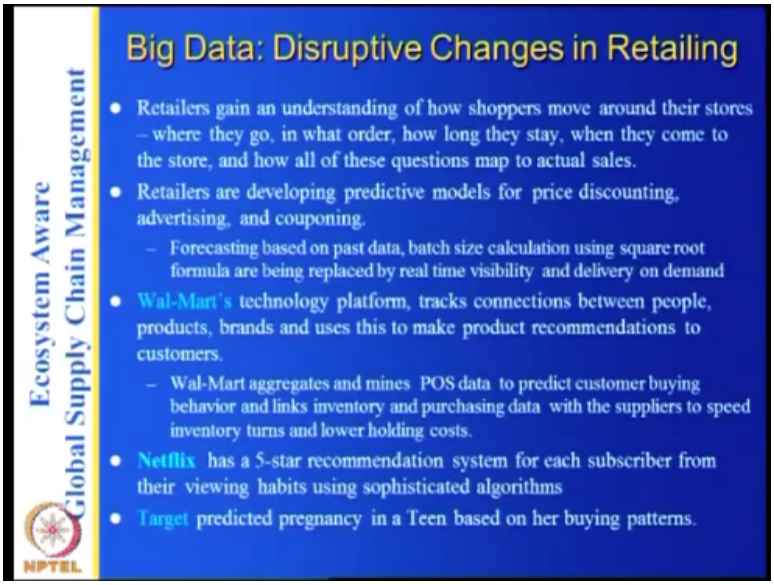

In the innocent times in the delivering issues is the big data nowadays big data is something which very popular in terms of unit is causing disruptive changes in retailing so what is that a retailer what it wants to understand the customer retail customer behavior it wants to have on.

It is shelves what the customer really wants at that point in time and it wants to understand the customer behavior so how do you get this you can get all this why service but surveys are becoming a very unpopular because the customers may not take it very serious so how shoppers move around their stores where they go in what order how long they stay when they come to the store and how will all these questions map onto actual sales so now you may go and visit someplace is touched a product go to the nick at it with others or something and then finally Donna may not bite.

o are you there to find out what is the price are you there to find out whether you choose what do you or something and how what is that you are actually buying so you want to understand customer behavior once he enters the retail store and retailers are developing pretty two models for price discounting advertising & couponing rather words if you buy something repeatedly from the your POS data point of sale data is it possible to analyze.

Which you either pay through a credit card or whatever so is it possible to identify you with what you are buying if you frequently buying something is it possible you can announce saying that if you buy two then I get rich discounting or advertising for products.

If you look if you go and look at some cell phones or something can you advertise we have a new cell phone coming up next week and it has these features and so on and you say we can have coupons you know which are getting issued next we have going to have a sale next week and so on so basically you can send all this information forecasting based on past data batch size calculation using square root formulas are being replaced by real-time visibility and delivery and demand so you can see a big shift in terms of the how retailers are looking at this in earlier what used to do.

You have to do forecasting based on last month's data POS cells and so on and use the square root formula how much inventory you want to have and all that but now it's all real time visibility and delivery on demand so for example Wal-Mart has a technology for a graph tax connections between people products brands and you just to make product recommendations to customers well if you can basically very few have a cell phone you will get recommendations then you are in this inside the store you will get the recommendations what depending on what label you are looking at so you will get recommendations.

So what Wal-Mart aggregates and mines view is data point of sale data to predict customer buying behavior and links inventory and purchasing data with the suppliers to speed inventory turns and lower hold recording costs so they want to have only what the customers are buying they do not want to have anything else this so depending on so it is the customer behavior and the buying behavior they data it or not the last month sales it is the current behavior of the customer what the customer wants today now is one that matters so that is the kind of disruption that is happening and of course there is a company called Netflix.

Which sells movies and it has a recommendation system for each subscriber from their viewing habits using sophisticated algorithms in other words if you are downloading a movie for viewing well depending on what you download whether it is Hollywood movies or Bollywood movies whatever and depending on that you they will make recommendations of what are the new things that are that are available so it requires algorithmic sophistication and so on so there is one thing target is I is a company predicted pregnancy in 18 based on her buying patterns.

So in other words did that is this is it possible to find out what the human being is going through if you are buying say wait a min enriched the mineral leverage project enriched vitamins then why are you buying if you are a lady then visit the pregnancy do you have

doctors this one so there are several questions which they can they can answer depending on your buying behavior what you are buying so of course there is this could be there is a privacy issues involved in all this so people you may think that nobody is watching you in your ribbon you are in a retail store.

But you have to be careful because me there is a big data and the algorithms behind and they are watching you whenever disruptive retailing so in the delivery mechanism it is not just delivery area products this the your behavior that is basically is reported to the retailers and big data is doing big runs in the in getting disruptive changes in retailing.

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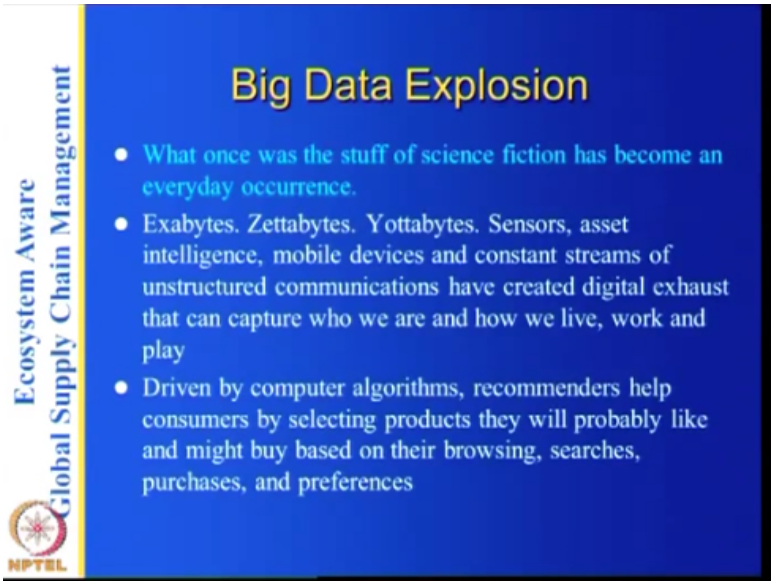

So that is the explosion of data what was once stuff of science fiction has become my everyday occurrence Exa bytes, Zetta bytes ,Yottabytes , sensors asset intelligence mobile devices constant streams of unstructured communications have created digital exhaust that can capture who we are how we live and work and play that is basically so driven by computer algorithms recommenders health consumers selecting products they will probably like and might buy based on browsing searches purchases and preferences.

So nothing confidential anymore if you are an Internet then you are known to the entire world so basically there is a big data explosion at searching.

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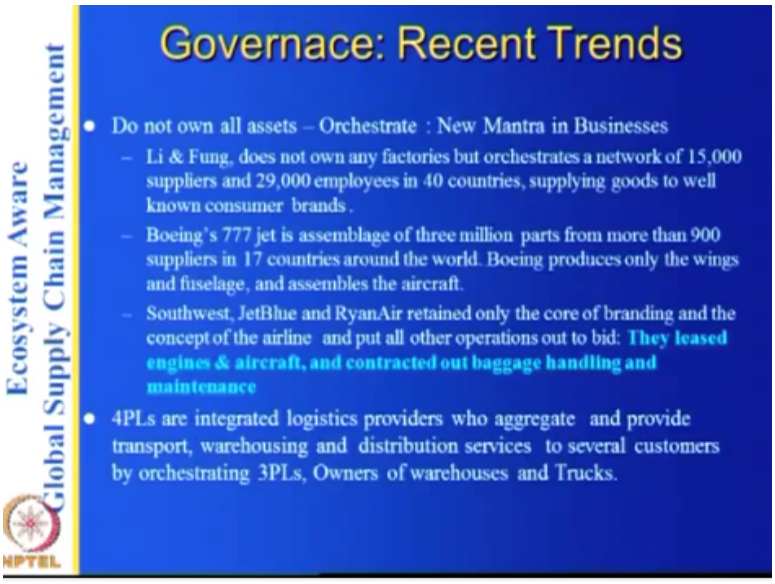

And there are basically several trends in terms of the governance that is happening in the recently people used to warn all the assets so how people are saying do not one all assets you are castrate it is a new month run business Li & Fung does not want any factories but our castrates network of 15,000 suppliers and 29000 employees in 10 in 40 countries supplying goods to well-known consumer brands and Boeing has 77 jet assemblage of 3 million parts for more than 900 suppliers in 17 countries Southwest they do not they only have branding and the concept of a land but put together operations out to bid they live engines the lease engines.

And aircraft contracted out baggage handling and maintenance and similarly logistics providers the fourth party logistics providers they basically orchestrate the movement of material from one place to another so there is a recent trend in terms of the governance as well.

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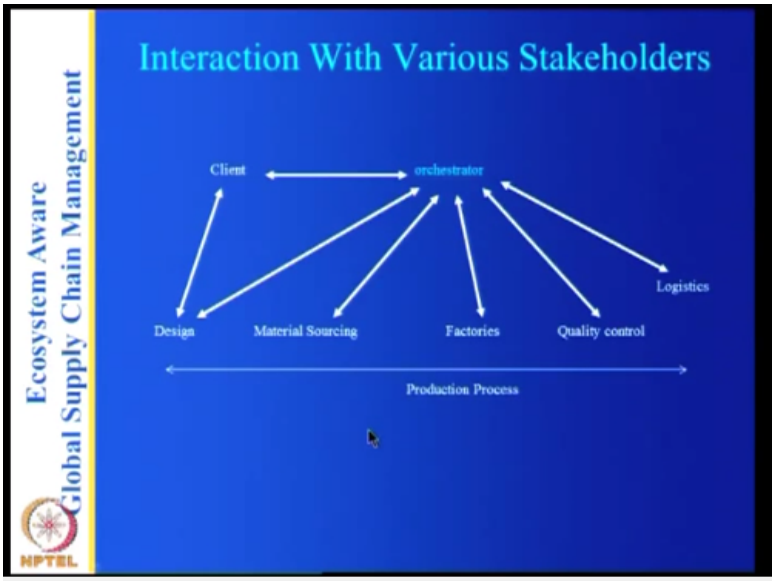

So you have an Orchestrator and you have the client and from client gives you the design and it basically it gets to the orchestrator and material sourcing factories quality control and logistics are other thing is done by the orchestrator and finally delivered to the client so this is the kind of governance mechanisms that are basically coming into the future.

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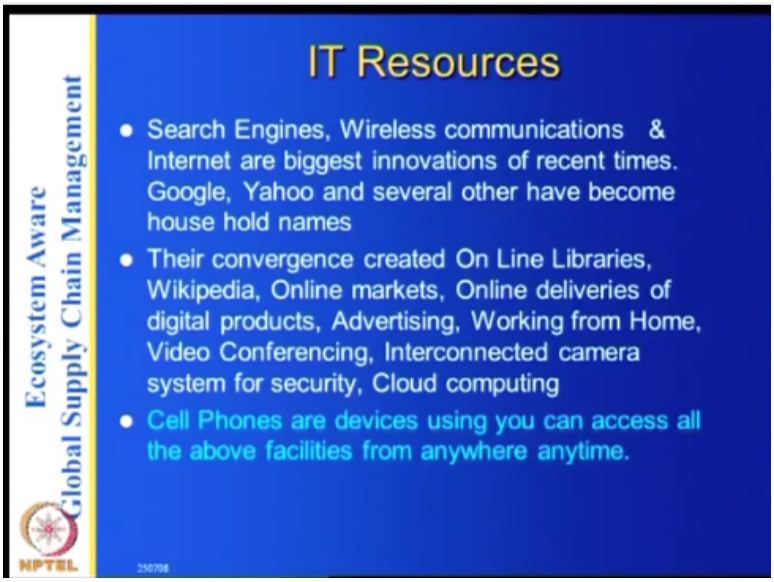

So we have innovations in terms of resources IT resources or search engines wireless communications and internet are the biggest innovations of recent times Google Yahoo and several others have become household names their convenience created online libraries Wikipedia online markets online deliveries of digital products advertising working from home

video conferencing interconnected camera system for security cloud computing all the IT innovations that have come cell phones are devices using you can use in which you can access all the above facilities from anywhere anytime.

So basically the IT resources innovations or great this one.

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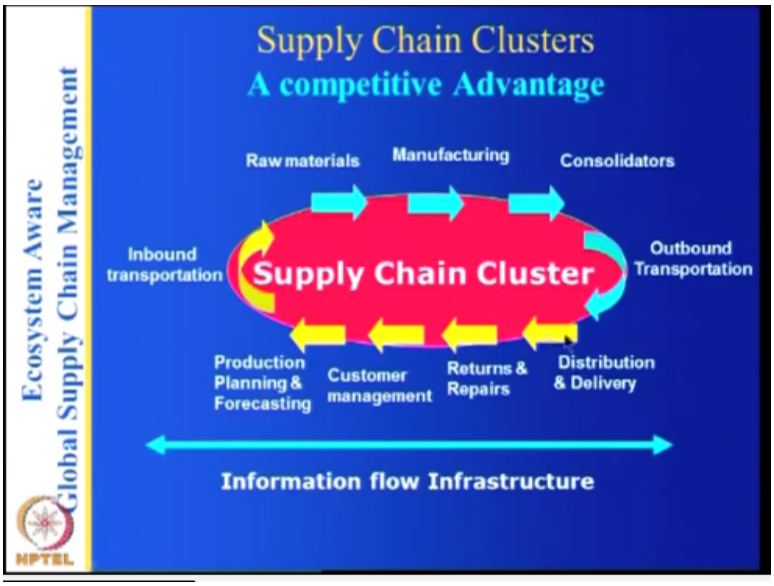

And you have the supply chain clusters which are created where you have the requesters which has inbound transportation raw materials manufacturers to outbound transportation distribution delivery and so on so you could keep at one place highly connected all the people through information flow in infrastructure so that becomes a supply chain cluster for a particular product they need not have to be collated co-located they can be co-located at one place.

But the competitive advantage comes in if their mobile ecole locate their globally located as well as and they are connected informational and financially and then goods flow is manipulated then you have a competitive advantage this is one of the big things that has happened in the delivery service the in the resources this one of course.

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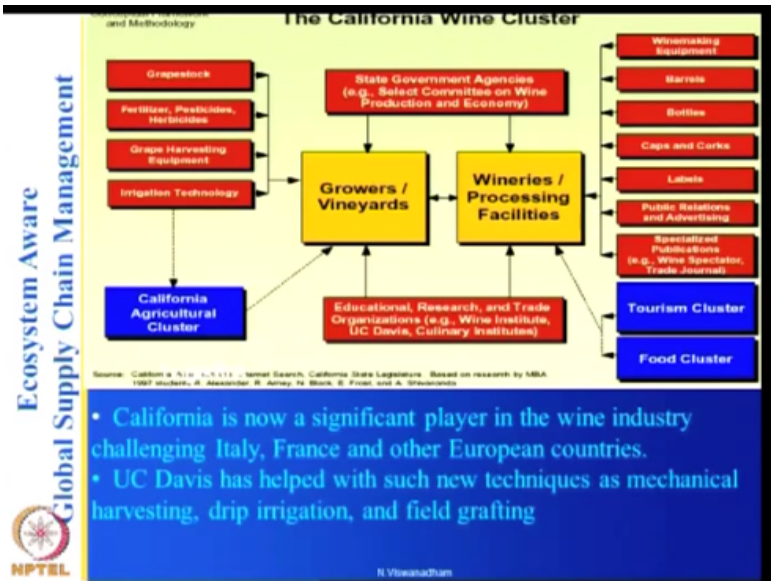

We have seen the resources of clusters. I have went through this a particular Californian wines cluster you have growers you have wineries and they see the supply chain here and you have the resources the delivery mechanisms are also the equipment the barrels and so on in terms of the delivery hole and educational institutions and these institutions.

The state governments and other agencies that welder fun so this basically provides in the terminology of a wine cluster the supply chain ecosystem of this California has become a significant player in the wine industry.

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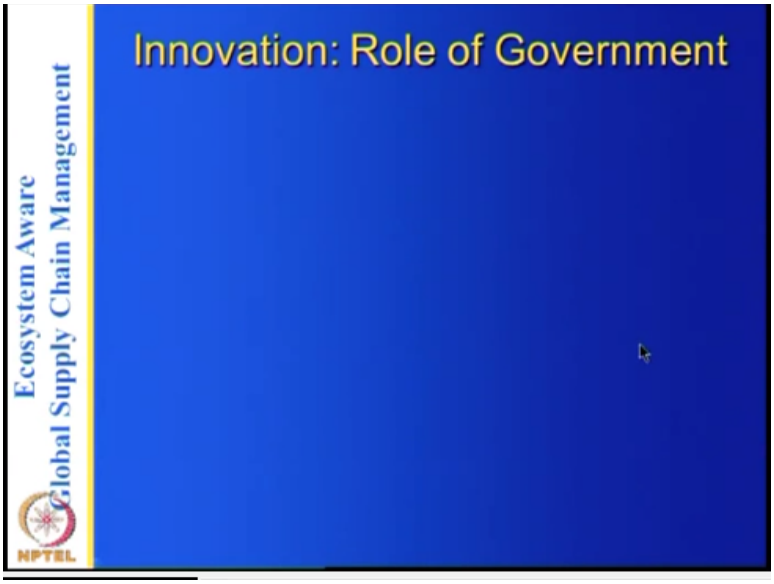

This so that is the innovation from the role of for the governors we will do that next time you.

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