

Entrepreneurship Essentials
Prof. Manoj Kumar Mandal
Rajendra Mishra School of Engineering Entrepreneurship
Indian Institute of Technology, Kharagpur

Module - 05
Lecture – 23
Lean Startup – I

Hello, every one this session we are going to discuss about Lean Startup we are just going to introduce the topic and then, in the next subsequent two sessions will be carrying forward the concept things are changing so fast.

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So, fast that you develop if you think of developing a product now and then you end up developing within a year or so chances are very high that by the time you will be ready with a product. There will be a competing product perhaps they will arrive even before expiry of 1

year and then you may actually end up remaining chasing other people other technology leaders.

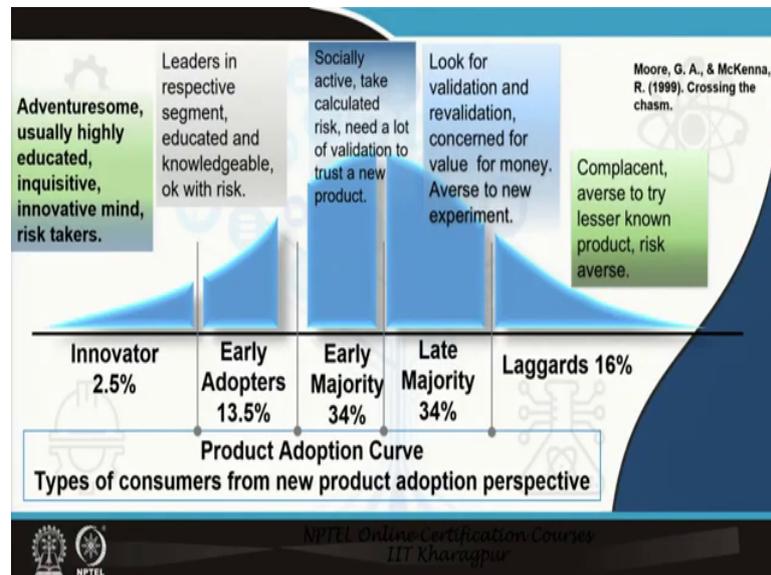
So, it is very important to build a product in minimum time, so that you are not a laggard you are rather a leader in the technology and the domain that you are thinking of developing a product. Now even if you develop a product and the product is kind of well accepted by the market at the beginning, and you have kind of looking at you have been looking at growth. Then suddenly there will be there will be surprises like it is not always necessary that early, early acceptance of product by some early customers will translate into growth moving forward.

So, that is why it is important to understand the product adoption curve or technology adoption cycle. So, new technology comes to the market it is not always necessary that everybody will be welcoming it. There will be some people who are excited about new technologies, so they are kind of innovator people.

So, they will adopt it and you may get a false notion that its well accepted and then move forward you spend a lot of money then eventually you may find that other people are not adopting it. So, understanding the different types of people and their mentality their requirements in particular their risk appetite it is very important to really move forward or plan accordingly.

Then there are like even before you develop a product there are different processes like linear process, circular process, linear process is a step by step process a well-established RND method. Where you define a problem and then gradually you try to ideate develop a product and then go to market. Alternately there is a validated learning process that you engage with customer at the very beginning and then gradually with their support with their feedback you keep on directing your direction of product development.

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So, that at the end you know that customers themselves are liking it because they were their all through the product development lifecycle. So, just a basic introduction about product adoption cycle or technology, but diffusion process, technology comes and then it gets gradually diffused into the majority of the population. Sometimes even it gets to say 10 percent of the population new technology arrives and then old technologies is absolute. VCR technology is one of that it came and then people became accustomed to it.

Then suddenly there was the CD and CD drive and then CD player, so DVD player and then nobody wanted to use VCR; it was kind of not so funky technology. Because, VCR had its own technological problems reusability then tape is the used to get tangled etcetera. So, let us see what kind of people are, there are more or less 5 kinds of people. One kind of people they

are very minority they are called innovator kind of people, they are adventurous, they are quite educated they may or may not be educated.

But then they are not bothered about risk they want to be the first to use any product you introduce some thing they are excited about the new things and they would like to buy. And they would like to not only buy suppose you are building a software, so this guy will try to buy that or maybe you give him a free sample or at a subsidized rate. So, he will use it and then you will find the bugs and then come back to you saying that you know I noticed some bugs and I have already troubleshot it and then this is the solution.

So, you have a free solution from this kind of guys, solution is not the main criteria, criteria is that these guys are ready to test your product and then give feedback. Not only that they are kind of forgiving about the aesthetics you do not have to really make a wonderful packaging or say if it is a hardware then they do not care about the aesthetics of it.

So, they just are with new product and excited about using them they will be talking to their friends and relatives and colleagues. So, that other people also come to know because they will be telling them because they get that excitement by telling other people that look I am using this and this nobody knows about it something like that.

Then there are early adopters they constitute about 13.5 percent of the population, they are also educated they are kind of leaders in the respective field. But then they need bit of validation they do not jump into some new technology they will see whether some people have validated like in customer validation you give 3 star, 4 star, 5 star at least they want to see that out of 5 people who bought how many people have given 5 star.

So, even if there are 5 people who have used it they are with that provided they have given some good number of stars. So, this kind of feedback helps them at the same time they are with little bit of bugs here and there. So, they will be complaining, but at the same time they are because they understand that this is a new product so etcetera.

Then moving forward there are other kind of people like early majority, they need real validation they are not with any kind of trouble and then troubleshooting. They want a perfect product they want to take they do not want to take any risk.

So, even if there are 5 star by 10 guys all 10 guys they will see only 10 people have used it I am not game for it. I want to see that there are some so many 100 of people gave has have given their validation only then they will buy. Even if they suppose you are giving suppose somebody mentioned that there is a bug and company has already removed that bug.

But they will be skeptic that there is a bug so I am not going to risk my business on this because this is not a branded company like Microsoft established credential. So, I do not want to take risk and then there are other issues like they want many features they just do not want a kind of a standalone thing that is not cannot be integrated with their legacy system or other system.

So, they will have umpteen number of complaints, so moving from early adopters to early majority is a real, real fight and real it requires real expertise and investment and an adoption of new knowledge.

So, you need a product with lot of features that fulfill all the requirements of early majority. Let majority are more skeptic they will usually not adopt new products unless they have a compelling reason to use that. Laggard constitute 16 percent they normally will not adopt new product as long as another product is available as low as long as they are with an existing product. And that product is given support they will not change if their the company that manufacturing the product will say that we are no longer going to support perhaps they will switch.

So, from here actually the point that is to be understood is that that a product whatever grade that is going to encounter challenges at every step, every stage of the product life cycle, product adoption cycle technology diffusion cycle. So, and there are umpteen number of complexities particularly if you have a if you are thinking of developing a product. And then

after you develop you are looking for customers that should absolutely, absolutely be avoided because its first of all the development time is going to be huge second of all its very difficult to find a customer if you have a product.

Rather you should look for people with pain and then understand their pain and then try to develop a product that fulfills or that alleviate the pains that you have targeted. Then you have people in the customers ready for you, but if you have a product and you are looking for customer you never know how many years you are going to take to identify customers and then convince them that this is a product that alleviates their pain. Of course, there are successive stories where people actually develop the product and then found customer and then become successful that is a different story.

But, first thing is that taking long time to develop a product and then attracting innovator kind of customer early adopters then with difficulty you move to early majority. If you take several years to do this process the complete this whole process by that time new technology will arrive in the marketplace and it is going to be very difficult to retain this customer forget about acquiring new customers.

So, to solve this problem of long product development cycle time number 1, number 2 to eliminate the uncertainty that uncertainty whether customers will buy your product. There is this lean startup philosophy or methodology that that people are nowadays adopting and if you are really thinking of starting a startup you must understand what is this lean philosophy and then lean and agile philosophy you must adopt that.

Otherwise if you follow a linear method of product development like you have no idea whether no idea where the customers are going to like your product till the time the product is ready in the marketplace. And, then you realize that the customers are not liking it this whole money goes down the drain so to avoid that you onboard customer at the very beginning.

Even before you think of developing a product to stay with customer empathize with them understand their pain by suffering the pain be part of that like the thing that Rivigo debt. We talked about the story at in some sessions earlier Rivigo was a have was a relay truck system,

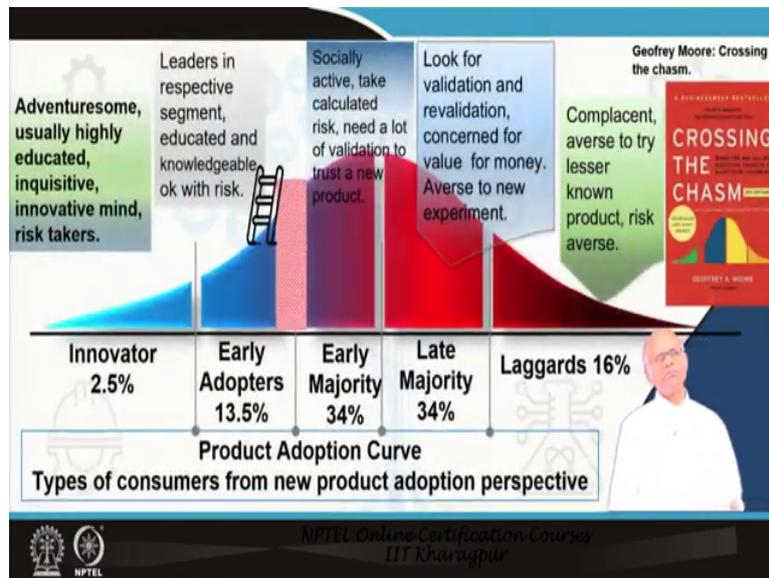
truck or truck meaning there are there are these 2 persons 1 is Gazelle another is Deepak. And Gazelle actually they both of them identified a problem about truck drivers, truck drivers were not interested to take this job even if they were sitting idle.

Because truck driving or such a painful job, but then understand understanding the pain from the mouth of truck drivers would not have led to development of a wonderful solution that they actually did. What Gazelle did they she started moving with the truck along with the drivers she empathized with them by suffering the pain? Because she was sleeping in the truck she was eating whatever food the drivers were eating she was not getting connected with their home. Even, if there are emergency she could not come back home because she was in the truck and she could not leave the truck because she was trying to empathize.

So, by suffering this is the way you empathize you suffer the same pain that your customers go through customers go through. So, you really get the pain and then that is how you can perhaps come up with a solution that will be so very acceptable to the customers. And in the process they came up with a relay system wherein a truck driver will start from 1 point they will move to point 2 in 4 to 5 hours where another driver will wait for him. So, the first driver will give the truck to the second driver and the truck that the second driver was driving it was heading towards this destination.

So, that are the first driver will take that truck and come back go home spend the night with the family. So, this kind of an innovation solution innovative solution in a very short span of time as possible because they try to empathize, not only empathize. They on boarded the customer at the very beginning talk to them with the solutions and then eventually it was successful.

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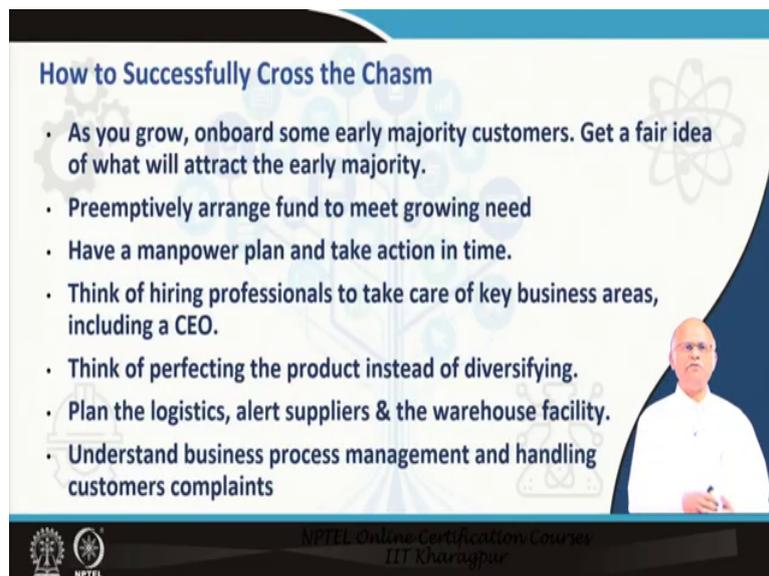
So, this book was this this idea was espoused by Geoffrey Moore in his book of 1999, but ever since the book was there in the marketplace marketers have adopted that as a chapter of marketing viable. And particularly this is stage from early adopters to early majority at this place there is real, real problem that has been demonstrated by many, many failed stories as well as successful stories. We talked about Anki robotics and artificial intelligence they raised 200 million dollar they were building cutting edge robots for toys.

And they were using artificial intelligence so that children get children could play with that with the robot as if it is another human being. After raising 200 million dollar and achieving a revenue of 100 million dollar for subsequent successively for 3 years or so. And then selling about 1.5 million toys the company shut shop in fine morning they said we do not have any more money to go ahead.

This kind of things happen at this conjunction from early adopters to early majority they were stuck at 100 million, 100 million dollar turnover that shows that they could not acquire a lot of customers from early majority. Because the turnover was not they their growth actually depart to almost 0 percent. Rather maybe negative because early adopters also once you satisfy them then gradually you do not have new customers to acquire.

So, they could not have strategies to move from early adopters to early majorities and then after 200 million dollar of funding they owe and 200 employees this those were talented employees who were developing this cutting as technology. In fact, they were planning to move into the matured artificial intelligence domain, the real robot that can that can replace in part a human in for some of the jobs that was their target, but still they were not successful.

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How to Successfully Cross the Chasm

- As you grow, onboard some early majority customers. Get a fair idea of what will attract the early majority.
- Preemptively arrange fund to meet growing need
- Have a manpower plan and take action in time.
- Think of hiring professionals to take care of key business areas, including a CEO.
- Think of perfecting the product instead of diversifying.
- Plan the logistics, alert suppliers & the warehouse facility.
- Understand business process management and handling customers complaints

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So though our discussion is about lean startup let us just complete this discussion as to how to successfully cross this chasm. See the problem of this chasms are multi dimensional first of all you start growing from the innovator kind of customer to early adopters.

Then you may not have any idea of what kind of infrastructure you need when you grow to early adopters. You may have the similar kind of marketing people similar, similar logistic similar infrastructure, similar customer service professionals. And, then particularly you may not plan the huge amount of money that is going to be necessary for meeting your increased working capital.

I mentioned earlier that you need working capital for maintaining raw, material maintaining goods in process maintaining finished goods and maintaining receivables. So, as the turnover goes up you need a lot of money, so this lot of money may not be plan unless you plan early then it takes about 6 years, 6 months' time to get funding. So, if your existing investors are not willing to fund further then and if you do not plan 6 months ahead one fine morning you find that money is not there anywhere and you have to shut down.

Though you have all latest technology you are a technology leader, but then that is the reality. So, meeting this growing need and the need that may appear moving forward like you have say 100 customers. Now maybe 10 customer representatives should be good enough to give them service, so anytime there is a there is a trouble there are people to troubleshoot, and there are people to receive their question and give them answer.

Suddenly, your customer becomes 1000 and this 10 people will never be able to service this 1000 and then our customer service quality will deteriorate not only you will not satisfy this additional 900 customer.

Even the earlier 100 customer will be kind of demoralized and eventually we will lose all of them one fine morning you have no customer. So, it is very important that you plan for the growth then growth is this growing at the beginning is one thing developing a product then going to market achieve some growth is one thing. But managing growth is another thing

where you need a professional CEO so this is the time when one should relinquish responsibilities or control and then put a CEO.

You have your own control on the equity, but then let the business process management be looked after by CEO most of the people like we talked about Sophia Amoruso she needed a CEO, but she did not really want to relinquish the control of business process management.

So, she did not hire and eventually she failed many, many startup failed because of because of this founders dilemma. Whether to whether that whether a professional can manage my business better than me is a question that most of the founders cannot answer realistically. They think that it is their baby and nobody else actually understand the business and nobody else can perform their job better than them. And then many people actually suddenly diversify into many, many things because they think that I have 100 customer with 1 product.

If I have 10 products I have 1000 customer or something like that and then eventually they realize very quickly that it was a fatal decision and then finally, they failed just fail because of the diversification. So, always better to perfect your product because early majority is going to demand perfection, your early adopters may not demand that kind of perfection that kind of aesthetic sense that kind of packaging whereas, early majority are going to going to demand that without that they are not going to buy.

So, you may not have any an ideas to why they are not buying some people bought and there are there were nice growths. But now there is no growth and in fact, there are negative growth so you must focus on this perfection rather than diversifying. Then if you are selling more then shipping becomes a problem, your logistic becomes a problem, warehouse becomes a problem you have to preempt all those needs to be able to seamlessly move forward.

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Then there is business process management most importantly this is not written in any of the books that I have referred to frugality is perhaps another single most important factor for success.

Many entrepreneurs, but yeah many entrepreneurs actually fail at the this place in particular I will be talking about Anki robotics and artificial intelligence. Many employees after their failure wrote clearly that these people burnt cash left and right. If they would have become frugal perhaps they could manage another 2 years with the same money.

Just imagine a little bit of frugality would have taken them for sustain them for another 2 years you never know perhaps they would have they would have enacted a very successful

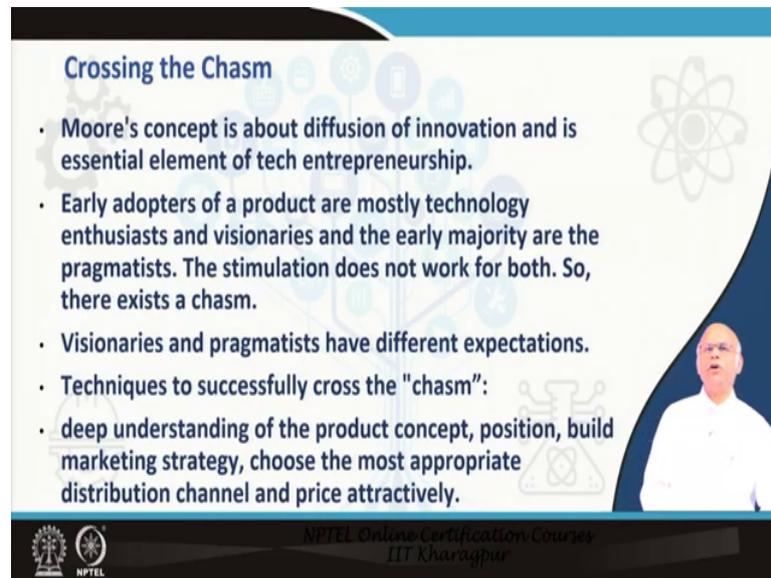
story by just being frugal. Many of the first generation entrepreneurs did not see a million dollar in their bank account or their parents bank account.

Suddenly, when they find some 10 of millions of dollars in their bank account they think money is endless there is no end to it this money is never going to be exhausted. But when you are not thrifty enough you are not frugal enough money vanishes without you even noticing. One fine morning you see there is no money at all that is what happened with Anki that is what happened with many, many companies whosoever failed you may have statistics that 42 percent of the starter failed.

Because customers did not buy their product something like 19 or 22 percent, 24 percent failed, because they ran out of cash. Whatever statistics say all 100 percent of the people who were not frugal they failed, reason may be they may they may attribute it to some other reason. Like Anki may attribute their failure to competition that robot came from china or something.

But the fact is that they were not frugal they were spending money left and right there is so much to learn from this particular issue. And almost like there will be a 90 percent possibility of you failing if you are not frugal and you can eliminate that 90 percent just if you are frugal enough.

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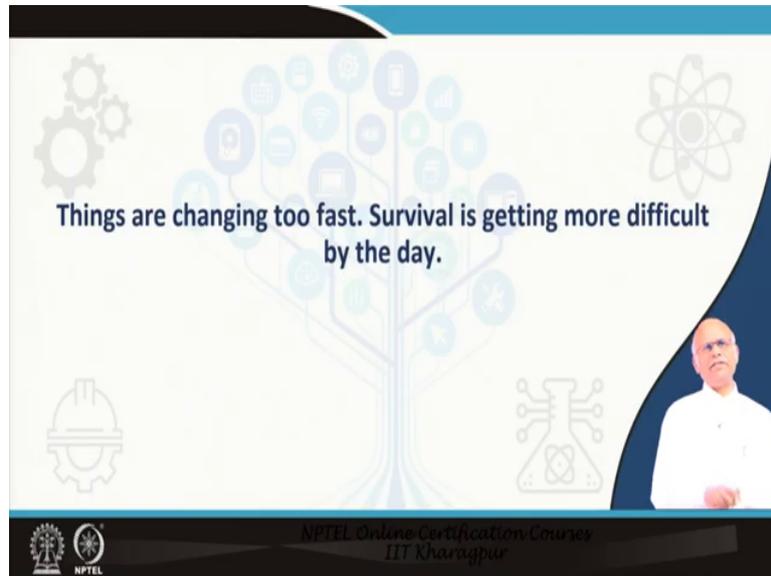
Crossing the Chasm

- Moore's concept is about diffusion of innovation and is essential element of tech entrepreneurship.
- Early adopters of a product are mostly technology enthusiasts and visionaries and the early majority are the pragmatists. The stimulation does not work for both. So, there exists a chasm.
- Visionaries and pragmatists have different expectations.
- Techniques to successfully cross the "chasm":
- deep understanding of the product concept, position, build marketing strategy, choose the most appropriate distribution channel and price attractively.

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So, focus on this point if you ever want to become an entrepreneur.

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So, these are about technology diffusion and product adoption cycle, now there is little a bit of introduction which I will bypass.

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**Change Itself Is Accelerating:
Trends Driving Market Turbulence**

- 1) The dual transformation through digital disruption in retail.
- 2) The rising dominance of digital technology platforms continues to shift market value in a big way.
- 3) Disruptive change through business model innovation across industries. [Trivago, Ola, Byju's, Paytm]
- 4) Cleantech and the downward pressure on energy prices has created new winners and losers in some of the world's biggest industries.
- 5) The rapid explosion of private "decacorn" companies signals accelerating turbulence in the years ahead.

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Change is happening so fast that you try to think of something today and tomorrow you find that somebody has already done.

And change is happening everywhere the existing status quo is being challenged by entrepreneur's day in and day out. And new entrepreneurs are challenging the existing business model they are coming up coming out with a new business model and the old business model is dying a natural death.

Talk about Trivago just now I mentioned Ola, Byjus, Paytm they came up with new ideas and existing businesses out of debt already. So and existing mega business houses like decacorn they are kind of exploding and making way for new entrepreneurs with new technology.

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Changing Perspectives

Uncertainty

1960

- Shareholders demanded **incremental** improvements
- **Financial capital** is dominant
- Innovation was **steady**
- Prices reflected **costs**
- Customers were **loyal**
- Investors and regulators **ignored** ethical standards

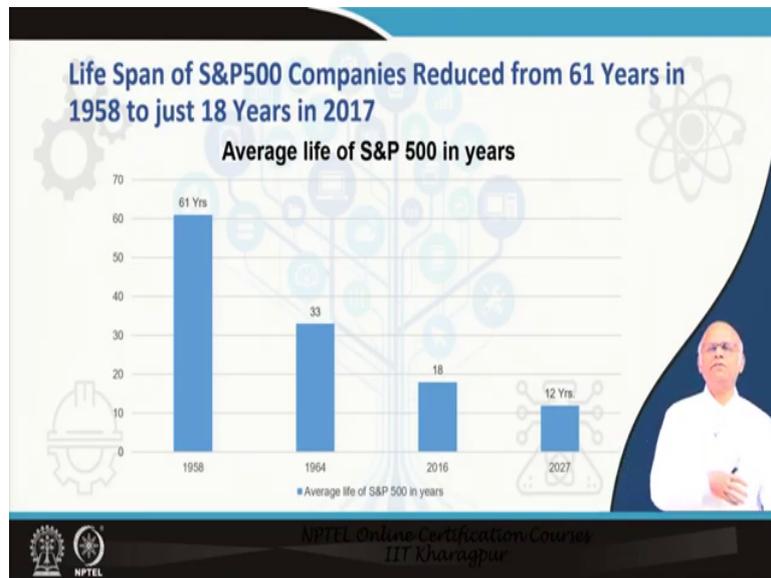
2030

- Shareholders demand **"best-in-class"** performance
- **Intellectual capital** is dominant
- Innovation is **rapid**
- **Globalization** is driving prices down
- Customers are **fickle**
- Investors and regulators are **demanding** higher ethical standard

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This shows this particular slide shows how things have become uncertain as we moved from the middle of 20th century to the beginning of the 21st century. Everything has changed customer is demanding more quality investors are demanding top grade performance and people at least are demanding more ethical standard.

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So, things have changed, look at the rate of death of fortune 500 companies in 58 a fortune 500 company ones become fortune 500 company they used to remain there for 61 years on an average. And 64 it came down to 33 and in 20 27 it is projected to come down to 12 years it may be even 10 years you never know.

So, a company which is becoming fortune 500 today has the potential to remain so for about 10 years; that means, new challenge will come new competitor will come and then they will grow faster than this fortune 500 companies.

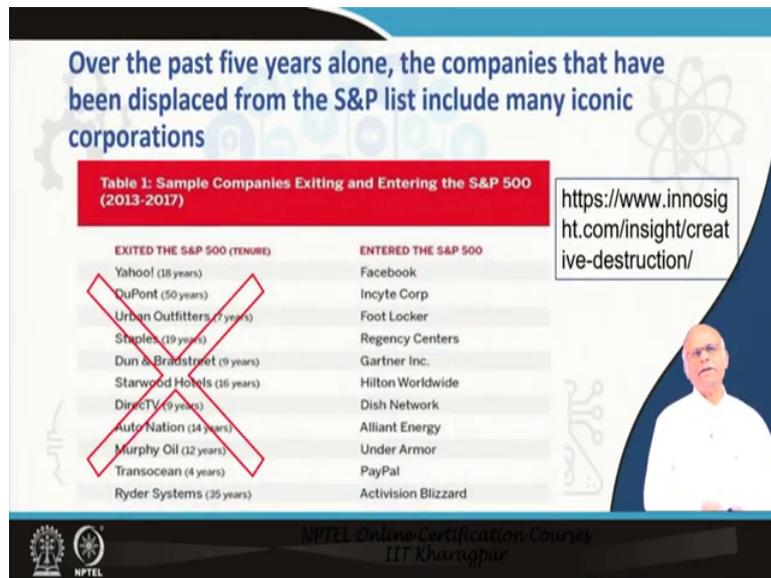
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Over the past five years alone, the companies that have been displaced from the S&P list include many iconic corporations

Table 1: Sample Companies Exiting and Entering the S&P 500 (2013-2017)

EXITED THE S&P 500 (TENURE)	ENTERED THE S&P 500
Yahoo! (18 years)	Facebook
DuPont (50 years)	Incyte Corp
Urban Outfitters (7 years)	Foot Locker
Shaples (19 years)	Regency Centers
Dun & Bradstreet (9 years)	Gartner Inc.
Starwood Hotels (16 years)	Hilton Worldwide
DirecTV (9 years)	Dish Network
Auto Nation (14 years)	Alliant Energy
Murphy Oil (12 years)	Under Armor
Transocean (4 years)	PayPal
Ryder Systems (35 years)	Activision Blizzard

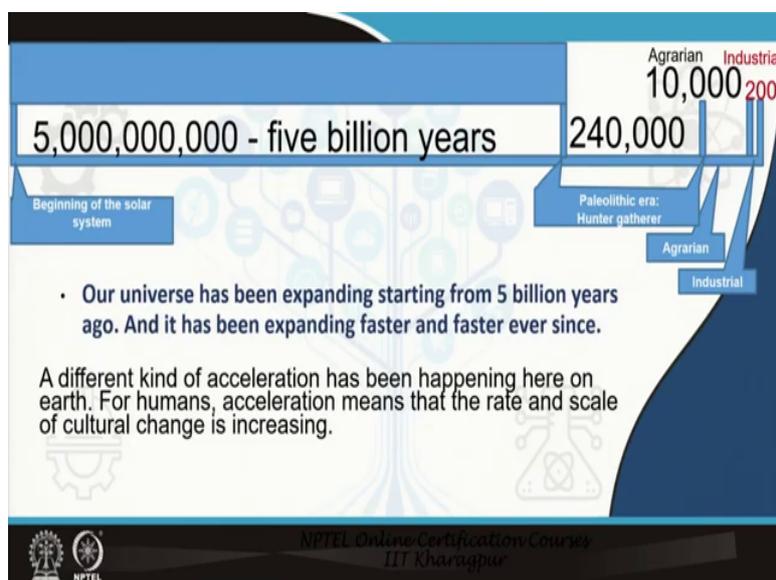
<https://www.innosight.com/insight/creative-destruction/>



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And then these companies will be out of fortune 500 and look at the left side on the right side. They were who is who in corporate world and on the left right side new companies have come up their fortune their fortune 500 companies.

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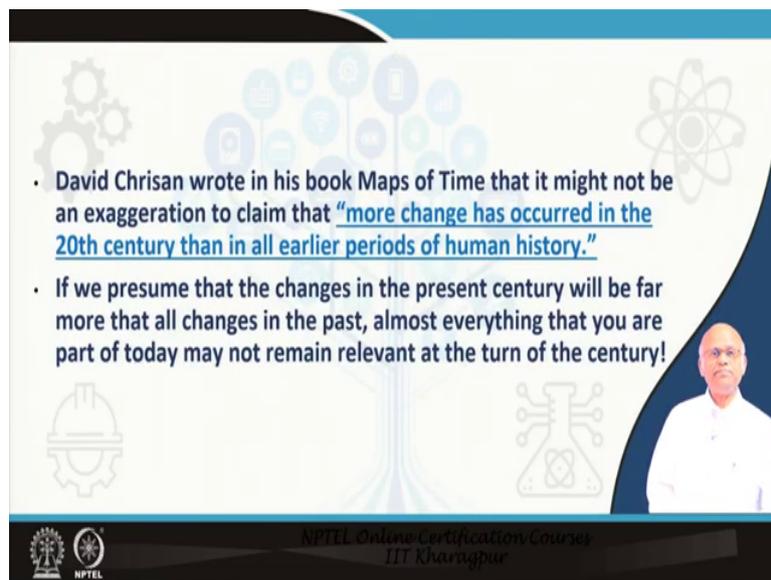
If you have if you want to or maybe I would like to give you a broader perspective on change how change is happening from the big bang it took 5 billion years for a civilized human being to emerge. So, 5 billion years then it took 2 lakh, 40000 years for human being this human make to become hunter gatherer and from hunter gatherer to become agrarian or to adopt agriculture as a way of life that took 2 lakh 40000 years.

Then from agrarian economy to become industrialized it took 10000 years and then from 10000 years, it took only 200 years to disrupt all technologies that came up in the first 100 years. So, in the next 100 years perhaps everything will be disrupt disrupted that you see today. If you ask your grandfather grandparents you will find that they never is to use the things that you use today almost everything except the food and drink that we normally that

has not changed much other than ready- made foods and all that and an online ordering and all that.

But, majority of the gadgets that you do majority of the facilities that we enjoy today were not there and moving forward maybe within 100 years somebody said this yeah.

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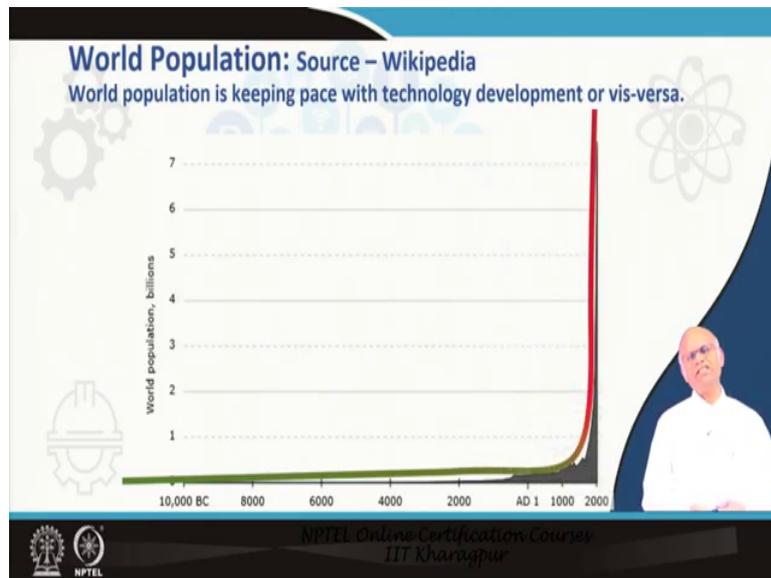
The slide features a light blue background with various icons: gears, a tree with nodes, an atom, a hard hat, and a chemical flask. A portrait of a man in a white shirt is on the right. The text is as follows:

- David Chrisan wrote in his book Maps of Time that it might not be an exaggeration to claim that “more change has occurred in the 20th century than in all earlier periods of human history.”
- If we presume that the changes in the present century will be far more than all changes in the past, almost everything that you are part of today may not remain relevant at the turn of the century!

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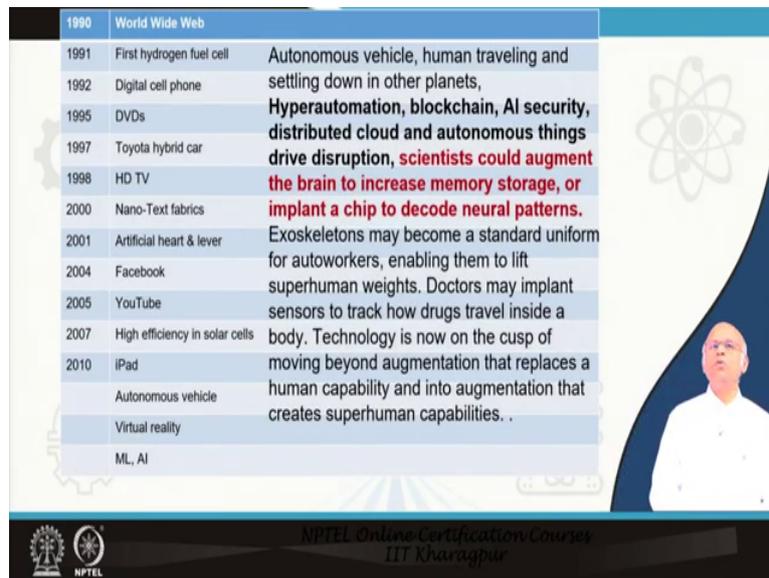
David Chrisan said in the 20th century the changes have happened occurred in the 20th century perhaps is more than whatever changes that you saw.

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During the 4 whole 5 billion years.

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1990	World Wide Web	
1991	First hydrogen fuel cell	Autonomous vehicle, human traveling and settling down in other planets,
1992	Digital cell phone	Hyperautomation, blockchain, AI security, distributed cloud and autonomous things
1995	DVDs	drive disruption, scientists could augment the brain to increase memory storage, or
1997	Toyota hybrid car	implant a chip to decode neural patterns.
1998	HD TV	
2000	Nano-Text fabrics	Exoskeletons may become a standard uniform for autoworkers, enabling them to lift
2001	Artificial heart & lever	superhuman weights. Doctors may implant sensors to track how drugs travel inside a
2004	Facebook	body. Technology is now on the cusp of moving beyond augmentation that replaces a
2005	YouTube	human capability and into augmentation that creates superhuman capabilities. .
2007	High efficiency in solar cells	
2010	iPad	
	Autonomous vehicle	
	Virtual reality	
	ML, AI	

So, in the next century perhaps you will see even more changes happening, these are changes that have already happened and that is kind of happening or it is in the process of happening people are even talking about a virtual cloning of yourself.

So, that you can replicate yourself elsewhere suppose you have a robot of your type your all intelligence given into that it will perform almost similarly like as you do accept some very specific intelligence most of the activities that you do can be done by the same robots. So, things are changing so fast that god knows what is going to happen.

Here is how population changed and I would like to give you a perspective that with change of population technology changed or with change of technologies population changed. Either

of the two or maybe both of them were complementary like when population started growing there was a need for more food more transportation more communication.

So, everything started changing and then with that population was also started changing. Population was moving in a straight line for 10000 years and then suddenly there is a over shoot almost like perpendicularly.

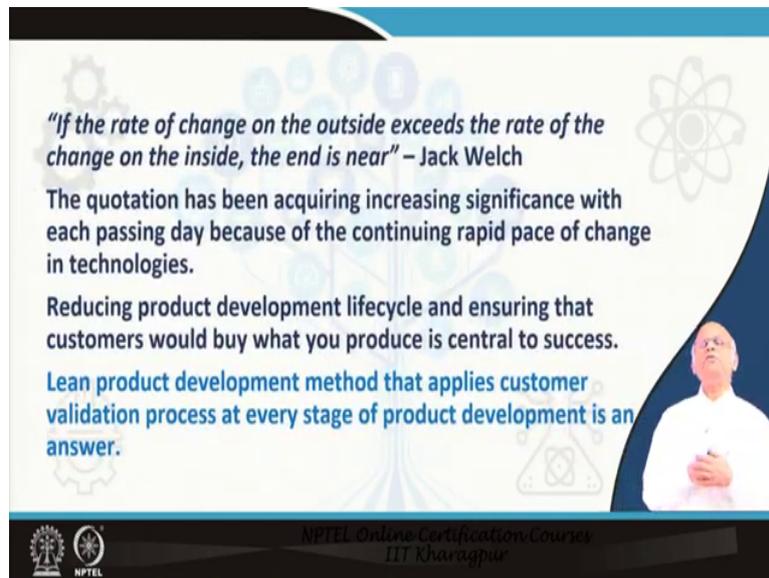
First of all this is not sustainable because normally there is in statistics there is a saying of mean reversion. It means the mean always revert means anything any natural, natural phenomena or natural data natural parameters that always reverse to the mean. If that happens then god knows how many people will be destroyed, more importantly this is putting huge pressure on the biosphere. We are consuming our annual production in the first few months and rest of the month we are actually somehow banking on various things like we are trying to over produce, over consume and then pollute the atmosphere.

So, it is a diversion, but then it is a very important point that I would like to make and this is going to define the future technology. Any point of time if you if you want to sit back and try to understand or try to forecast technology as to what is going to be the new technology what is going to emerge as the new technology.

It is the survival of human being it is the existential crisis of human society that will define what technology you need to innovate and this technology will be innovated automatically. We have seen that necessity is the mother of invention we have seen that the army the military has had always been at the forefront of giving us new technologies.

Because they have existential crises, so whenever we have existential crises that defines what technology we need and that technology will immerse. So, if you are interested in technology forecasting you should rather than extrapolating from past development it is better to understand the challenge that human beings are kind of exposed to are going to be exposed to like this coronavirus. So, you can think that more research will be in this direction because this is yeah our very existence.

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"If the rate of change on the outside exceeds the rate of the change on the inside, the end is near" – Jack Welch

The quotation has been acquiring increasing significance with each passing day because of the continuing rapid pace of change in technologies.

Reducing product development lifecycle and ensuring that customers would buy what you produce is central to success.

Lean product development method that applies customer validation process at every stage of product development is an answer.

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The slide features a background with faint icons of gears, a network of nodes, and a stylized atom. On the right side, there is a small inset image of a man in a white shirt, likely the speaker, holding a device. The bottom of the slide contains the NPTEL logo and the text 'NPTEL Online Certification Courses IIT Kharagpur'.

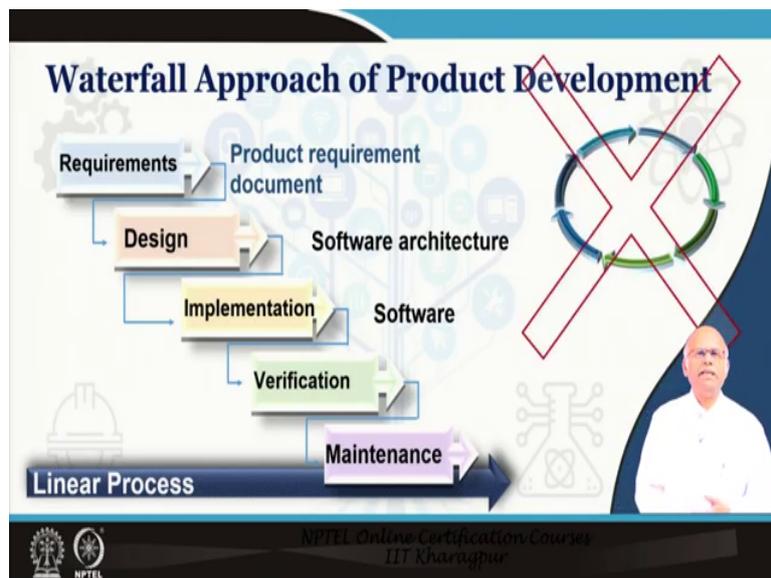
So, product development lifecycle has to be reduced and if you want to reduce product development lifecycle you cannot actually go in a linear process that today you ideate tomorrow you build a prototype day after you make prototype that then refine them then go to market. And then in the market place it is not accepted you come back and then it start all over again you really have to get every stage customer validation. So, suppose you have are in an idea stage talk to the customer that I am going to build the product for you are you interested in this product if they say ok.

You build it then we will see so; that means, you have a green signal or if they say that yes we definitely need this. Of course, you should be mindful that many a times if you are bringing a disruptive technology or a technology that the customers are not familiar with many people

will say I do not need that. I do not even understand what you are talking about many new many customers are not even aware that they have a pain.

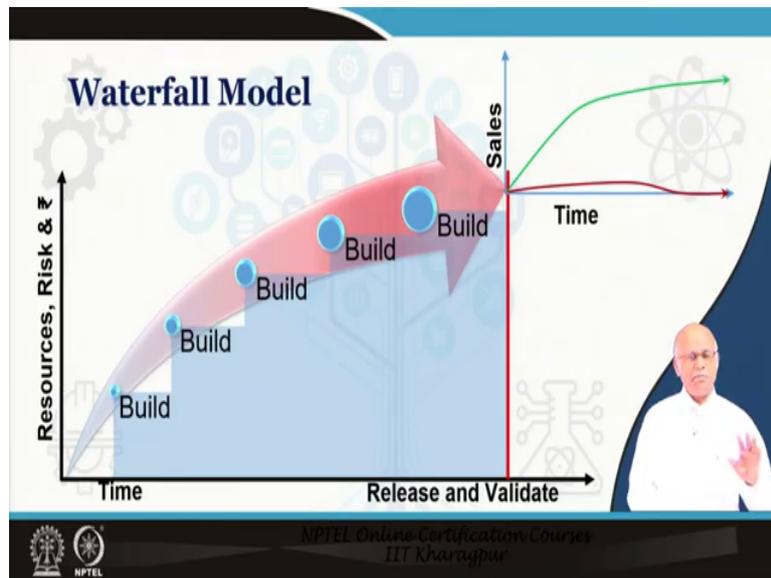
So, say having said that the majority or the mainstream technology development has to be done through customer engagement and customer validation at every stage.

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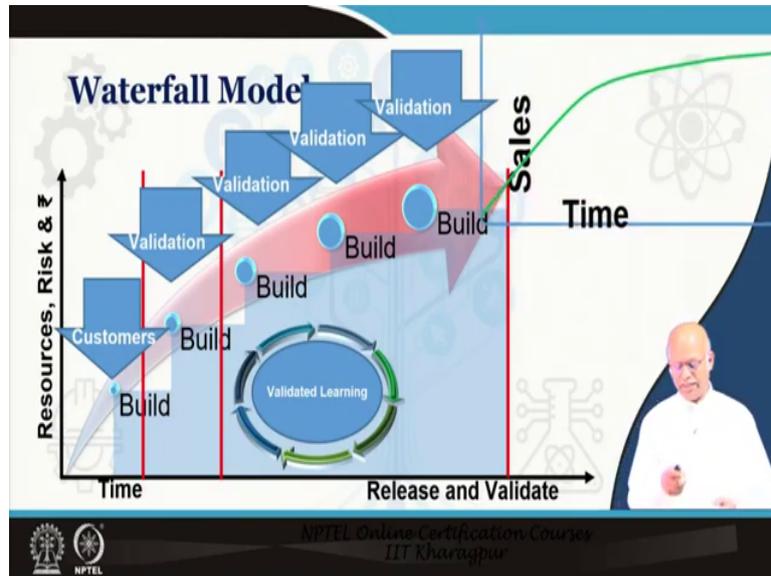
This is linear process linear process there is no validation and then eventually you build it and then maintain. And many of the places you will find that it is not acceptable to customer.

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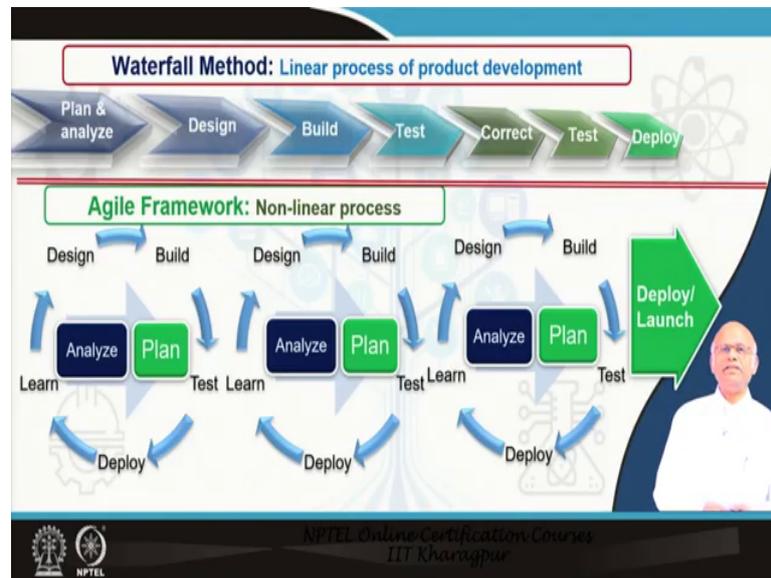
So, developmental money and all that will go down the drain so this is a process where you build, build and build. And then you go to market expecting a particular this green, green line or curve is the curve that your this is your that is your expected revenue.

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Whereas the red one is the likely revenue; that means, the product may actually fail alternately you get validated at every stage. And you get validated learning and then you launch this product chances are that you will actually achieve the kind of sales that you are projecting.

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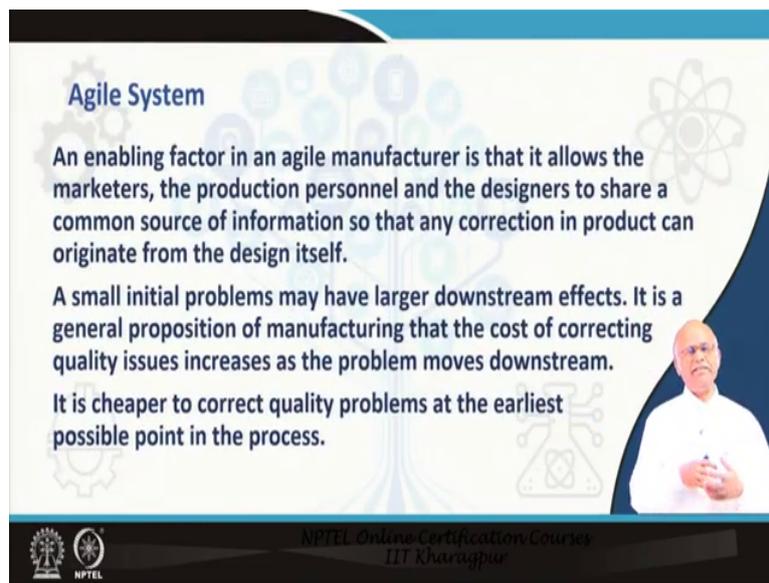
The distinction between linear process and lean processes like this then in the linear process there is no validation in the lean process it is a lean actually is agile and lean combined together. The agile process came from software development wherein they even before developing a building a software they will do a kind of a wire framing and then show it to the customer do you like it they will say yes or they will give some suggestion.

So, with that knowledge you come back you get you redesign build it again and then go to customer show it show it to him some early prototype, which has which is some basic features. Not basic, but which has important features that the customer will attach value and then get feedback from customer eventually you move forward this way.

So, this is this process is called validated learning you build something show it to customer learn gather data then you design again redesign. In the process through the cyclical process

eventually when you are ready with the finished product chances are that customers will not say no to your product because they were part of they know that this product they need this is this has been built based on their requirement based on their demand.

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Agile System

An enabling factor in an agile manufacturer is that it allows the marketers, the production personnel and the designers to share a common source of information so that any correction in product can originate from the design itself.

A small initial problems may have larger downstream effects. It is a general proposition of manufacturing that the cost of correcting quality issues increases as the problem moves downstream.

It is cheaper to correct quality problems at the earliest possible point in the process.

The slide features a speaker in a white shirt on the right side. The background is light blue with faint gear and atom icons. The NPTEL logo and 'NPTEL Online Certification Courses IIT Kharagpur' are visible at the bottom.

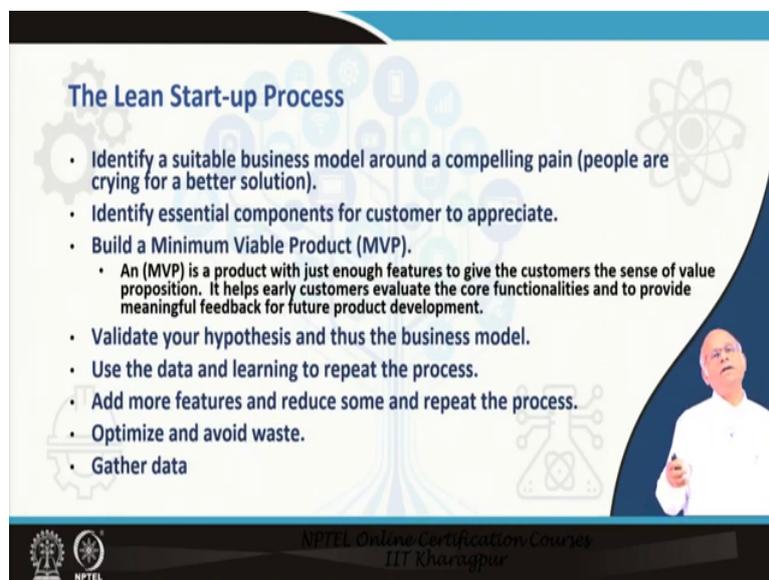
Lean system is combination of agile and lean manufacturing lean startup is the is the combination of agile system and lean manufacturing. Agile system is a system wherein you try to get engaged with the customer at every stage meaning you get customer validation you always try to understand that whatever we are designing customers actually want this.

And, lean manufacturing is you try to reduce anything and everything without affecting customer value lean manufacturing says that you should eliminate everything that that is there in a product by elimination of which customers will not complain. Suppose, you are using this product and there is some sticker at the back and if the customer is not bothered about the

sticker. Suppose this is sticker requires only 5 paise to fix lean manufacturing says that eliminate that please do not keep it.

Because customers are not bother about it and by spending 5 paise you are not adding any value to the product if the customer complains of course, that is different. So, if there are features in your product elimination of which does not lead to customers complaining then you should eliminate that because customers are not bothered about it that is also part of lean manufacturing.

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The Lean Start-up Process

- Identify a suitable business model around a compelling pain (people are crying for a better solution).
- Identify essential components for customer to appreciate.
- Build a Minimum Viable Product (MVP).
 - An (MVP) is a product with just enough features to give the customers the sense of value proposition. It helps early customers evaluate the core functionalities and to provide meaningful feedback for future product development.
- Validate your hypothesis and thus the business model.
- Use the data and learning to repeat the process.
- Add more features and reduce some and repeat the process.
- Optimize and avoid waste.
- Gather data

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So, lean manufacturing and agile system together has become lean start up process in lean start up process there are some basic stages or basic ethos or philosophies like a minimum viable product is a philosophy it is called Minimum Viable Prototype or product.

Minimum Viable Product is a product with minimum features that gives the customer maximum value proposition. Suppose you have a product which has 100 features now you give only ten features in a product which define your value proposition. So, that when customer have this product then customers are going to understand that you have these features which I like or I do not like [vocalized- noise]. So, depending on that you will be building more features into that and gradually you will be making a complete product.

So, first of all you build a minimum viable product take it to customer for validation come back. So, when customer says yes we need this your hypothesis gets validated for lean product development or only for any product development you have two hypothesis, one is value hypothesis another is growth hypothesis. Value hypothesis says that whatever you are creating is of value to your customer is superior value proposition compared to competitors growth hypothesis is that.

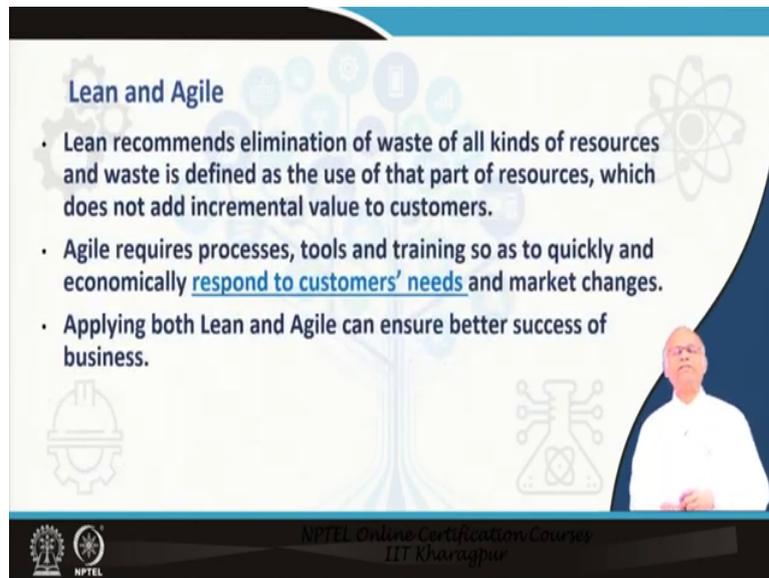
There are sufficient number of customer if you build this product then there will be adequate customer base for you to achieve growth moving forward. There is another thing cause leap of faith leap of faith is something which is almost like a hypothesis, but you have no data to support it.

So, you just make a kind of a blind hypothesis that people are going to use this this is this manner like when iPod came to the marketplace Apple had hypothesis that customers listens to music on the go meaning that when customers are moving jogging or troubling there will be they will be listening to music. Why this is hypothesis because this was already there Walkman was already there they had a leap of faith that customer will download music online and pay that was not there anywhere.

So, that is why that was a leap of faith and it was proven that leap of this means people actually downloaded and that is how iPod becomes so such a successful product. So, validation of your hypothesis at the early stage we will save you a lot of money time resources all that. It will actually if you are not validating, it may actually break your company it may

lead to failure because you will spend all your resources. So, there will be nothing to pivot
validate your hypothesis use the data for learning avoid waste.

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Lean and Agile

- Lean recommends elimination of waste of all kinds of resources and waste is defined as the use of that part of resources, which does not add incremental value to customers.
- Agile requires processes, tools and training so as to quickly and economically respond to customers' needs and market changes.
- Applying both Lean and Agile can ensure better success of business.

The slide features a presenter in a white shirt on the right side. The background includes icons of a gear, a lightbulb, and a network diagram. At the bottom, there are logos for IIT Kharagpur and NPTEL, along with the text 'NPTEL Online Certification Courses IIT Kharagpur'.

And not only validate you should use the lean manufacturing idea as well try to do everything at the minimum of cost, so that you save lot of resources so lean and agile together.

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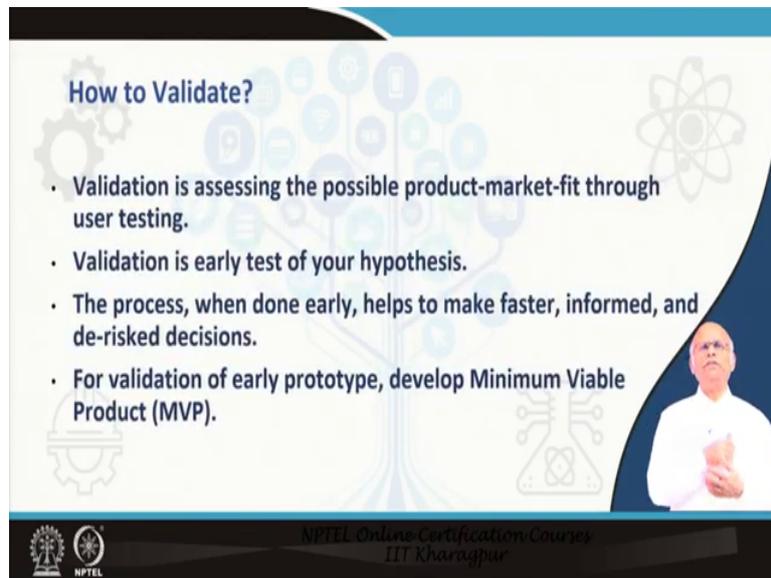
Lean Startup

- Eric Reis seems to have combined the idea of elimination of wastes in lean manufacturing with the validated learning of Agile method, and expounded the Lean startup process.

The slide features a central graphic of a tree with various icons (gears, lightbulbs, etc.) as leaves. In the bottom right corner, a presenter is visible. The footer includes the NPTEL logo and the text 'NPTEL Online Certification Courses IIT Kharagpur'.

Actually, is going to give you so much competitive advantage at the early stage even during development of the product. But, it you have to continuously keep that in mind throughout your business a business as long as the business remains gross.

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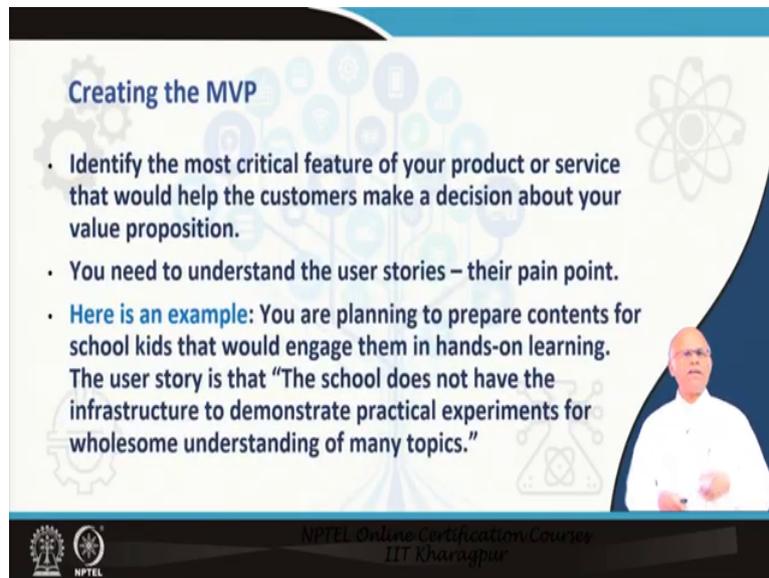
How to Validate?

- Validation is assessing the possible product-market-fit through user testing.
- Validation is early test of your hypothesis.
- The process, when done early, helps to make faster, informed, and de-risked decisions.
- For validation of early prototype, develop Minimum Viable Product (MVP).

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Because every time you have to innovate your business model to remain ahead of competition, Eric Reis wrote the book and he has combined these two philosophies in that. And, then how to validate meaning you build a minimum viable prototype take it to the customer and the customers are going to tell you which features they like which features they do not like.

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Creating the MVP

- Identify the most critical feature of your product or service that would help the customers make a decision about your value proposition.
- You need to understand the user stories – their pain point.
- **Here is an example:** You are planning to prepare contents for school kids that would engage them in hands-on learning. The user story is that “The school does not have the infrastructure to demonstrate practical experiments for wholesome understanding of many topics.”

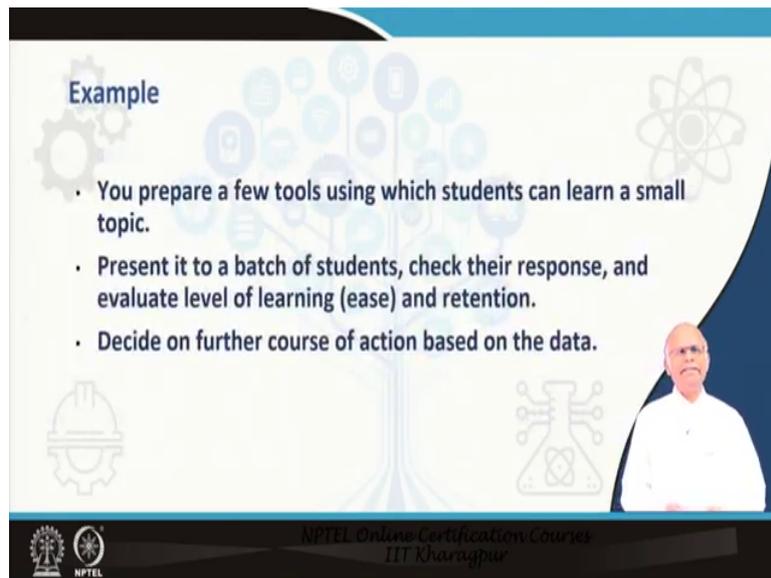
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For example: suppose you are building a software or say a digital process of experimentation in school level for a school level children. Now you may build a complete product and take it to a school where there is no such infrastructure and tell the faculty members or management that look I have a system using which you can actually simulate those experiments that other people are doing in real laboratories.

That is a fine is fine, but then after experimentation if they say that no I we do not like your effort and money goes down the drain. Alternately what you can do is you can copy paste from somewhere meaning without really influencing up on somebody's IP you just build something that that kind of prove the concept is a proof of concept kind of a thing.

Show it to children and then if children think that wow this is good and the management says that why not if you build it we are going to buy. So, then you can come back and build the product and then then it will be a successful story moving forward.

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Example

- You prepare a few tools using which students can learn a small topic.
- Present it to a batch of students, check their response, and evaluate level of learning (ease) and retention.
- Decide on further course of action based on the data.

The slide features a background with various educational icons: gears, a tree with circular nodes, an atom, a hard hat, and a chemical flask. A small video inset of a man in a white shirt is positioned in the bottom right corner of the slide content area.

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I think we have this much, so some references and big thank you.