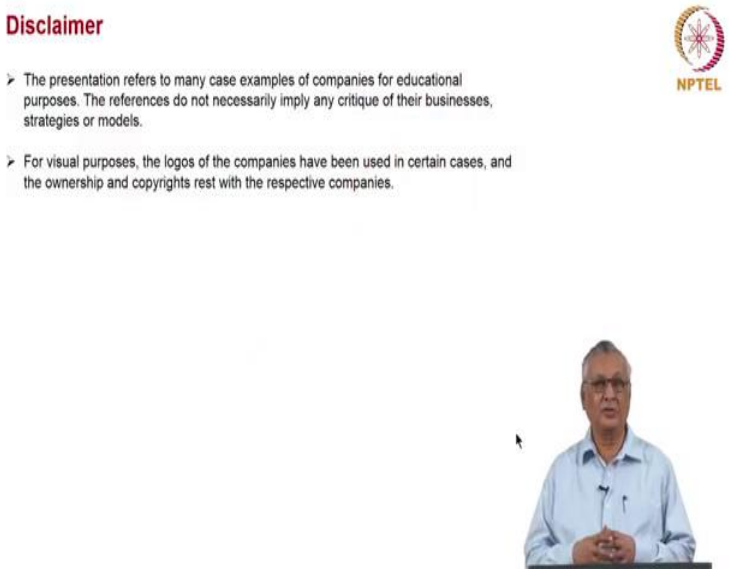
Entrepreneurship
Professor C Bhaktavatsala
Department of Management Studies
Indian Institute of Technology Madras
Lecture 17
Commercialization and Disruption as Success Drivers Part 2

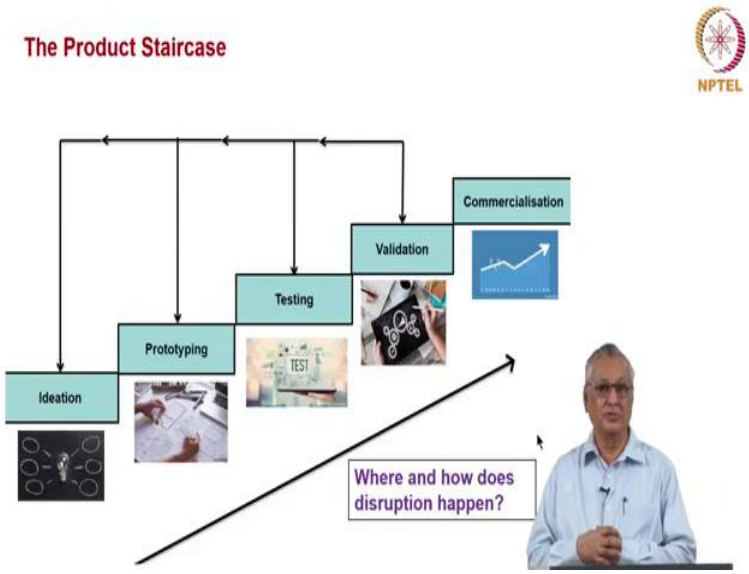
Hi friends, welcome to the course on Entrepreneurship. In this session we will talk about disruption as success driver. In the previous sessions, we talked about entrepreneurial journey, we talked about entrepreneurial self-discovery, we talked about 4-5 important pieces of developing an entrepreneurial product or a start-up product, namely ideation, prototyping, testing, validation, and commercialization. In this session, we will focus more on market related activities, and how entrepreneurial firms or start-up firms impinge on the marketplace. So, we talk about disruption as a driver as part of this.

(Refer Slide Time: 1:02)



I would like to state couple of points here. This presentation comprises number of case examples that is for educational purposes only. The discussions do not intend any critique of the way those firms have managed themselves, their business models, their businesses and no value judgments of any type or intended in this discussion. Secondly, for visual purposes the logos of companies have been used in certain cases, and the ownership and copyrights obviously, rest with the respective companies. So, with this, we will get on to the main subject of the program.

(Refer Slide Time: 1:39)

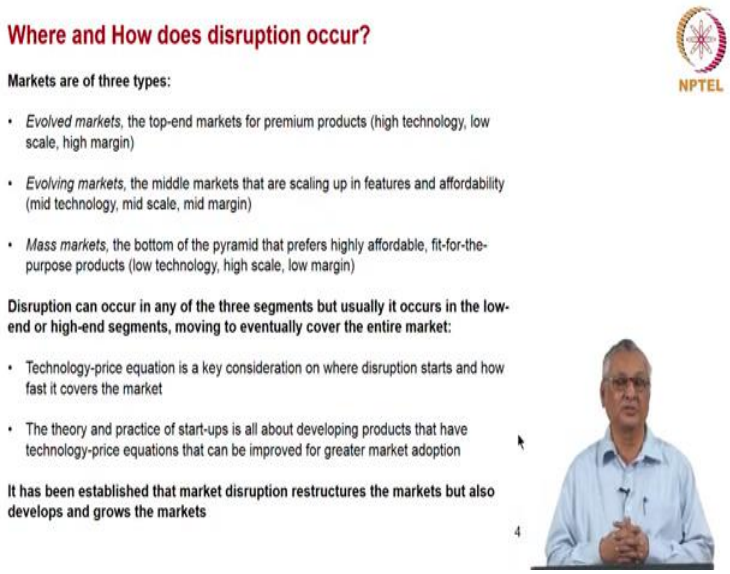


So, we have talked about this important concept, the product stair case, how does the start-up product or an entrepreneur product start getting developed. The first phase is ideation which includes obviously the empathetic review of customer requirements and finding the problems and coming up with solutions, then the prototyping stage converting the idea into a workable prototype. Again, we discussed in that we have two types of prototypes, one is a minimum viable product and second is the ultimate desirable product.

The concept of ultimate desirable product being something novel that I am proposing in this session in this course. The third one is testing, which is to make sure that the prototype meets the specifications that have been drawn up by the designers and the team. The fourth one is the validation, validation of the product concept as well as the business concept based on the testing results. We also discuss that testing is by and large, very quantitative and go-no-go kind of situation.

Whereas validation is both quantitative as well as qualitative and more often than not, it lies in the hands of real users, in real environment. And finally, we talked about commercialization and how does a product get itself commercialized? So, in this product staircase, right from the concept of idea to the actual reality of commercialization, where and how does disruption happen? That is the subject of this session and also we will understand what disruption is.

(Refer Slide Time: 3:18)



So where and how does disruption occur and what is disruption? These are the questions which we should engage ourselves in. First of all, when we look at the market side of the entrepreneurial moment, we have markets which are of three types. The first type of the market is an evolved market that is a top end market wherein we have products which are luxurious in nature, which are of high technology, and which probably are not accepted or sold in large numbers, so it is a premium market. We can think of, let us say, a Land Rover, high-end utility vehicle or a Mercedes Benz high-end vehicle or an Audi Q7. So, these are the kinds of products which are for evolved market.

The second type of market is the evolving market that is the middle market, which is scaling up in features and affordability. They have technology which is getting evolved. We can say that in terms of both technology as well as scale, it is a mid-technology and mid-scale market and margins obviously are also related in terms of neither too high nor too low. These are the evolving markets.

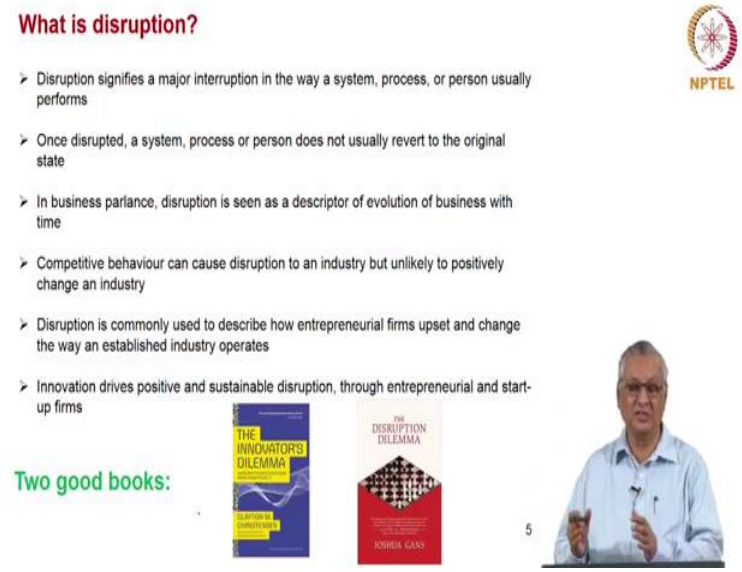
The third ones are mass markets that is the typical bottom of the pyramid markets and which cater to a whole swath of population who have got needs for basic functionality. So we may call it low technology, but basically, they are of functional products. What is to be done will be done, like you look at a faucet, its job is to deliver water. You can do that in normal taps kind of situation which is opened or pressed, or it could be a kind of artistic piece like Jaguar or Grohe does.

So, it could be a mass market product or an evolved market product. So, the technology involved in these things are basic functional technologies. Scale of manufacturer obviously is very high because it caters to the requirement of a huge population and the margins are low, and the companies which are participating in this market segment have to understand the ability to manufacture products which are well developed, well established in terms of technology, but which provide simultaneously high scale as well as low margin.

Disruption can typically occur in any of the three segments, but usually it occurs in the low or high end segments and moves eventually to cover the entire market. So, the way disruption covers the entire market is determined by one factor which is the technology price equation. That is the high the technology, high price, it covers one type of market, the evolved market, high technology low price, it covers the entire market. So, the technology price equation is a key consideration on where disruption starts and the time it takes to cover the entire market.

So, the theory and practice of start-ups or entrepreneurial firms which are moulded in an innovative way is all about developing products that have technology price equations that can be improved for greater market adoption. It has been established from our practical examples that market disruption, although the word disruption means it is destabilisation, but market disruption actually not only restructures the markets but also develops and grows the markets that is the established fact.

(Refer Slide Time: 6:53)



So, what is disruption? So, disruption means that there has been a major interruption in the way a system, a process or a person usually performs. The characteristics of disruption

compared to any other disturbance, let us say is that disturbance restores the market to its original position after the force that is disturbing goes away. But disruption is a kind of reasonably perpetual and long lasting change in the market dynamics that won't allow the market to return to the earlier dynamics.

Let us think of a market where there are three players who have 33 percent each of the market share. Now it is possible for somebody to disturb the market, one of the three players to disturb the market by bringing in lots of new products suddenly, or by reducing the prices suddenly or resorting to other promotional matters, so they gain the market share. So that company which is doing these extraordinary things, becomes let us say 50 percent Market Share Company and others come down to 25 percent each.

Now, obviously some disruption has happened in the marketplace, but I would not call it the disruption of the type which we are discussing here, because it is prone to be reverted back, it is prone to be brought back to the original status when others also do the similar things. So, when other companies also come up with new products, which match the way other introduced products spec to spec, and they also do a value analysis and make a price point which is comparable, then the system reverts to again 33 percent, 33 percent and 33 percent.

Therefore, the characteristic of disruption is that, once disrupted a system, process, or a person does not usually revert to the original state. In business parlance, disruption is seen as a descriptor of evolution of business with time. So, when we talk about ecommerce, we say that it is a disruptive market trend. When we talk about online purchase of books, we say that it is a disruptive market trend. When we talk about reading materials on kindle, it is a disruptive market trend.

And there is no way in which a physical marketplace or physical process are going to push away the kindles off the world or the Amazons off the world or the Ecommerce companies off the world and reoccupy this space. Therefore, in disruption has created a new market, which has come to stay and it is coexisting with the previous market and it is a different matter of subject how much of 100 has become 200 in terms of the overall market size and the 100 remained as 100 or it has become smaller, those are different aspects.

But for the purpose of this discussion, we should say that disruption is a feature, which ensures that the market equilibrium is disturbed and is disturbed rather permanently and it cannot be reverted. So, competitive behaviour of companies should not be confused with

disruptive actions of companies, competitive behaviour, yes, alters the industry dynamics but it cannot permanently alter the industry dynamics. And for our discussion it is important that disruption is a commonly used word to describe how and entrepreneurial firms upset and change the way an established industry operates.

Now, innovation is the way used by the firms to achieve disruption, and innovation drives positive and sustainable disruption through entrepreneurial and start-up funds. So, at this stage, I would comment two good books for you to go through. One is The Innovator's Dilemma, the second is The Disruption Dilemma. We will come to those books later as part of the discussion on technological innovation, but I think you should keep these two books in mind as you think of disruption.

(Refer Slide Time: 10:48)

Now we spoke about towards the end of the last slide, how innovation is the driver of disruption. We will talk about innovation at greater length when we discuss the technological innovation as the subject matter of the next session next few sessions, but let us capture the overall contours of innovation. Now innovation can be of two types, which we all experience. One is a sustaining innovation and second is a disruptive innovation. So sustaining innovation is one thing, which does not radically significantly affect the existing markets.

That is, it protects the existing markets, develops new products, probably expands the markets. But it does not change this constitutional structure of the market. It is like you have a laptop computer which comes up with two times the processing power, two times the

memory capacity, and three times the screen display power. So, it is a sustaining innovation because it is not going to radically change the way the laptop market is going to be there.

But then there is a disruptive innovation, one that creates a new market by providing different value sets that is market is something which has happened when let us say telex mission has been replaced by facsimile and a facsimile is replaced by a combined printer cum scanner. This is a disruptive innovation because the need for a particular type of product has been completely eliminated and the new product has come and created a new market.

Now a sustaining innovation can be evolutionary that is improving the product incrementally, which is what you see in our smartphones. Every now and then there is an improvement, the processing speed is improved, the number of cameras is bumped up, the megapixel capacity is bumped up, the OLED screen's ability is improved, and low light imaging is perfected. So it is a kind of incremental innovation, which is called evolutionary improvement.

The second is the revolutionary improvement which is improving the product dramatically, but still not shaking out the market. So an example of that is again let us go to the smart phones where bezel all around the phone was a standard feature. So, when the bezels were completely removed, and you get what you call raindrop display or infinity display, occupying the complete frame to frame, edge to edge screen for display, then it is a revolutionary development.

But still it has not shaken the market, it has only improved the market dynamics, it has expanded the market. Therefore, that still in sustaining innovation, so innovation is of two types; one is sustaining innovation and disruptive innovation. And within this sustaining innovation, we have an evolutionary innovation as well as a revolutionary innovation. Now, let us talk about a disruptive innovation. A disruptive innovation is an innovation which completely obviates the need for a product which has been existing.

So, if you think about the innovations in the computer industry, we had originally magnetic tapes, rims and rims of magnetic tapes were powering the mainframe computers, then they went away. Then there were hard disk, then we had personal computers, then we had CD ROMs, we had flash disk, now we have got cloud memory. So these are the innovations which ensured that certain components of the products went away permanently once for all, and the product itself got reconfigured.

Let us say from a mainframe computer to a small frame computer that is what happened. Now, how do these disruptive innovations occur? They can occur when we talked about three types of markets; the high end, the mid-tier and the low end. The disruption can occur at the low end or at the high end and gradually occupy the entire market depending upon the technology price equation.

At times it also starts at the core that is the middle level area, if the technology price equation has been perfected right from the beginning, and then it spreads and covers the entire market. Now, which kind of firms do what kind of innovation? Obviously established firms are good at sustaining innovations, that is innovations which are incremental, both evolutionary and revolutionary.

They do not alter the market dynamics, but they expand the market sizes, they expand the market segments, whereas entrepreneurial and start-up firms are amazing at disruptive innovation. These are the firms which create new markets or make emerging markets, huge markets by way of their disruptive innovations. Therefore, a disruptive innovation is a potent combination of high technology and low cost, often packaged in a new business model as well. So, this is the innovation part, which triggers the market dynamics.

(Refer Slide Time: 15:57)

Now, let us look at some case studies of how disruptions have invigorated markets. We said that the disruptions do not destroy the market. They change the market dynamics, but they also grow the market substantially. So, if you look at the academia, earlier for everything you

needed a encyclopaedia, but today you have Wikipedia. So, an encyclopaedia has been transformed into a Wikipedia.

And it has transformed in such a way that a traditional encyclopaedia has to be a, or shall we say, prescribed work of development. People, publishing houses, encyclopedicians, they start work with an objective in mind whereas Wikipedia is a all-pervasive expert sourced knowledge enhancing medium. Therefore, what is found in Wikipedia is far more superior and far greater in scale content and depth then what is found in traditional encyclopaedia.

And also the updates occur on a real time basis. So if you are having an encyclopaedia, it will talk about events of last year or previous generations but not today's because it is done in a print way and then it is done with certain hierarchical procedures of development, whereas Wikipedia is much more agile and makes information as a kind of very useful, perfect market open to all the public, so it has altered the way the academia can function.

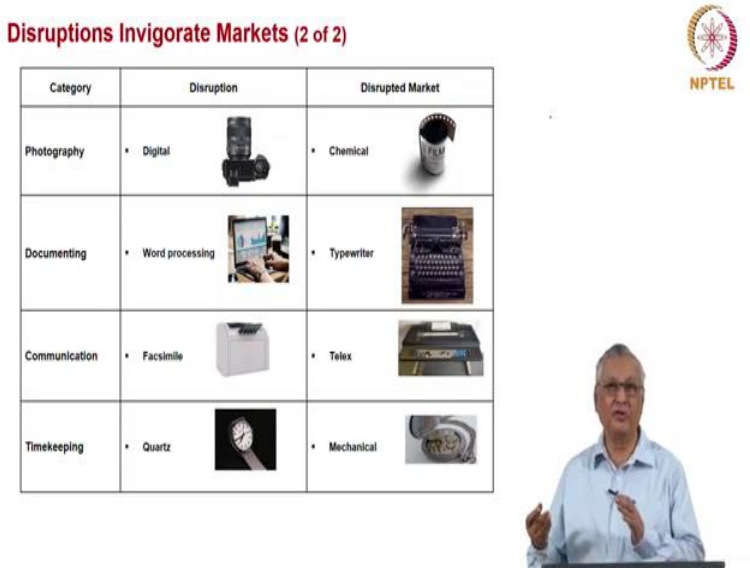
Second is, we have the example of education. Traditionally, education has been done physically in classrooms with direct interaction between teachers and the students and amongst the students, and it is a very disciplined, rigorous structured and time bound program. At the end of the course, when you learn a lot of information, knowledge, you undergo an exam, you get evaluated and you get a certain level of score, whether it could be a grade or specific marks, and then these are all collated and you get your degree certificate.

So, this is the physical classroom education, which has been the mainstay of education, and it would continue to be the mainstay of education. But what has happened is that more people want to learn more, and information is growing exponentially. So, the physical classroom model cannot meet the complete requirements of education. In addition to that several people who are in the workplace would like to update themselves with new skills like computer programmer, programmers would like to learn more about artificial intelligence, deep learning, machine learning, and things like that.

So that is where online education has come in, wherein people can stay in one place and then record their videos, their teaching materials and disseminate knowledge across the universe and NPTEL has done great job in creating this online education movement in India and we are experiencing that right here as we, as I speak and as you listen, so that is the second one. It has disrupted the market, online education will never go away, nor will physical education.

Both will coexist and both will coexist with the superior methods and superior methodologies of conducting education. The third one is the mainframe computers market, which was disrupted by the personal computer market. And the fourth one is the data storage as referred to CD ROMs being one method of storing data in the personal computers and now they are replaced by flash disk, and tomorrow there will be even smaller flash disks carrying greater amounts of information power.

(Refer Slide Time: 19:39)

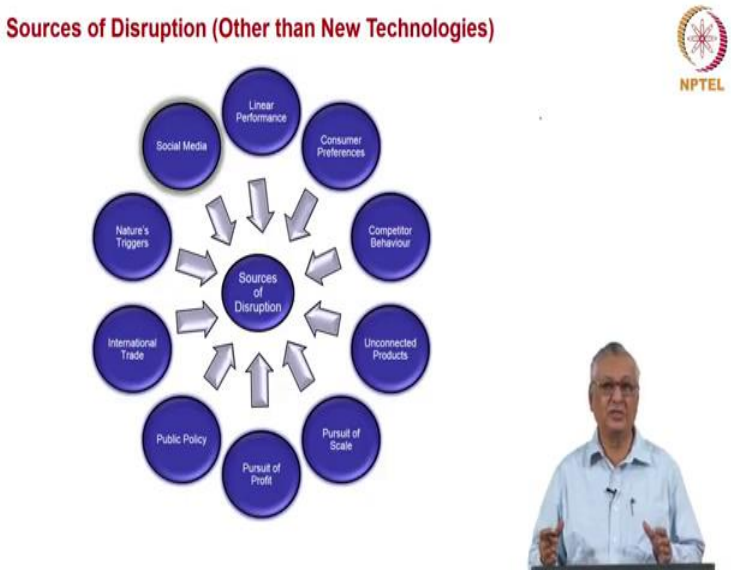


In photography, we have film-based photography, chemical photography, which has been replaced by digital photography. In documenting we used to have typewriters in the 1970s and probably some part of 1980s too, and that has been completely eliminated more or less and while the methodology of typing may be there, it has come into shape as word processing. And it offers a whole lot of features including margin adjustments, spellcheck, then ability to do it in a textbook fashion, two column fashion, three column fashion, simultaneous box as well as text fashion, so the possibilities are virtually limitless.

Then we talk about communication, Telex by which we use to send messages on real time basis by typing and then somebody else would receive it after a gap of 1 minute or 2 minutes has been replaced by facsimile where you get an identical document, a telex is not an identical document. It could be identical information, but received in a different manner whereas in facsimile, you get identical documentation which provides greater authenticity to the document, therefore facsimile has become a preferred way of communicating rather than telex, and telex went out of the way.

Then when we come to timekeeping, mechanical watches were replaced by quartz watches, they were also supplemented by kinetic watches, solar powered watches, radio powered watches, all kinds of things. But in this case, the market has been disrupted as mechanical, but it has not completely gone away because watch has reinvented itself as a fashion accessory rather than merely a time instrument. So, in certain cases, the disruptions have completely eliminated a product or a market for the product. And in some cases, they have expanded the market and modernized the previous product, and also coexisted successfully.

(Refer Slide Time: 21:39)



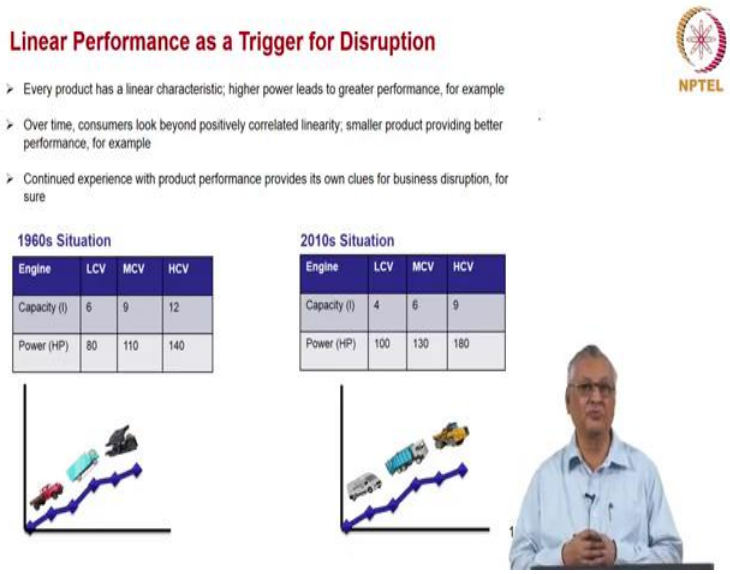
Now, we all know that innovation drives disruption, disruption drives new market dynamics. Without doubt, innovation, creates new products, and new products develop new markets, so that is one part. So, we are not here looking at those kinds of activities. I am proposing that there are several source of disruption which occur all around us, which are connected in a way to products, but not really driven by products.

So, these are the 10 factors which are happening; one is linear performance, linear performance of products. Second is changing consumer preferences, third is how competitors behave, fourth one is unconnected products, we see two products and when we wish, if only those two products were available to together as one product, how would it be? Then we have pursuit of scale, then companies have pursuit of profit as one of the motives.

Public Policy comes in it has its own ways of describing how products should be developed and how package should be developed, then international trade happens. Nature itself is a trigger for market dynamics, and ultimately in today's globalized, interconnected world,

social media is one great revolution that has happened and it provides you triggers what happens in Kenya, you tend to get to know immediately for example, and that could lead a product revolutionary or the market Revolution. So, we will look at each of these things a little more.

(Refer Slide Time: 23:14)



So, linear performance as a trigger for disruption, when we say linear performance, what do I mean? Suppose we have a half HP motor, which takes water from 100 feet and then pumps it to 50 feet high tank, obviously 1 HP motor takes water from deeper down borewell and then pumps into higher level tank, that is a linear characteristic, but then market may demand or market may be presented with certain products which have highly linearity.

For example, if you look at the commercial vehicle situation in the 1960s, we have three types of commercial vehicle; light commercial vehicle, medium commercial vehicle and heavy commercial vehicle. Now they are powered by engines of 6 litre, 9 litre and 12 litre engines and they were respectively developing 80 horsepower, 110 horsepower and 140 horsepower.

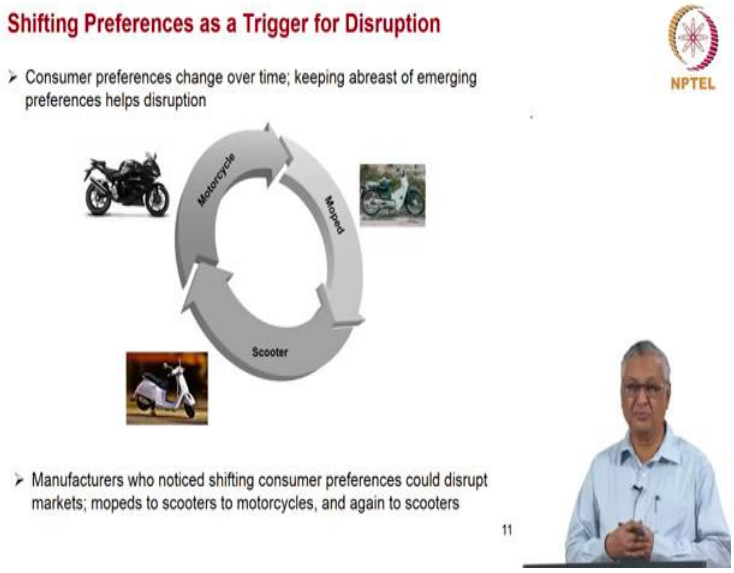
Now, today you see this situation, the same categories remain that is a light commercial vehicle for intracity transportation, medium commercial vehicle for intercity transportation and HCV for really tough transportation of very heavy products. Now they are powered by engines which are smaller in size, 4 litre, 6 litre and 9 litre and the capacity, engine capacity is bumped up by horsepower capacity. 4 litre engine now develops 100 horsepower whereas previously a 6 litre engine was developing only 80 horsepower.

Similarly, in medium commercial vehicle, a 6 litre engine is developing 130 horsepower, almost like HCV and the HCV is further enhanced. So, what does it imply? It implies that if a capital goods, let us say a gas turbine is being transported by medium commercial vehicle in

the past, given the ability of the light commercial vehicle to power on and take that kind of load, it might be shifted to the light commercial vehicle category.

Which means that the market dynamics of a particular proportion between light commercial vehicle, medium concentrated and HCV is getting disrupted because of the linear characteristics of performance development that are happening in the marketplace. So, consumers like when linearity is correlated, but it is correlated in a more positive way with a smaller product providing better performance and that is the reason for business disruption in its own context.

(Refer Slide Time: 25:56)

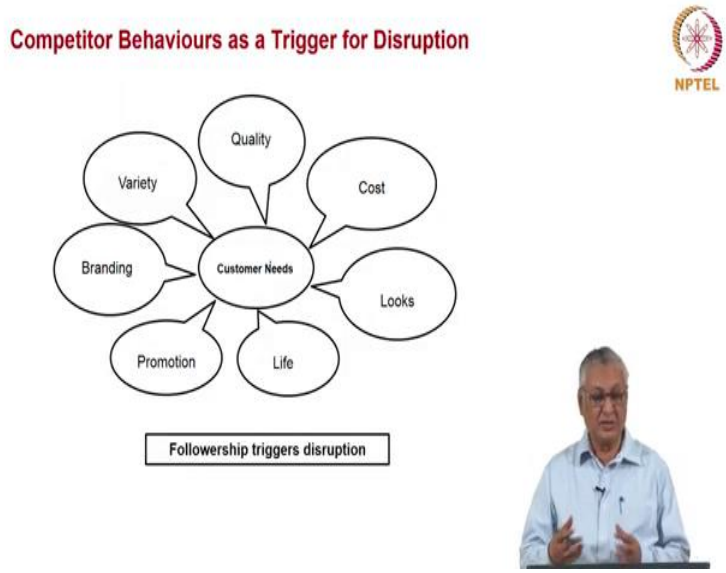


Then there are shifting preferences as a trigger for disruption. You can see that in two wheelers market, if you look at the market from the 1970s to what it is today. So earlier we had the low power scooters and we had mopeds, which were seen as the poor person's alternative for personalized transportation. From mopeds, the preferences shifted to scooters, from scooters, it shifted to motorcycles and now from motorcycles again it shifted to scooters.

So there have been shifting consumer preferences as to how they would like to be transporting themselves in the environment, and that is a trigger for disruption. Obviously, whether a better scooter led to the preference for scooters or the markets continuing requirement but not very well expressed has led to a better shift for the scooters, we may have to debate because the question was that earlier in scooters, we had two types of drives; one was the chain drive, and one was the gear drive, both the drives had their own limitations.

So, when the scooter manufacturer particularly Honda came up with continuously variable transmission, which provided the benefits of both the types of drives, obviously, a new product emerged within the known familiar contour of scooter and the this led to the customer preferences. So, this shifting customer preferences wait for just an appropriate product queue and then the whole market gets disrupted. And if manufacturers are not ready to see those disruptions coming, they are likely to be outwitted by more agile competitors. And again, these are the areas where start-ups and entrepreneurial firms provide inputs which can alter the dynamics in a very substantial and significant way.

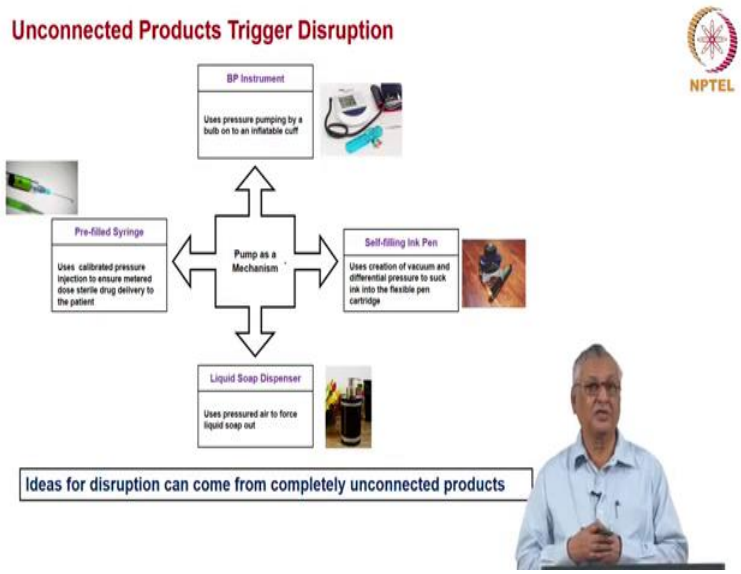
(Refer Slide Time: 27:51)



The third way is the competitor's behaviours, they act as trigger. Now, every product has got a certain level of cost, performance, quality, and every company has got its own definition of product variety. It promotes its products in such a way, it meets certain life goals of the customers, it also results in certain branding.

Now, when many people come with these kinds of parameters, but they have their own equations of what level of quality I should give and what kind of cost I should provide, and what kind of looks I should give to my product, you will find that the followership that happens that triggers disruption. This is another way in which disruption happens in the marketplace, essentially through competitor behaviour.

(Refer Slide Time: 28:43)



Then unconnected products trigger disruption product but not connected with the current product which we are considering. And merging of the technology into this product triggers innovation. So, we have examples where there used to be program logic controls in the machine tools and they had small touchscreens. So, the touchscreen capability was available in the 1970s itself, but it came on and got integrated into the smart device functionality in a big way in the 1990s and particularly in 2000s that has happened.

Now, this unconnected product staggering disruption can be exemplified by one very simple example, we have pump, what does it do? It creates a vacuum, then takes in material liquid usually, or it pumps out material by displacing air along with the product. So, when we look at pump as a mechanism, you can see it as a BP instrument. So, it has a cuff, which can be inflated and pressure is exerted by a flexible bulb which we use it and then the BP is measured.

The same pump is used in a pen, you can have instead of having the rigmarole of filling the ink and let the ink spill over, people said that we will have lossless ink filling and how did they do, they did they provided a cartridge within the pen and by kind of using pumping action you suck the ink inside so, it was a self-filling ink pen. Then we had liquid soap dispenser, why did the liquid soap dispenser come? Because the idea of soap is to keep ourselves rid of all germs.

So, if you use the same soap with the same hands, you are actually transmitting the germs, then kind of ridding yourself from the germs and also the contact could be long, short and the

consumption of the soap could be very high. Therefore, you dispense for yourself only that level of soap which you require and without any hand contact from one person to another person, so it used air pressure to force the liquid soap out. It was a more hygienic way or more effective and more cost effective way of doing soap dispensation.

And ultimate is prefilled syringe, so when we give injections what we do we have a vial which is pre filled with liquid injectable like let us say insulin, then you take a syringe and then you force air into the vial, then you draw the material into the syringe. In doing so, the contaminated air you are trying to push it into the vial and then pushing it back. So, while the vial itself has been filled under aseptic conditions and it is completely sterile, when it is manufactured in the pharmaceutical company, by way of your administration, you are kind of spoiling this sterility to some extent.

It may not introduce pathogens in that but at least the sterility is compromised. So, if we have a prefilled syringe, where the syringe is like this and the whole dispensation, there is this sterile medicine is inside and you can dial in the kind of required amount and then you press it and then it delivers through the thing, it is a prefilled syringe which can be used without any contamination. So, again here again the pumping action is used.

So, the point that is being made here is that when you look at a particular product it’s already there in the market and understand how you can use that product for improving my own product and therefore, improving my own market and disruption happens.