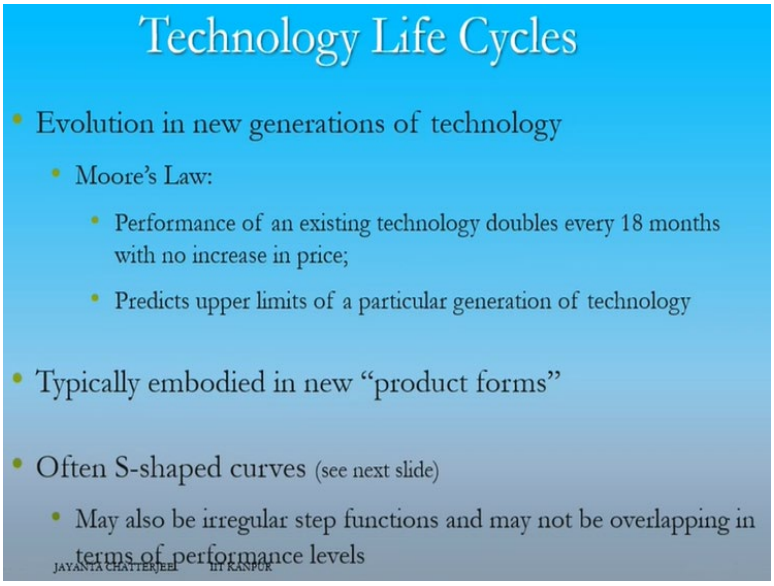
BUSINESS MARKETING - TECHNOLOGY FOCUS

Prof. Jayanta Chatterjee
Department of Management
Indian Institute of Technology, Kanpur

Lecture 03: Technology life cycle, networks and platforms

Hello, welcome back to our discussions on industrial marketing, B2B marketing, technology marketing. We have been discussing the interesting distinctive marketing issues for technical or technology rich, technology endowed products, high-tech products, fast technology products, rapidly evolving products, where products means both intangible as well as tangible components.



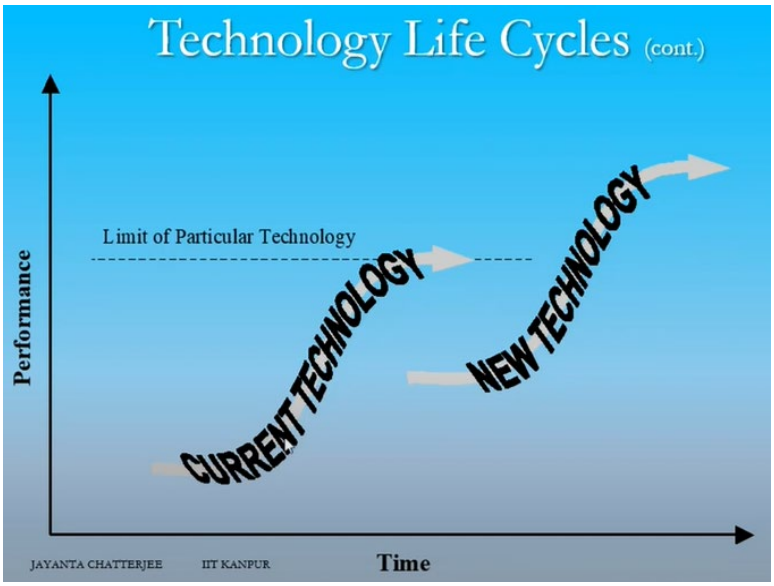
I alluded to this particular terminology which you now see on the screen Technology life cycle. We you must be familiar with the concept of product life cycle which we have discussed in our earlier courses on marketing and advanced concepts in marketing but now we will see the a similar concept quite related but a bit different.

The technology life cycle, technology adoption life cycle which we will discuss maybe in a later session. The technology life cycle as I was mentioning earlier I think yesterday that it has some interesting paradoxes and one of those paradoxes is well captured by this Moore's law. It was originally, it became famous or popular during the time of rapid

evolution of the semiconductor industry. But today we can see this particular law almost applicable to many products particularly those which are based on microelectronics or which are smart products.

So the Moore's Law states that the performance of an existing technology doubles every 18 months with no increase in price, which means that a mobile phone will almost become double in its capability every 18 months or 2 years with no increase in price and actually there can be decline in price. So for a budget of say 30,000 rupees the mobile phone that you can buy today will perhaps be available to you in the same bundle of features, two years later, maybe at 15,000, 20,000 rupees. And at 30,000 rupees, at that time, you will be able to, two years later, you will be able to buy a phone which will have maybe almost double the capacity in terms of memory in terms of speed in terms of different other functionalities.

So, this concept tells us that marketing also in this kind of technology products should be will have to move very fast will have to take care of this rapid obsolescence or rapid decline in prices and rapid evolution in the product form.

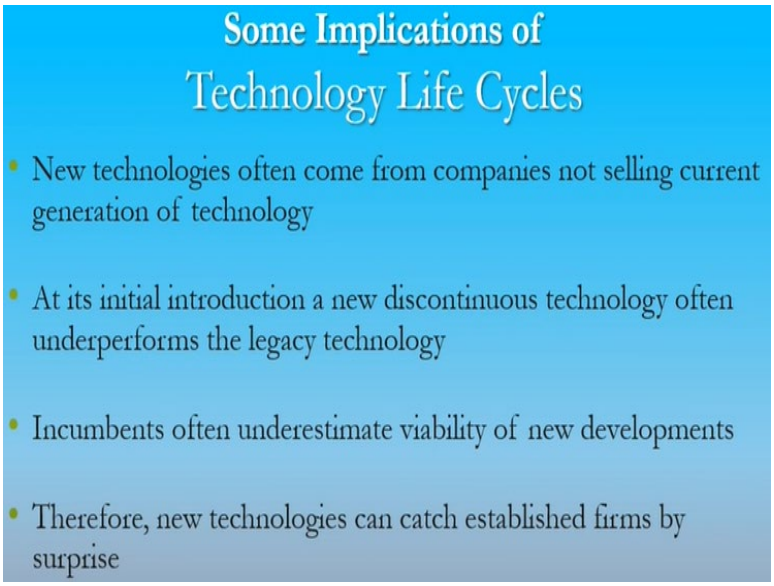


This technology embodied in the product form and product features and its evolution can be very nicely seen in this graphical presentation which shows that if you see this graph on the left hand side the current technology it tells us that this technology will very

rapidly mature and plateau but in the meantime this new technology means a new package of forms and features towards performing the same tasks for the customer, to solve the same sort of problems for the customer, to get the same sort of jobs done for the customer in a new bundle of forms, features, values.

It may emerge even in an adjacent sector. And while this technology, the existing technology, current technology is rapidly maturing, this technology will be growing and soon will overtake the current state of availability and will surpass and will create a new stream of values, may bring in new types of customers. Like we know that today, even small retailers, your neighborhood shops and the distributors or the wholesalers who supply those neighborhood stores get a lot of their work done on their mobile phones.

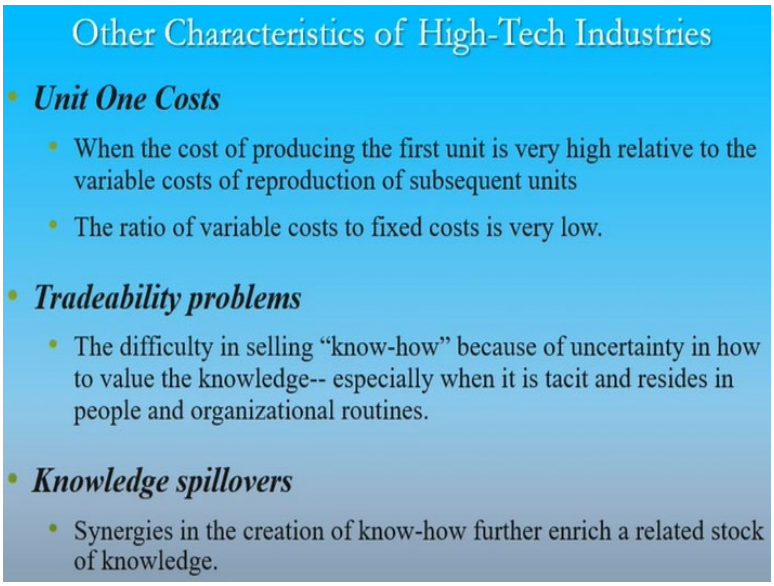
A lot of computer-like processing, which maybe five years back would have needed at least a laptop. Today, the same sort of services features, functionalities, performances will be available from the smartphone. Tomorrow, we may see even the smartphones replaced by concepts like metaverse, which people are now talking about. There may be New formats coming from companies not selling phones today.



So new technologies coming from companies not selling the current generation of technology is a feature of this rapid evolution of technology lifecycle.

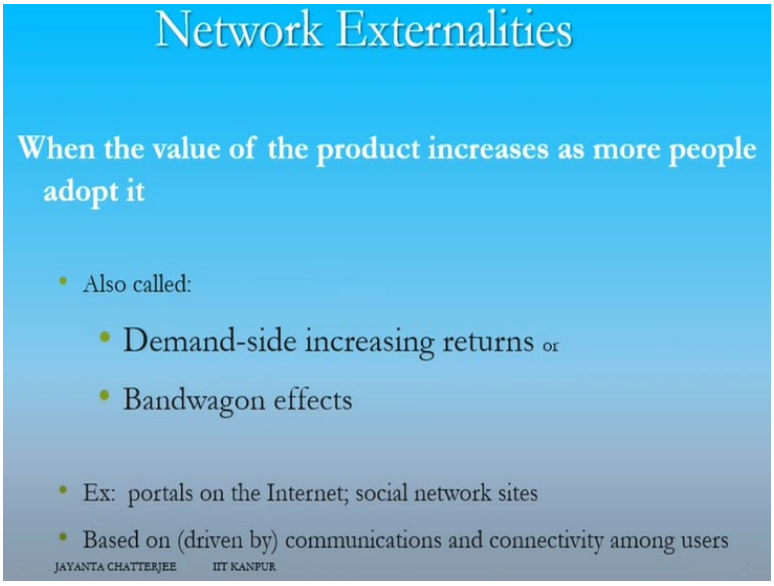
And another interesting thing, actually, I have mentioned, these discontinuous technologies or disruptive technologies often appear as a fringe element, but they soon overtake the mainstream. And so newcomers with new technologies can catch the established companies and their current marketing mix by a complete surprise. Some of these changes happen because of some features of technology which high-tech products that because it perhaps takes a lot, a lot of investment in producing, in innovating the first unit. Entrepreneurs innovate with very tight belts.

They may be almost starved of resources. They may put all their investment in the development, design development. At that time, they may be not earning any profit.

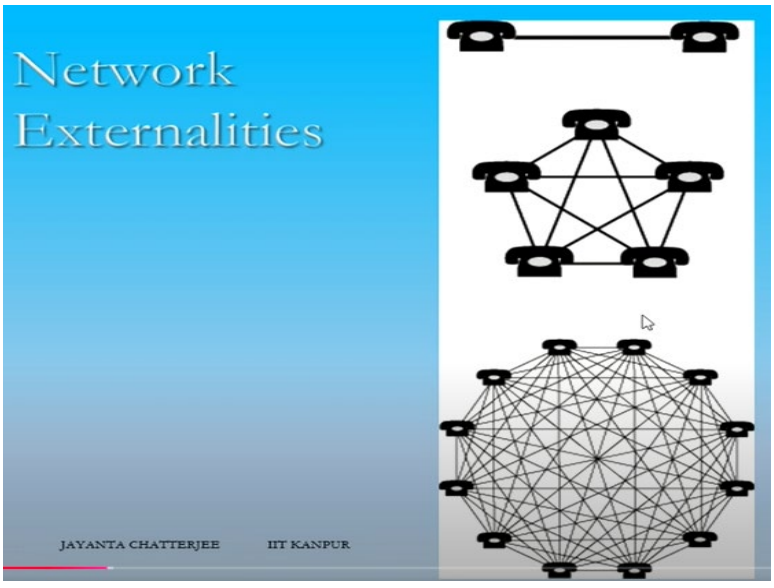


But these initial costs start rapidly declining in the subsequent units as they get produced. That's one of the reasons that we see often this rapid decline in price of technology products.

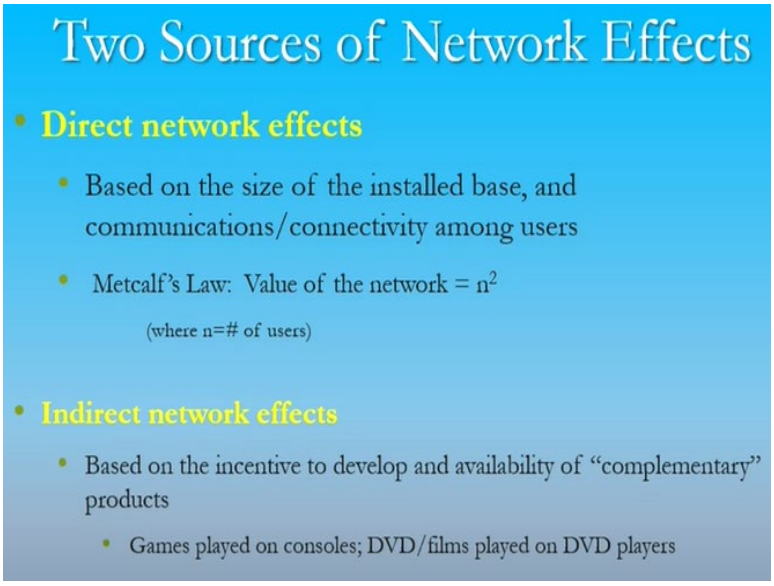
And this tradability problem, the difficulty in selling know-how or actually even sometimes new developments can happen where an existing company observes the emergence of a new competitor, but can often can't often do anything because the lot of interesting new developments may be tacit in the mind of the entrepreneur. And it takes time for the existing company to catch up. The other interesting thing that we will talk about is known as network externalities.



And that says that in many technology products, the value enhances rapidly based on the number of people adopting the new technology. This is often called the demand side increasing returns.



So, like, I think this next picture explains it very nicely, that if you have only one telephone, that could even be a smartphone, it has very little value. The value increases very rapidly if another phone gets connected. But then when five phones get connected, the interactions, the communication happening among five participants will mean that the advantages or value created will be to the power of five.



And so when many phones get connected, the Metcalfe's law comes into picture, which says that the value of network is equal to n squared, where n is equal to the number of users. So if you have 2 users, then it is 2 to the power 2. But if there are 5 users, then it is 5 to the power 2. So it is like a 4 to 25 jump when the number of users increase from 2 to 5. So this number of people adopting a new technology, number of people connected to a network almost geometrically enhances by this Metcalfe's law the value of the, so in marketing as you can therefore easily see that many times a network based business can greatly enhance its value by encouraging more people to use the new technology.

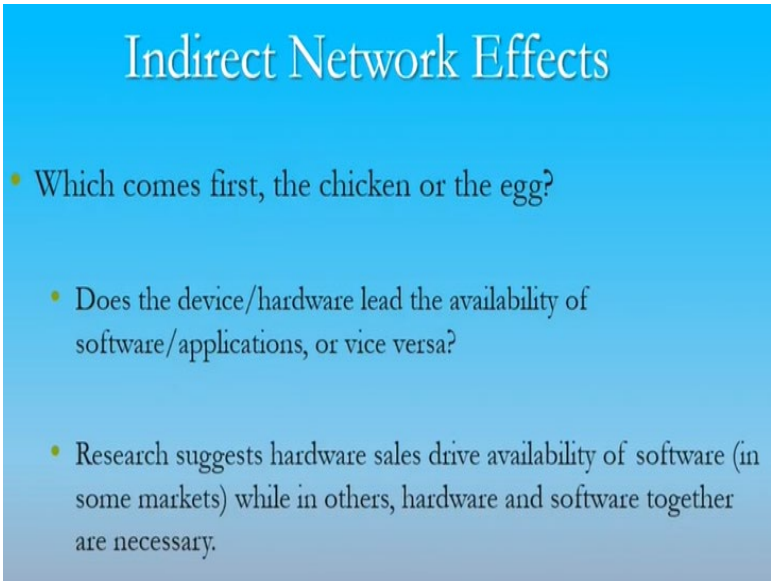
We have recently seen in India a great example of this. Like, just a few years back, when Jio, Reliance Jio, came into the mobile phone service market, mobile telephony market, they offered their high-speed technology service, their 4G service at no cost it was a startling phenomenon in the market at that stage that you could get a reliance connection and enjoy as well as lot of data service at no cost at all.

Obviously, the number of users adopting the Jio service exploded. And they had always said that now for pioneer customers, for our early adopters, We are providing this free service, but we will charge. So they waited. In fact, they extended the number of months. And finally, they started charging. But today, they are sometimes the largest and the most valued telecom service provider in the country. Maybe sometimes they are in the second

position, but they have definitely become one of the top two in a span of time which may be a fraction of the time taken by Reliance Jio's competitors.

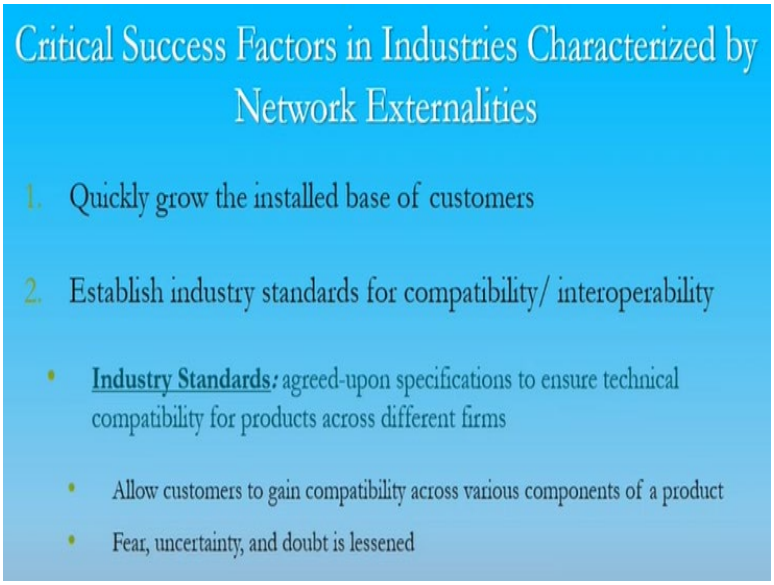
They have been in this business maybe for 10, 15, 20 years and Reliance has reached the top position in less than five years. So, this is an example of Metcalfe's law this is an example of the network effect and this is an example of the network externalities and now having acquired that enormous customer base and building up a very significant level of revenue, Reliance Jio has created a pool of resources which can now be deployed for many other services and can create a whole range of value streams and a very powerful business indeed. This is an interesting example of marketing the power of network externality.

So, we can see how Reliance has also Reliance Jio has acquired a dominant position in fiber to home broadband service and they are becoming a major player in content delivery through their geo music channel, TV channel, movie delivery channel, all riding on that Fiber to home broadband service platform. But the beginning was that bold step based on the belief in the network effect. Also, the indirect network effect, that is the ability to develop complementary products and services, well depicted by the Reliance Jio example.

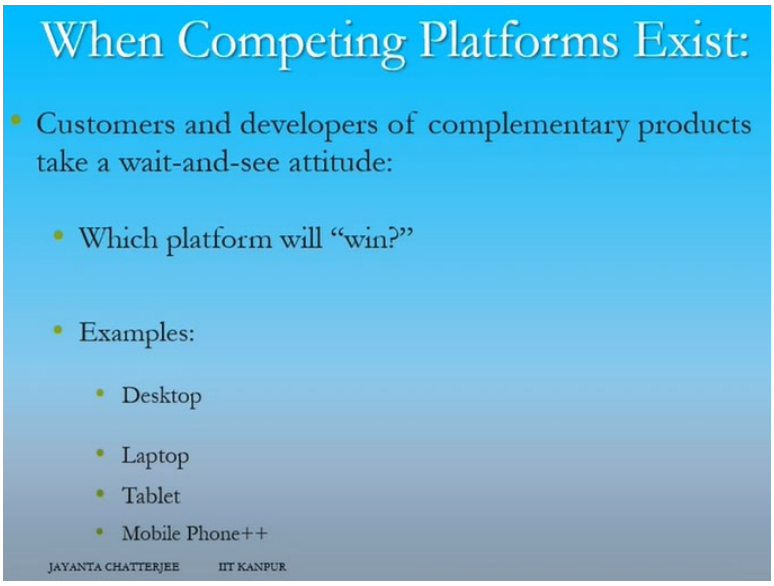


And often the availability of new hardware capabilities in this kind of industries create new streams of software values, new types of capabilities. And that's the kind of thing we see today in Android technology platform based mobile phone services through the creation of numerous apps which are available from the play store, games, educational content, entertainment content of various other types. And all those services are sometimes offered free, but with advertisement plugged into them. Or sometimes they are offered free and then they are offered at a higher level at some fee.

So the very base level with lots of advertisement may be available free. But you can get ad-free service at a much higher level of functionality at some fee. Another kind of this free plus fee is another kind of marketing technique, very peculiar to this technology-rich products and services.



So in this kind of businesses, the strategy will always be to quickly grow the installed base of customers and establish, therefore, an industry standard through various kind of compatibility and interoperability. So in this vast Indian market for telecom services, using these particular features of technology marketing, particular strategies of technology marketing, two companies, Reliance Jio and Airtel, they have created such overwhelmingly dominant positions that it will be very, very tough for another organization to penetrate this market.



So, we see here, therefore, sometimes using these strategies, you can create very strong barriers to the entry of new competitors. And you can also push out existing players. Many of the small telecom service providers have today either merged into these large companies or they have just kind of exited from the game.

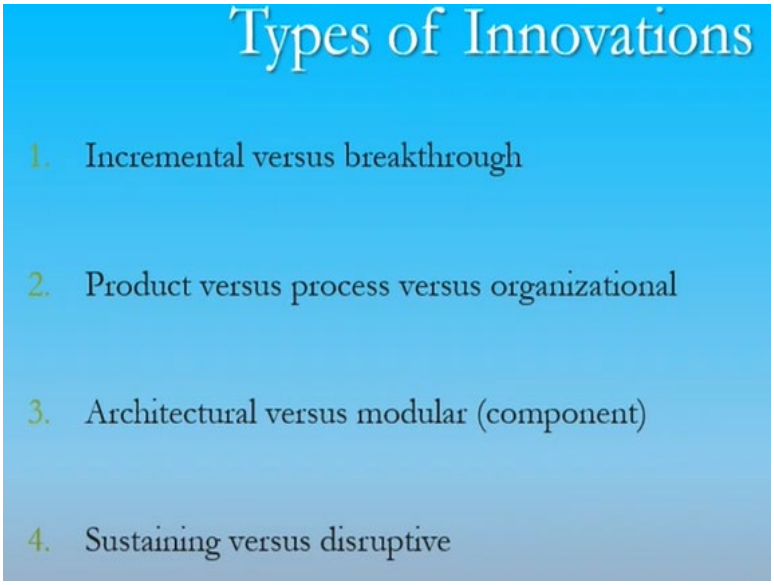
We will also understand that the marketing strategy in particularly in the B2B domain, in the high technology, technology rich products and services can get a lot of competitive advantages by using the platform technology or understanding of the platform issues. For example, the information processing at the end customer level is today a very, very well contested domain. We can see some prominent movements there that the information appliances are are becoming more and more personal, portable, miniaturized, lighter, and so on.

And we can see, therefore, now there are contesting platforms. So the desktops have given way to laptops quite some time back. And that for quite a few years, the growth of laptops far exceeded the growth rate of desktops. But now we can see that even the laptops have sort of slowed down. You remember the graph that I showed a little while back that the technology lifecycle, one graph rapidly matures and another graph takes shape and overtakes.

So that's why we see the laptop growth overtook the growth rate of desktops. Then the tablets and pads, more portable devices, started growing rapidly. The laptop growth slowed down. And now we don't know whether these large-sized phones, which are sometimes called phablets, will take over and will become the dominant player in the information appliance market.

So these are all examples of platform and platform-based marketing strategies. So in short, products in the technology rich domain are bundle of values. These bundle of values are delivered in rapidly evolving forms. There are interesting laws that we have discussed, the Moore's law and the Metcalfe law which direct marketing strategies with respect to pricing, with respect to promotion, with respect to distribution, and of course pricing.

I will conclude today's session with a few examples of innovations and how innovations can be marketed and the distinctive types of innovation creating different approaches to marketing.



So there are incremental innovations and breakthrough innovation. Incremental innovations means the form and bundle of features remain almost the same, only few are added.

There is no radical or significant change in the packaging of values. But breakthrough innovations are they change the nature of the game. I discussed in the previous session about the evolution of cameras and how the camera evolution plateaued and cameras shifted and fused into the smartphone and created a almost a breakthrough. That is not a classic example of a breakthrough innovation, but it is almost because the availability of a camera functionality just out of your pocket as a composite device. Providing you many other functionality like communication or entertainment. And so on created a sort of different ball game.

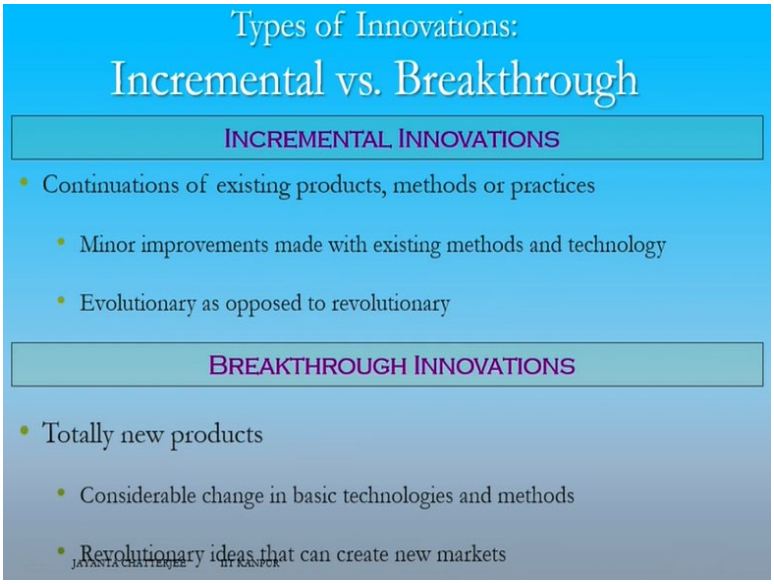
So we can, we are now seeing that how communication is getting blended with entertainment. So you might be getting, sending a WhatsApp message which is containing a song or so you will be rapidly connecting to your friend circle with your latest effort, musical effort and you will be sometimes generating a very large audience through facilities like the YouTube services like the YouTube. So incremental versus breakthrough, one kind of distinction. Another kind of distinction is product versus process. In fact, in all these technology-laden products, in the early stage, the marketing strategy depends on differentiation.

So at that stage, every competitor tries to outdo the other in terms of product features. So it's a feature-based competition at that stage, functionality-based competition at that stage. But soon standards emerge or what we call a dominant design emerges and everybody has to conform to the same size or shape or bundle of functionalities, basic functionalities. But then the game or the competitive strategy moves from at that stage, when the dominant design has emerged and everybody has to conform to certain standards, the competitive strategy moves from feature-based competition to price-based competition.

Because all products are more or less the same in terms of features and functionalities. So then you have some variants depending on, for example, in the phone, maybe some phones will offer X amount of storage, X amount of random access memory, size of memory and they will have some price differentials but otherwise there will not be very much difference because all are conforming to the same standard. So the competition will

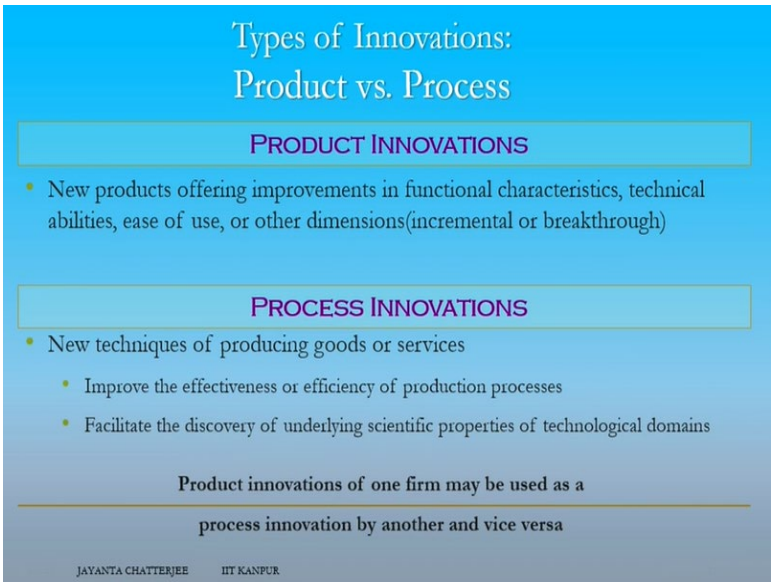
depend on price and please understand that your price based competition capability depends on your cost capability. Lower your cost compared to your competition better is your price based strategic maneuverability so you can do a lot of pricing variants, if your cost to produce the item is the lowest and lowering of cost depends on process excellence.

So, product innovation gives way to process innovation as the life cycle matures. Also, just like we have this incremental versus breakthrough, similarly we have distinctions in types of innovation of architectural versus modular, or sustaining, which is almost the same, it's quite closely allied to incremental, and breakthrough is quite allied to disruptive.



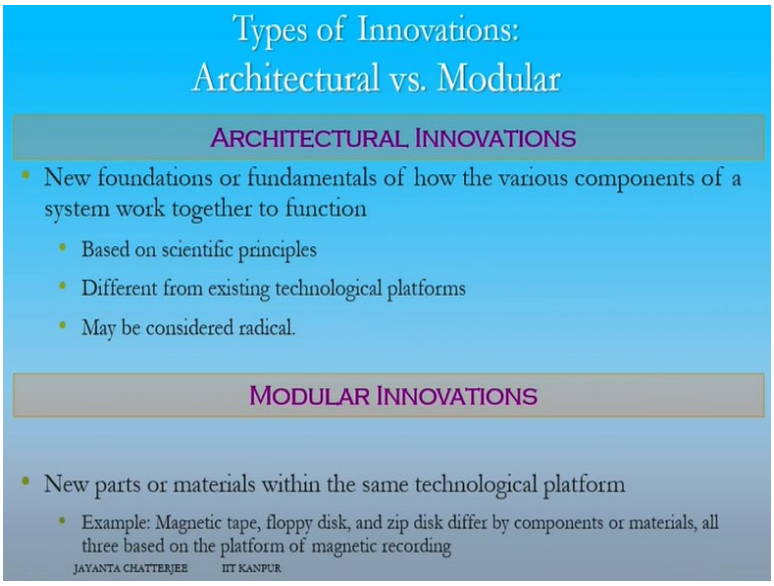
So depending on these distinctions, We can see changes in marketing approaches too. This slide we present the summary of features of incremental innovation compared to breakthrough innovation. So basically incremental means minor improvement with existing methods and technology in almost the same bundle. And here the, you know, you can just offer 128 GB memory and maybe you can increase it too. So when you offer 256 GB, then it's an incremental change. But whereas if you offer in a laptop, the disk based memory or rather solid state drives as opposed to moving parts based earlier generation of disk drives, you are on the way to creating a breakthrough.

Because as you move from mechanical disk-based drives to solid-state drives, you reduce the power demand and you can use maybe a different battery size. You can make the whole laptop or tablet or much lighter and perhaps more economic. So breakthrough innovations can often actually create also breakthrough in not only in the product bundle but also in the pricing.



Similarly, product innovations, we see a lot of product innovations at the early stage of the life cycle.

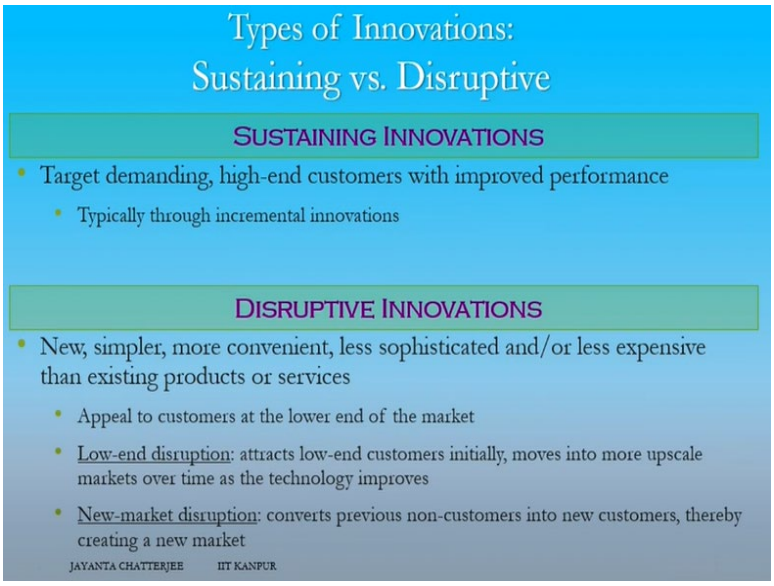
And we see more and more process innovation at the later stage of the life cycle. Because lowering of cost becomes imperative at that stage to be more price flexible and And lowering of cost can only happen through process excellence.



Architectural innovation are innovation where, you know, like for example, when portable computers were designed, they were architectural innovation with respect to the large or medium size mainframes that were the dominant designs of that time.

So this portability and personalization. So personal computer or personal computing was an architectural innovation that created a whole new industry that brought in a whole new number of customers. So computing which was confined to large organizations in the past became accessible to small and medium organizations and spawned all kinds of innovations. As opposed to architectural innovation, just as opposed to breakthrough innovation, in incremental innovation or modular innovation, we see new parts or materials within the same technological platform.

So as I was just now saying that the use of these drives, solid state drives replacing the disk-based drive is a kind of a modular innovation. And sometimes these modular innovations can create breakthroughs because they can change or encourage new innovations in associated devices or products. So the modular innovation in the memory, disk-based memory replaced by solid-state memory can actually create breakthrough innovations in the battery.

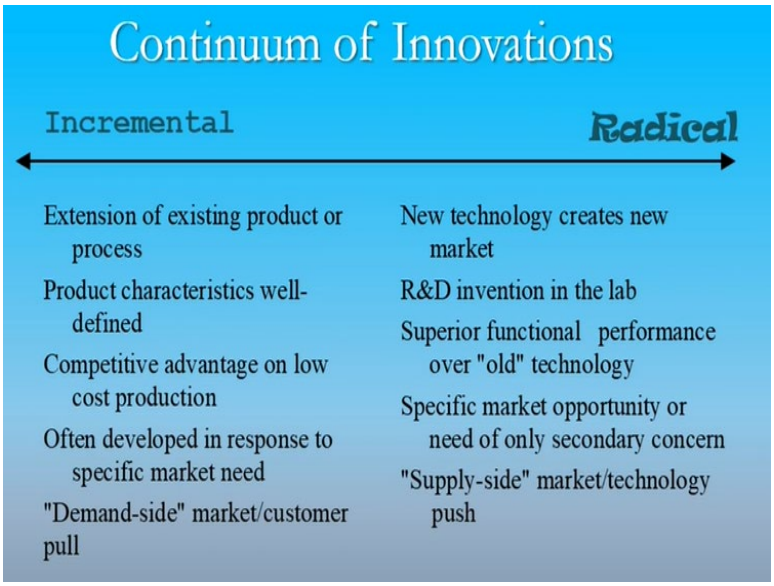


So this kind of relationships are there. And disruptive innovation we have discussed a lot when we discussed the disruption created by personal computers. So when Apple came, Apple was a startup, was created, their personal computers were created in their garage sort of facilities. It was ignored by the dominant players of that time, companies like DEC, Digital Equipment Corporation, because they ignored this whole issue of portability and personalization. At that stage, personal computers created by Apple had very low level of functionality compared to those DEC computers like PDP 11 which were mini computers huge functionality very powerful but mainly used by large steel plants, chemical plants, maybe large hospitals, or research facilities.

Whereas the personal computer was used by individuals as well as by small shops, small businesses. But new range of software came into the picture. Creation of modules or modular innovation like the mouse. Like the graphical user interface created a whole stream of modular and innovations in software and created a whole new range of customers. And what was earlier a low-end disruption like the Apple soon became mainstream and became a very large business and digital equipment corporation became defunct.

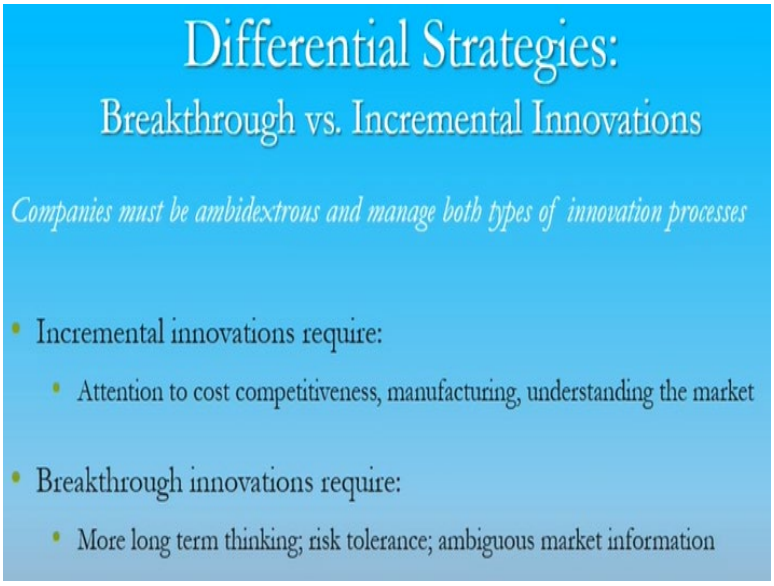
So this disruption of innovation is very important for the marketers to understand in technology-laden products. Because you may be chasing the dream of creating the faster, the more powerful, the larger mainframe computer, and you may be completely taken by

surprise by small portable devices which over time very rapidly will become very, very powerful and will make your dream of creating the faster, larger, more powerful computer an obsolete dream.

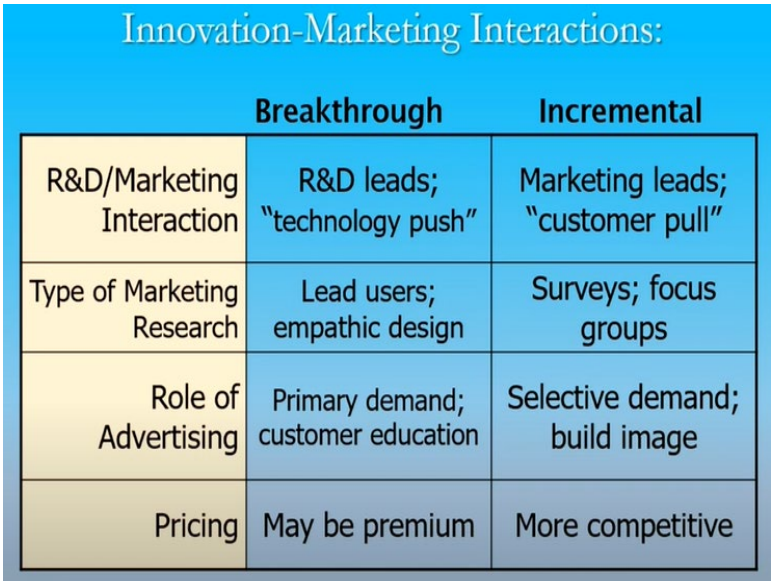


So this kind of this summary, this slide summarizes the incremental versus radical continuum of innovation. I use the word continuum at this stage to underline the fact what may start as incremental can sometimes cause radical changes to happen or sometimes what can be radical today can may soon become part of the standard and then can rely on incremental changes to create new values and at a point of time can be overtaken by a new technology cycle. So incremental basically extension of existing product or process whereas radical means new technology creating new market, incremental where product characteristics are already very well understood, whereas in the radical, the form and the shape and the touch and the feel and the user interface all evolve very rapidly at the early stage. And in incremental, process is very important, low cost is very important, whereas in radical, the differentiation is very important, feature-based competition is very important, and so on and so forth.

Incremental are often driven by your existing customers, whereas radical may be in response to a complete new type of customer needs.



Let me now conclude by presenting to you this drivers of marketing thoughts that incremental or modular innovations driven by cost, competitiveness, superior manufacturing, superior understanding of consumer behavior, buyer's behavior whereas breakthrough innovations may be more driven by feature-based competition, more risky thinking, response to not so well-defined market requirements, and so on. So breakthrough innovation requires often intuitive marketing, whereas incremental innovations can be well serviced by defined marketing.



So this presents the interaction between marketing and innovation, like breakthrough innovations need intense interaction between R&D and design and development and marketing.

Technology push is the engine in this case, whereas Incremental innovations are often led by marketing. Marketing brings the requirement which are serviced by the R&D. So in case of breakthrough R&D leads, in case of incremental marketing leads. For breakthrough innovation, you may be often relying on lead user based marketing research or empathic design creation methodology. We will discuss these in a later session.

Whereas incremental innovations are serviced by our classical type of market research like focus groups or survey of needs and so on. Promotion in case of breakthrough, is focused on demand creation, whereas in case of incremental innovation, the role of promotion is to enhance the brand image or the position of the product-service bundle in the customer's mind. Whereas in case of incremental innovation, marketing promotion, marketing communication has to create a new position in the customer's mind. Often in incremental innovation, your marketing communication will be servicing known customers. Whereas for incremental innovation, you may have to discover customers.

So customer development becomes key. Breakthrough innovations can often use premium pricing techniques like skimming. Well exemplified by companies like DuPont who continuously come though, come with breakthrough products and their pricing always is premium pricing but they have because of the first mover advantage, rapidly declining cost as they produce more and more and they have therefore a big capability of managing the price as the product proliferate.

So, start high and you can go down in a controlled fashion to expand the market whereas in incremental innovation you may not get any premium but you may get some incremental advantage but most often incremental innovations will be directed towards creating cost advantage so that you are more competitive in a defined market with a defined set of product and service bundle. So that sort of brings us to the conclusion of our discussions on marketing, how it remains the same in many respects in case of the

technology-rich, technology-endowed or high-tech products and how marketing has distinctive new strategies and has to service new requirements in the marketplace.

So, technology marketing, technology marketing of technology rich products and services within the domain of business marketing or industry marketing is an interesting set of strategies, tactics. And you will see later on when we go into each of the marketing mix elements that sometimes what we have discussed in this session and the earlier session can be even used for conventional technology products for creating enduring customer relationship. Sometimes you can take a product like say motor, electric motor, quite a conventional industrial product. But you can greatly enhance its marketability by using logistics, strategies for pricing, which we might have learned from the technology marketing field.

We may use pricing strategies even in conventional products, like say chemicals, which we have learned from high-tech products like semiconductor devices. So when we discuss the details in the subsequent sessions, we will see how the concepts that we have discussed today or yesterday will come into play in creating new value streams. So, this is where we end today's session. And in the coming few sessions, we will be looking at buying behavior in B2B marketing or we will be looking at different kinds of players and their interactions in B2B marketing. Thank you.