

Product Design and Manufacturing
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Lecture – 05
Product Characteristics

Welcome, to lecture number 5 in this lecture, we will be more focusing towards product characteristics. So, the content of this lecture will be developing successful product everybody wants to develop a product, which is very successful now, the question comes is what are the attributes?

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So, that is what we will try to cover in this lecture. So, developing a successful product. Next how do you evaluate? Or what are the attributes for successful products? And then key factor for successful products and then finally, we will try to see the product characteristics.

So, before developing a product first what we are supposed to do? We have to do something called as empathy study, in empathy study what happens? We go to the site or we go and understand what the customer wants? And then we try to live along with the

customer or we get into the customer shoe and look at the problem from the customers point of view and then we start looking forward for what are the possible requirements?. (Refer Slide Time: 01:29)



Developing successful products

- Before talking about product characteristics, just recalling the product development:
 - Successful enterprises in the business world constantly percolate in a state of innovation in terms of products manufactured, frequently introducing new products or modifying and improving existing products as desired by the customers.
 - The overall process of conceptualizing a product and designing, producing, and selling is known by a generalized and comprehensive process called **product development**.

So, when we have to do that, what we do is before we talk to the customer and then, we try to evaluate their needs. So, a successful enterprise in business world constantly percolates in the state of innovation in terms of product manufactured, frequently introducing new products or modifying and improving existing products as desired by the customer.

So, 10 years before when the mobile phones came into the market the customer's requirement was how do I communicate? That was the only requirement. And later slowly, slowly what has happened, people started demanding more features the first set of demands where, can there be a clock in it, can there be an alarm in it, so can there be an SMS in it, can I have a calculator in it. So, these were all people started demanding one after the other after the other and then, as I said in the S technology curve there was a paradigm shift from a normal phone to a smart phone. When we this smart phone again started demanding camera, then video, then SMS, then so many other things.

So, what a successful company does is or a company, which make successful product does is they try to go to the customer understand what their demands? And customer's demands is never constant it keeps on changing. So, a company should always go to the customer ask their demands and try to improvise their own product such that, they meet

the customer demand. So, this is what I said a successful enterprise in the business would constantly percolate into the state of innovation in terms of product manufacturing, frequently introducing new products if the new products can be a paradigm shift or generally it is what they do? Is it only a delta X improvement they modify and improve the existing product as decided by the customer. The overall process of conceptualizing a product and design, producing and selling it is known by the generalized and comprehensive process called as product development.

When you talk about a product development it is not that, the design alone it is also how do you produce? How do you sell it? Is generally packaged and put in the definition of product development. So, the product development information there are some key in new product development. So, they are nothing but, what people want? Next what features of the product are considered essential? So, there is a big difference between essential and desired you should first talk to the customer understand what are the essential things? And what are the desirable things?

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Product Developing information

- The key in new product development is the information that indicates
 - what people want?
 - what features of the product are considered essential?
 - what price they pay for it?
 - what features are desirable but can be reduced for a lower price?
 - current and potential competitors?
 - likely changes in the market size?
- Before a successful product can be developed, someone has to come up with, or develop, an idea for conceptualizing it.

Required:
• Essential features
• desired features

For example, in a dark place a light is essential, a blue light is desired. So, an essential is one quality desire if it is there it is ok, if it is not there does not mean that, the product is going to is not going to have a big impact. So, that is what it is what features of the product are considered essential? So now, it is very clear when you write the requirements of the customer you will try to classify it as essential features, essential

features and desired features. So, essential features are must, desire if it is there it is appreciated. So, then what price they pay for it? For example, I would like to have rolls Royce car and pay car price worth of Maruti 800, which is never accepted because, you should understand there are more number of features, right? So, that is what it is what features they pay for? And they will not pay for many cases they will not pay for desired feature, but they would like to have it what features are desirable? But, can be reduced for a lower price.

So, the other thing what you should understand is? Today when you try to develop a new product you should have it in mind you cannot develop a product for a wide spectrum of people, you try to classify the people into several small groups and try to take one group for that group, you try to make a solution or a product and then, try to sell it at that group alone and why not? Why should I make it more focused? Because, if you make it as a wide spectrum product then, your product will have more number of desired features, for which people will not pay money.

So, it is better used desire feature, make it more focused towards the spectrum of customers and try to develop product. So, that is what we have said? What features are desirable? But, can be reduced for a lower price I have 1000 rupees for I want to buy a product worth of 1000 rupees, if I start adding all these desired features it goes to 1500. So now, I try to look at what all features I can cut down and make the product for these 1000 rupees?

So, then you should also understand what is the current and the potential competitors for your product? This is very, very important if you do not understand who your competitors are? Then you will not be able to make successful product. So, you should understand today X is the competitor for you, tomorrow there can be Y also coming into the market for example, in automobile ford was the only big company, which was there for a long time for Dimeler crystal all these thing. Hyundai just came into in between Maruti came in between. So now, you see they when in 1970s ambassador never thought that, there would be a company called Maruti, which is there in India, but later down in 1980s and 90s Maruti started dictating the market.

So, you should understand who is your current? And you should understand who are your potential competitors going to be? Then likely changes in the market size. Today there is no product, which is going to be for life long. So, I develop a product for a next 20 years this is the product going to dictate it is not going to be like that, the product requirements are going to change the market size can enhance or come down the old phone, which was punch type Nokia phone today there is market size is almost negligible people have all moved towards smart phones.

So, you should also understand the market can shrink, the market can expand. So, these are some of the key points, which you should always keep in your mind before developing new products or when you develop new products this are the information, which you have to note down. Before a successful product can be developed someone has to come up with or develop an idea for conceptualizing it.

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Attributes of successful product development

Products that sell well and make a healthy profit

1. **Cost:** includes the cost of both producing and developing.
2. **Value:** the quality of the product.
3. **Time:** from assessing market needs to product sale. — decades
↓
year
↓
months
↓
days
4. **Technical know-how:** the actual procedure to follow.

The slide features a handwritten diagram to the right of the 'Time' attribute, showing a vertical flow from 'decades' to 'year', 'months', and 'days' with downward arrows. A box is drawn around the word 'days'.

So, the attributes for a successful product development is 1 is cost, 2 is value, 3 is time and 4 is technological know-how. When we talk about cost, cost you should understand what is the cost? The product is going to incur from the developing stage and then, to the producing stage what is the total cost involved? For example, if you look at big factory like tyre manufacturing companies they invest 10,000 crores.

So, this 10,000 crores is the cost, which is involved and they would try to have this as one of the big parameter and see when will they get back this 10,000. So, who are their customers? How are they going to sell it? And when do they come with the brake even? And all those things will come into that cost. So, this cost includes cost of both producing and developing.

Next is value quality of the product, I buy a product and today what we expect is the quality? Quality can be reliability, repeatability, endurance whatever it is. So, the quality of the product is another big attribute for a successful product and by the way nobody is going to pay money for quality. So, if somebody comes and says, here is a quality product pay 10 rupees more and here, is another product which is ok, but there is no quality in it is 5 rupees nobody is going to accept it. So, quality has to be integrated part of a product, which is getting developed. So, the value is in terms of quality people always look forward.


Time, time is very, very important. So, you have identified a customer's voice and now, you should understand how quickly you address those voices, their demands, their requirements. So, time is very important time, which what we are talking about is from the time of understanding customers voice, you go back to your desk start working on various concepts, freezing those concepts, doing an engineering design producing a prototype getting back to the customer showing to it, getting it cleared and then coming back and start freezing the design and producing it in bulk is called as the time here, what we talk. From accessing the market need to product sales is what we are talking about here, this today earlier it was talked in terms of decades then, it came down to years now, we talk about in months and I am it is not very far off we start talking about days this is not very far off.

So, there are so many companies, which are there so many start-ups, which are there. So, all those people are trying to identify customer's voice and then, there might be a time constraints within 24 days please produce a product and release into the market may be that, because technology is so matured all they have to do is identify customer's voice and then, start doing it the final is technical know-how.

The actual procedure to follow is the technical know-how. So, this is one of the attributes. So, suppose by hook or crook you make up prototype and the customer has accepted your prototype he has said, wonderful let us freeze it here now, if you go back to him and say, I do not know how to produce it in bulk I can produce 2 piece or 3 piece or 10 piece. So, then that is also a big attribute. So, technical know-how should be nothing but, the actual procedure to be followed in. So, that you can produce in bulk and meet out the customers requirement.

So, attributes for a successful product are costing, value, time and technology know how and technology know how varies with respect to batch size, varies with respect to cost, varies with respect to time for example, plastic bag quickly come into the market why? The number of processing steps is less and it is very economical ok. So, these are some of the attributes. So, a product that sells well and makes a healthy profit needs to have all these four attributes what are the key factors for a successful product? One thing is distinctness.

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Key factors to for successful products

- Distinctiveness:**
 - Provide excellent value for the money spent and enhanced quality perceived.
- Customer focus and market orientation:**
 - Develop a intensive understanding of the trait of the market.
 - Recognise the competition.
- Preparedness:**
 - Work preceding actual product design is critical in determining if a product will be a success.

So, distinctness is provide excellent value for the money spent and enhance quality received. So, distinctness I pay X rupees I get a product and this product is distinct from all other in terms of performance. So, this is what is distinctiveness?

Next is customer focus and market orientation. So, it is to develop an intensive understanding of the traits of the market, that is very, very important understanding the traits of the market then, recognizing the competition is very, very important this is the second key factor, the third key factor is the preparedness how well are you prepared to take the competition? How well can you develop a product? What is the know-how you have about this particular design? So, that you can quickly go reach out to the customers. So, preparedness is work preceding actual product design is critical in determining if a product will be successful. So, preparedness is to understand more of customer; understand more of technology and get ready for solving it. So, work preceding actual product design is critical in determining, if a product will be a success. Next is sharp and early product definition.

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Key factors for successful products

Sharp and early product definition:

- An outline of the concept and the benefits to be provided.
- A list of product attributes and features, ranked in the order "essential" to "desirable."

Execution of activity:

- Product development teams that succeed do a better job across the activities identified under homework and market orientation.
- These teams don't skip market studies and undertake trial sells.

Organisation behaviour:

- Teams comprise members from all basic functions:
 - research and development,
 - engineering design, → simulation, freeze the design in terms of dimension + order, texture, etc.
 - production,
 - quality,
 - sales

So, here what we are trying to say, is an outline of the concept and the benefit to be provided has to be very clearly written then, a list of product attributes and features ranking in the order of essential and desirable is very, very important. So, that is what is early product definition and sharp is you have to make it very clear, that is what we mean sharp then, execution of the activities.

So, you have identified essential and desire now, you have to understand how step by step you have to you are supposed to go towards the solution? For example, you can have a team, right? That is what product development team, that succeed to a better job across

activities identifies under home work and market orientation. So, what this point means is they have to go to the market understand the needs and then, start assigning the activities and then executing it, the team does not skip the market study and undertake trial sell.

So, market study is very important the organisation behaviour. So, organization behaviour means, I have said earlier a product development team should be constituted.

who are all going to be the member of the product development team research and development engineering design? What is engineering design? So, he does simulation and he tries to freeze the design in terms of in terms of dimensions and tolerance or whatever tolerance, texture et cetera ok.

So, then it is production. So, how do we produce? Then quality see today there is also a big challenge if I try to produce a part and if I do not know to evaluate or assess those, that part what I have manufactured for example, if I try to make a feature a micro feature of 1 micron and I have done it over 10 centimeter cross 10 centimeter plate for hydrophobic activities or hydrophobicity the biggest challenge is can I measure what I have produced in one shot? It is very difficult what we do is we try to take several patches of 10 ten miles microns use a characterization tool, measure the deviation and later stitch the image and then see what is it.

So, quality is also very important what I produce if I cannot measure the quality for example, I say I produce a soft very soft surface the texture what is there on top of the product is as soft as a babies skin. So now, the biggest challenge is how do characterise a baby's skin? So, quality is also very important quality is a very difficult word to even define then sales. So, all of them will be part of a product development team and start looking into the customers voice.

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Key factors for successful products

Project selection:

- Involvement in multiple projects scatters valuable resources among many candidate projects.
- However, not all projects are likely to materialize.

Telling the world you have good product:

- Legitimate promotion of the product.
- Launching new product with appropriate forums and adequate allocation of the resources for marketing.

The slide contains two hand-drawn diagrams. The left diagram shows a grid with 'Jan' and 'Feb' above it, a box labeled 'Board exam', and 'Mar/Apr' below it. The right diagram shows a box labeled 'Institute X' with an arrow pointing down to 'Students -> July'.

So,

The project selection is very, very, very important it the involvement in multiple projects scatters, valuable resources among many candidates' project so; however, not all projects are likely to material. So, what is that is see, when you start developing a product you cannot say I have listened to one group of customers and here, is an idea and produce only one product and when you say that producing only one product there is a possibility or there is an uncertainty, that that will be successful.

So, what are you supposed to do? Is you are supposed to go to the market understand customer voice of several segments for example, one in terms of college going kids, one in terms of babies, one in terms of house wives, one in terms of retired people or aged people. So, what happens is you have now, clustered them and you would look at each clusters voice completely different requirements will be there and then, you will come back to your company start discussing with your team and then, you will try to choose a product where in which, you have an expertise and you see a foreseen success. So, that is what it is ok.

So, if you start working on all these projects like one I said in college going, one in babies, one another one in housewives, the other one in senior citizens. So, if you start working on all the 4 your time resources are limited. So, it is very difficult. So, what you have to do is you have to choose a project where, you can be very, very successful or chose a project where, you can make a profit project selection is very, very important.

So, I will I have in IIT Kanpur what happens is we have at the beginning of every semester we ask the students to choose the course the biggest problem is the students will always choosing the course. So, certain students will chose the course, which are grade friendly certain students register a course, which are job oriented certain students register for a course where, in which their knowledge can be enhanced in one particular domain. So, choosing a course and excelling is a big challenge.

So, in the same way project selection is also very important to make a product successful telling the world that, you have a good product. So, this is also very, very important. So, you legitimately promote promotion of the product is very important then, launching new products with appropriate forums and adequate allocation of the resources for marketing is very, very important.

here let us take a simple example and here, I take an educational institute as an example. So, say for example, if there is an institute is there institute X so, the institute X who are the customers? Customers are students. So and when do they come they come all in July every year ok. So, for them so, what they do is they let us take class 12 students ok. So, the students in July of every year these class 12 students have their board exams, in March, April they have their board exam and then, what they do is after this board exam is over they try to choose, which course to take or which institute to go.

So, the starting date is July, their ending date of end semester exams or board exams are going to be April. So, naturally a student cannot make a choice in March or April. So, what he does? He does looking for a future either in the month of January or in the month of February and decides which institute to do higher studies or to go for college. So, to study in July when does he make a decision? He makes a decision in January and February.

So, if at all an institute has to make advertisements enough of advertisements, they are supposed to invest money about their institute in the area of sales and marketing whatever, it is during the month of January and February not in March, April, May, June. Because, if you miss out because a student has already made a choice. So, here you have to decide what is your product? Where to pitch in? What time to pitch in? What are the resources to be allocated? Such that; It can convert this into a customer.

So, that is what we say launching of new products here, I have taken an example of a educational institutions, if you try to look at a automobile what happens is they generally try to launch or you take a movie generally they try to launch during Diwali and Holi whatever it is. So, launching the new product with appropriate forum and adequate allocation of resources in advertisement that is what is marketing here.

So, legitimate promotion of the product is must. Today, if you do not promote your product people will not be able to come recognize and buy your product. So, there is a need to blow your own trumpet add the appropriate time to make a successful product.

The other factors are the factors listed have unexpected effect on the success of new product is order of entry, innovativeness and the nature of benefits. So, these are some of the other factors, which are involved key factors for a successful product. A business

So,

simply cannot introduce a product and on the basis of price advantage alone expect a successful; that means, to say if you produce a product in a cost economical manner cost economical manner it does not mean that, you are going to succeed today you see there are so many product, which are cost economical, which are not very successful.

But, vice versa there are certain quality products pretty expensive, but very successful in the market. So, that is what we are trying to say a business simply cannot introduce a product on the basis of price advantage alone to success a product.

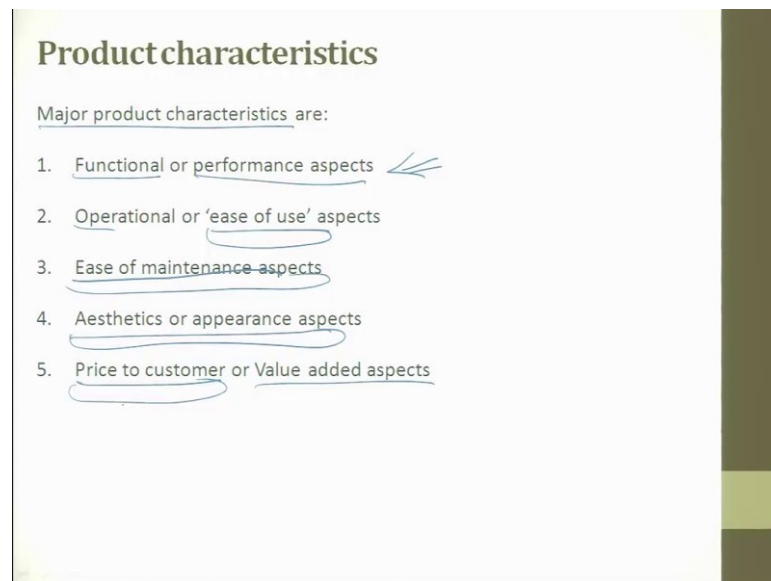
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Key factors for successful products

Other factors:

- Factors listed have unexpected effect on the success of a new product.
 - order of entry,
 - innovativeness, and the
 - nature of benefits.
- A business simply cannot introduce a product and, on the basis of price advantage alone, expect to succeed. ↓
↓
cost economical

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the product characteristics which are there so, major product characteristics are going to be functional or performance aspect. So, you would like to give more importance to performance of the product so, functional or performance, operational or ease of use. So, for example, I try to use this pen, which is digital pen, which tries to help me in teaching I try to highlight every point here.

So, ease of use. So, this product has to be user friendly and very easy to use ok. So, operational or easy to use there are kitchen utensils where, the operation is extremely difficult. So, those products do not succeed in the market. So, this is one major parameter product characteristics operational ease or ease of use.

Next easy for maintenance is another big thing for example, when I buy a product it has to be considered for maintenance then, comes aesthetics and appearance. It is not that, aesthetics is not important aesthetics and appearance are very, very important recently I saw a one of my friend has purchased a Rotomac a Roti-making or Roti-mac. So, the entire machine looks very similar to that of a “Belan” and it also looks where, ever there is a hot thing they have put red.

So, appearance is also very, very important. So, the price or to customer and the valueadded aspects is very, very important. So, function I tried to buy a pen, I tried to buy a car, I tried to buy a camera first thing is it has to excel in it is performance. In fact, when I when I was visiting Japan I saw that, they were trying to demonstrate their camera saying, that it is water proof. They were just immersing the camera inside a tank

So,

and then, taking it out and taking photos water tank and they were taking photos. So, performance aspect is very important.

Next is how easy is it is used today, today this is being talked about in a very big manner very big manner for example, earlier days in automobile the car key the ignition key used to be placed at locations, which are which were never user friendly. In fact, the earlier days in automobile the headline button used to be separate, the light on button used to be separate, the wiper button used to be separate, the speed of the wiper button used to be separate.

So, all four were there today you see there are two arms levers, which are given just below your steering and were in which, you can pull up pull down and then, move left or right everything is getting integrated. So, that is nothing but ease of use. So, ease of maintenance aspect. So, today you see that, earlier in Indian automobiles the tyre getting punctured flattened was a big problem today you see that, tyre technology has improved you have made tubeless tyres and if at all there is a flattening happen they have applied now, glues these glues get hardened and they do not allow the tyres to get flattened.

So, this is easy from maintenance, aesthetics and appearance is also very important and finally, the price to customer I give 10,000 rupees I get a product, which is worth of 10,000 rupees. So, that is what we see these are the 5 product characteristics, which are very important to make a successful product in the market.

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Product characteristics

1. Functional aspects:

- When the marketing possibilities have been determined, the functional scope has to be carefully analysed and properly exemplified.
- Functional aspect implies the fundamental reason for product demand.
- Functional aspects are often multiple, and usage of the product can be left to the customer's choice.
- The customer can decide the period to exploit its characteristics.

So, functional characteristics whatever, we saw I have just put it in words. So, when the marketing possibilities have been determined the functional scope has to be carefully analysed and properly exemplified the functional aspect implies the fundamental reason for product demand the functional aspect are often multiple; that means, to say a product can have multiple use a product can have multiple functions, that is what we have saying.

So, functions a single product from multiple functions a mobile phone a alarm can be there, clock can be there, an app can be there, a phone can be there, a camera can be there, functional aspects, right? So, functional aspects are often multiple and the usage of products can be left to the customer's choice, you want to use your cell phone as a camera go head no problem. That choice has to be given to the customer. So, these are some of the functional aspects, which are very important the customer can decide the

period to exploit its characteristics as and when I become there is a need I start using a camera then, I start using a video then I load an app called as Whatsapp and I start using it. So, it has left to the customer so; that means, to say a product whatever you have developed should have multiple functions to be catered, that is what is the bottom line. (Refer Slide Time: 29:33)

Product characteristics

2. Operational aspects (ergonomic considerations):

- Easy to handle and Easy to operate.
- Adaptable to various operational conditions, and subjected to varying degrees of skill of potential operators.
- The designer's problem becomes all the more critical.
- Rising trend for increased versatility because characteristic implies using basic attachments as elements for building suitable combinations for specific purposes.

↓ Use of modular Concept

Diagram illustrating a modular concept for a juicer:

- Motor
- Jar
- Juice
- Egg beater
- Mix
- Vegetable cutter

Then, operational aspects operational aspects I have told you ergonomics is very, very important easy to handle easy to operate for example, earlier days the cover of a pen we used to have screwing and unscrewing today it is all press fit easy to handle ok. So, adaptable to various operating conditions and subjected to varying degrees of skill of potential operators.

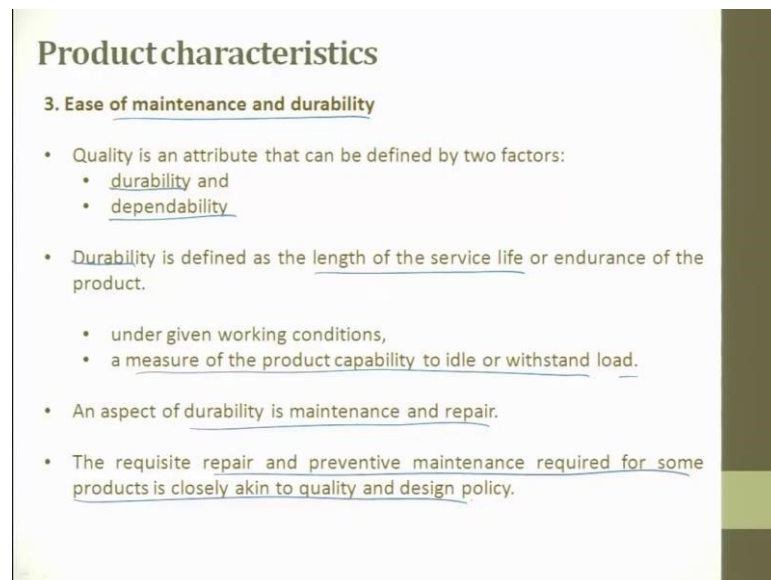
So, you cannot say that, my product is only for educated people. The cell phone never came and said the cell phone is only for minimum qualified of engineers can be used or doctors can be used earlier days it was so, but today those myths are killed. So, what they say is they say, whatever product you develop has to be. So, user friendly that, anybody can use it that is what they say.

The designer's problem becomes all the more critical when you talk about this ergonomics factor. So, rising trend for increasing versatility because, of characteristic implies using the basic attachment an element for building suitable combination of specific purpose. So, here what we are trying to say is we are trying to say use of modular concept. So, use of modular concept is what we are trying to talk about here. So,

rising trend of increasing versatility because, characteristics implied using basic attachments as elements for building suitable combination of specific purpose is also operation ease; that means, to say I have a motor this motor can be attached to a jar where, in which I can make juice, I can use it for as a egg beater, I can use it for mixing, I can use it for shredding or vegetable cutter.

So, I had a motor. So, this motor should have a particular attachment such that, whenever I want to switch between these 4 applications I should be able to do immediately instantly and very fast and on top of it has to be maintenance free, that is what we are trying to talk about in this ergonomic consideration.

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Product characteristics

3. Ease of maintenance and durability

- Quality is an attribute that can be defined by two factors:
 - durability and
 - dependability
- Durability is defined as the length of the service life or endurance of the product.
 - under given working conditions,
 - a measure of the product capability to idle or withstand load.
- An aspect of durability is maintenance and repair.
- The requisite repair and preventive maintenance required for some products is closely akin to quality and design policy.

Next is easy for maintenance, when we talk about maintenance 2 things durability and dependability are the 2 important factors of quality, that is there. Durability is how long defines the length of the service life or endurance of a product under given working conditions ok, say for example, you cannot take a product, which is thought of to work very well in a plain condition for example, in a in a terrine condition where, there were temperature are between vary between 5 degrees to 40 degrees.

So, a product which, works in this zone cannot be taken to a place where, the temperature is from minus 30 degrees to minus 6 degrees and start using it. So, what happens is

durability is always talked about in this working condition, the length of the service or the life of the product is this.

So, a measure of the product capability to idle or withstand to withstand loads for example, I buy a rubber band and I cannot expect the rubber band to lift 25 kilos that's what it is withstanding loads is very important the durability is maintenance and repair and the required repair and prevent to maintenance required for some products is closely aligned akin to quality and the design policy. So, ease for maintenance durability and dependability of the product has to be thought of. Aesthetics, aesthetics though it is not must, but without it you cannot live.

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Product characteristics

4. Aesthetic aspects:

- Aesthetics aspect is mainly concerned with moulding the final shape around the basic skeleton.
- This moulding of shape may be severely limited in scope, and finally emerges is termed as junctional shape.
- A study of the gradual reversal in shape of these objects in the past few decades convince us that there has been an increasing portrayal of aesthetics in design.
- In cases, aesthetics is the governing factor in design and completely dominates it.
- This is especially true for many consumer goods or fashion goods..

So, it is a trade-off you have to do you cannot give more emphasis to aesthetics and less importance to function, function is priority aesthetics is desirable. If your product does not have an aesthetics look you might not sell into the market for example, in olden days the edges of the edges of a product were all made out had sharp hardness. So, the aesthetics look is make it rounded.

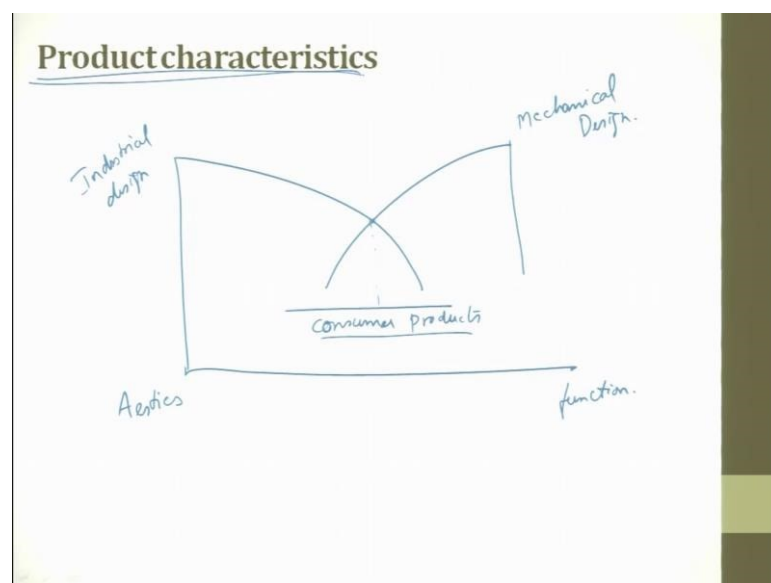
So, it gave aesthetic look. So, earlier days the chairs were all made out of wooden chairs were there then it became plastic. So, people wanted to have still a feel of wooden in the plastic chair. So, they have now, in plastic chair that texture of wooden is being integrated that is only an aesthetic if without that it is not going to affect the functionality

of chair, but with that it is going to affect sales of the chair. So, that is what aesthetic is important is desired, but it is not essential.

You have to know how much weightage you have to give for this aesthetics, there are many products you see in market today aesthetically beautiful even at one point of time America in 1970 and 80s they gave lot of importance to aesthetics, but that was the time Europeans and Japanese took over the entire business they started concentrating more on functional aspect.

So, aesthetics is desired, but it is not essential. Aesthetics aspect is mainly concerned with moulding and finishing of rounding of the skeletons this mould or shape ok, this is what I have already explained to you. So, I will keep moving in aesthetic is the governing factor in design and completely dominated it this is essentially true for many consumer products or fashion products aesthetics is must, but you have to keep functional on top of it.

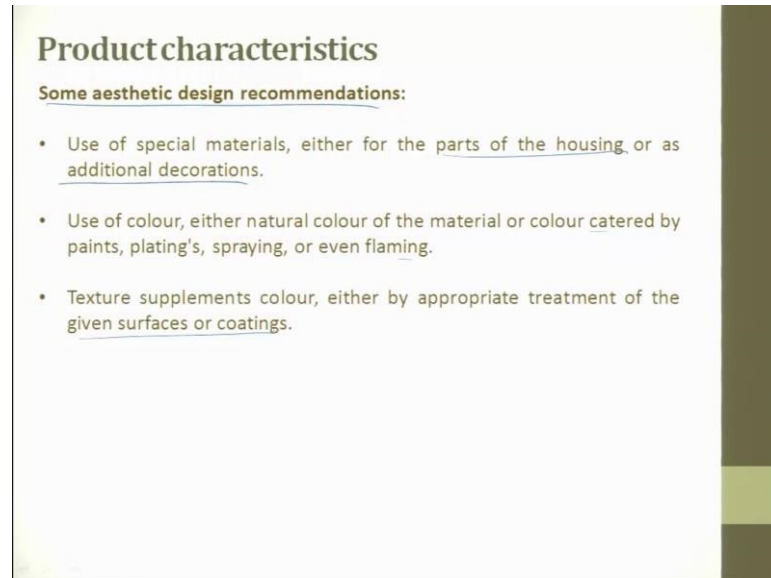
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So, when we try to draw a curve for product characteristics I would like to draw this. So, this is aesthetics and this is functional ok, this is here I would like to write industrial design and then here, I would like to do mechanical design ok. So, if I do that, this is what is the consumer products. So, if you talk about function, mechanical design is very important if you talk about aesthetics industrial design is very important, today all the

consumer products are a combination of these two. So, you try to do at this point. So, this is the product characteristics curve. So, some aesthetic design.

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Product characteristics

Some aesthetic design recommendations:

- Use of special materials, either for the parts of the housing or as additional decorations.
- Use of colour, either natural colour of the material or colour catered by paints, plating's, spraying, or even flaming.
- Texture supplements colour, either by appropriate treatment of the given surfaces or coatings.

Recommendation you use of special materials either for the part of the housing or additional decorations you want, use of colour either natural colour of the material or colour created by the paint created by the paints painting spray or even flames can be part of aesthetics. The texture supplementing colour either by appropriate treatment of a given surface or coating, these are some of the recommendations, which I told this I gave you a simple example of a wooden chair keep that in mind.

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Product characteristics

Some aesthetic design recommendations:

- Shape denoted by outer contours and similarity to familiar objects.
- Scaling the product, either to a blown-up size or to a small size (modelling).
- Packaging, especially for small items, novelty and enticement of packaging are often conveyed in the mind of the customer.

Some more recommendations sharp edges we have discussed and then, these things we have covered. So, packaging is also part of aesthetics. So, packaging especially of a small item novelty and enticement of packaging are often conveyed in the minds of a customer. So, here what I mean to say is the colour also many a times gets treated are I am always carried away some body wears a pink pant, a green pant I give I remember those students, who were wearing those pants face much more rather than normal coloured pant.

So, the aesthetics colour also tries to stay within the same way when you do sell a product in a mall where, or in a business supermarket. So, what happens is the packaging plays a very important the packaging and the colour of the packaging plays a very important role to decide the customer's choice.

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Product characteristics

5. Price to customer:

- The product cost ordains its selling price and scope its market attractiveness.
- This doesn't infer that price is the sole determinant of which buyers find alluring about a product; cheaper but inferior-quality products tend to fall by the wayside.
- The price does determine profitability, however, and it is in this context that product cost is important.
◦ No of product dem Price - Profit ↓
◦ Less of product more Price - Profit ↑
- Product cost is a function of both **fixed costs**, such as tooling and capital equipment costs, and **variable costs**, such as material and labour costs.

So, the pricing to customer is the last point the pricing to customer is very important. The product cost ordains it is selling price and scope it is market attractiveness, this does not in infer the price is the sole determinant, of which buyer finds about a product cheaper, but inferior quality products tend to fall by the wayside.

See when you think about it in Indian scenario, you can see lot of milk vendors having smart phones, in fact my mason who comes and does work in my house has a mobile phone his salary will not be very high to provide for it, but he has found out there is a business, which he is going to get because, of these phones in India 10 years back or almost all the milk vendors used to move around by bicycle, today this has completely changed they have started using powered vehicles because, they have found out this investment is going to give them more business. So, it is again and again I repeat it is not the cost, which plays an important role, but what value it add to the customer in his business is important.

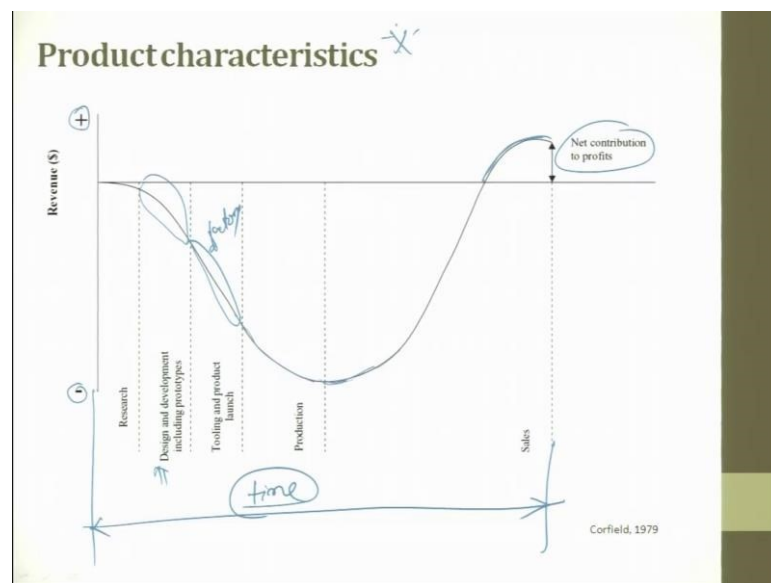
So, if you can develop a product, which adds more value to the customer and he is going to make an innings out of it they do not mind selling out that money. So, that is what is nothing but price to customer, the price does not determine profitability; however, it is. So, again there are 2 things in market.

So, one you can try to sell more number of products with a lesser price less price then, this is one strategy the other strategy is less number of products for more price. So, you have to decide. So, here the profit margin will be less here, the profit margin will be

more is low profit is high. So, if the price does not determine the profit you can choose anyone strategy and then start doing it.

When we talk about the pricing the product cost is a function of both fixed price and variable price, fixed price are generally asserts big asserts capital equipment's variable cost is nothing but, the man power involved or the material involved in producing the price.

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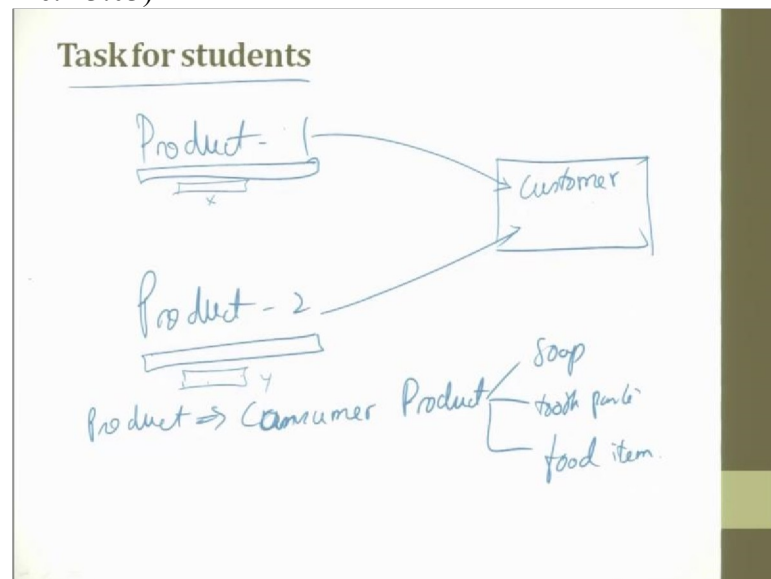
When you look at the product characteristics here, is a graph which talks about revenue, revenue with respect to positive; that means, to say I am going to make a profit I am undergoing a loss or I am investing more of money in the research phase there is an investment of money where, is no revenue made when it is designed and development including prototype you further invest money, but the amount of money which is invested here is not so, high because today we have moved to digital world.

So, there are, lot of software tools, which come in a big way which can help in accelerating the design and development till the prototyping stage once the prototype is made customer has agreed then, starts the launching of the product tooling operation research comes here. So, here it is more of capital intensive market. So, you try to spend more money in establishing a factory.

Then, you start producing. So, when you start producing these are almost the fixed cost and here, when you start producing more amount of material is involved, more amount of man power is involved. So, you invest more money and then what happens is from here on there is a slow increase. So, this is the state where, in which there is a shift going to happen from the negative side you are going to move towards profit side. So, after period of time you can see this bell curve crosses the 0 state and then, it starts making profit.

So, when it starts selling in a big way sales it is going to make profit. So, this here does it mean that, there is no sale here also there is a sale going on, but it is not. So, high the numbers become very large. Today this one is called if you remember back the time, which is involved in the project. So, this time understanding customer's voice, producing product and making profit cannot be infinity it has to be as small as possible, but you have to legitimately spend enough time in each state and then, make a sale progress about it. So, this time and this is the cost. So, this time has to be small this cost has to be small so, that you can make a profit out of it. So, this graph is very, very important for you to understand.

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So, today task for the students is you will try to take product 1, product 2 both are for the same customer you will try to understand what is this strategy for this product to give it to the customer? And what is the strategy for this product to give it to the customer? So, here what we are talking is in terms of a consumer product a product whatever is the product should be a consumer product so; that means, to say it can be a soap, it can be a

tooth paste, it can be a food item whatever it is choose it and then this is given to the same customer product A and product B.

And when you try to choose this product choose product A means, product 1 and 2 should be similar product for example, you choose a product here as tooth paste, product 2 should be also another tooth paste and try to realize how do these companies try to attract the customers? And how do the customers make a choice in these 2 products? So, I repeat the product can be anything, but product 1 and product 2 should be a similar product.

For example, soap you take soap, you take soap there can be a x soap here, y soap here how does the x soap convince the customer to buy his product, how does y do? And how do they succeed or how do they fail? Please try to understand because, if you do this exercise you can choose anything of your choice a soap can be what you use daily, tooth paste can what you use daily, food items or you go to the market and you say 2 soaps are put in front of you how do you chose which soap will suit you?

Is it going to be the cost is it going to be the advertisement, is it going to be the colour, is it going the fragrance and is it going to be the performance cost to performance I buy this soap it will with stand for two months cost to performance. So, what are you going to look at it? So, this is an exercise, which you will do it for yourself and try to understand and appreciate how do you make a choice of choosing a product?

Thank you very much.