Product Design using Value Engineering

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Lecture - 03
Profit Consideration

Namaskar Friends! Welcome to session 3 of our course on Product Design using the Value Engineering concept and today we are going to discuss the Profit Consideration. As we have seen in our first two sessions in our course that we are going to discuss the importance of value engineering in the product design process.

So, before we go to the value engineering concept let us first try to establish the basic fundamentals regarding why product design is important which we have already covered, what is a product life cycle we have already covered. Now why the companies are developing new and new products, each and every company wants to do more and more business they want to earn more and more profit, and for profit, there can be different approaches which the companies may follow. In order to improve, in order to increase their profit and for making profit there can be different sets of objective functions that the companies may like to optimize.

So, today we will try to see that what are the three most important strategies or the options that are available with the companies when they want to work on the profit. So, working on the profit means that they want to increase their market share, they want to increase their profit and therefore become a best company or may be a profitable company in the market.

So, that is the basic target that why and how the companies can increase their profit. So, the first and foremost thing that any company wants is to make profit. So, let us see now the presentation and we will try to see with the help of certain diagrams that how the company stand to improve their profit.

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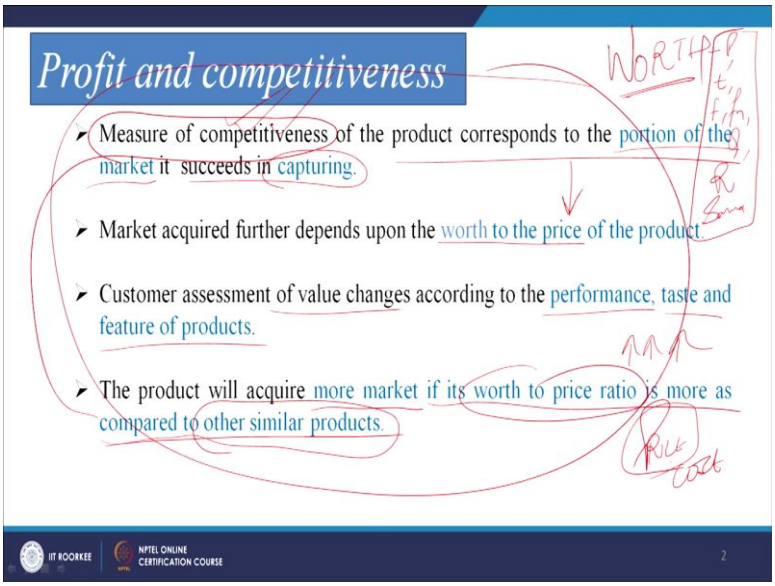

So, the measure of competitiveness of the product corresponds to the portion of the market it succeeds in capturing. So, we will say that this product is competitive because there are two words here profit consideration.

So, when we will say that the company is profitable, when the product has captured a relatively or a significant amount of the market share. So, the measure of competitiveness that the product is competitive in the market corresponds to or correlates to the portion of the market it succeeds in capturing. So, it will be able to capture the market if the product has got certain value. What is value we will cover in the next session, how to define the value for a product, we will cover in the next session.

So, it clearly establishes effect that if the product has value, the product has worth then only it will be able to capture the significant amount of the market share and therefore it will be competitive in the market. Market acquired further depends on the worth to price. So, this first point establishes the basis for the worth to price ratio that how much is the worth of the product.

What is the price the customer is going to pay, to acquire that product and if the product is worthy of the price for which the customer is acquiring that product, then, only the product will be able to acquire the significant amount of market share.

And this worth to price ratio is very important then this we are going to establish that if we adopt the principles of value engineering in our product design process, we are going to focus on this ratio only that what are the functions we are achieving, what is the quality we are delivering, what is the performance of our product, what is that combined effect of all these criteria defining the quality of the product vis a vis the cost of the product. The price the customer is going to pay to acquire that product.

So, if this balance is maintained that we are fixing the price, and we are trying to satisfy the needs and requirements of the customer, needs and requirements translated in to the functional requirements of the product. We are able to provide the functions for which the product is designed, we are able to add aesthetic values, aesthetic functions to the product customer is willing to pay a price for that product.

So, that balance between the functions and the cost is the basic aspect of value engineering and that is clearly mentioned here. A product will only be able to acquire a significant amount of market share, if depends upon, if the worth to price of the product is good or this ratio is significantly higher; higher is the worth, lower is the cost automatically each and every customer will be attracted towards that product. Customer assessment of value change is according to the performance taste and features of the product.

So, here also again, the performance word is coming, taste is coming features of the product is coming, all these terms will be clubbed together as the functional requirements of the product, which means that we have to identify the functional requirements from the customers feedback or from our design already existing design that why and how this product is able to get into the hands of the customer. Why a customer is buying this is particular product?

So, the customer assessment of value will change as per the performance taste and feature of the product. So, we have to focus on all these points and these will come again when we talk about the value of the product. That whether it is tasteful, tasteful means that whether it is as per the requirements or the taste or the colour preferences of the customer, whether it is giving the desired performance, whether the features that the customer want are available in the product or not and that will decide the assessment of our product.

The product will acquire more market I have already highlighted this point, if it is worth to price ratio is more as compared to the similar product. Again this point comes to the first point that is measure of the competitiveness. So, if the worth to price ratio is significantly high. It will be able to beat the other similar products, and therefore will be competitive in the market.

So, here, the overall summary that has to be explained here can be explained in two words only, first word is the worth which will depend upon suppose performance, it may depend upon the taste of the customer, it may depends upon the feature, it may depends depend upon the functions, it may depend upon the quality of the product, it may depend upon the reliability of the product. So, it may depend upon the service available for the product. So, different features add up to a single word that we may say as the worth and the second important point is the price or the cost of the product.

So, these two are the summary and if we are able to balance this ratio we are able to provide all these criterion at a significantly lower cost the product will automatically become competitive. So, that is the overall target of value analysis.

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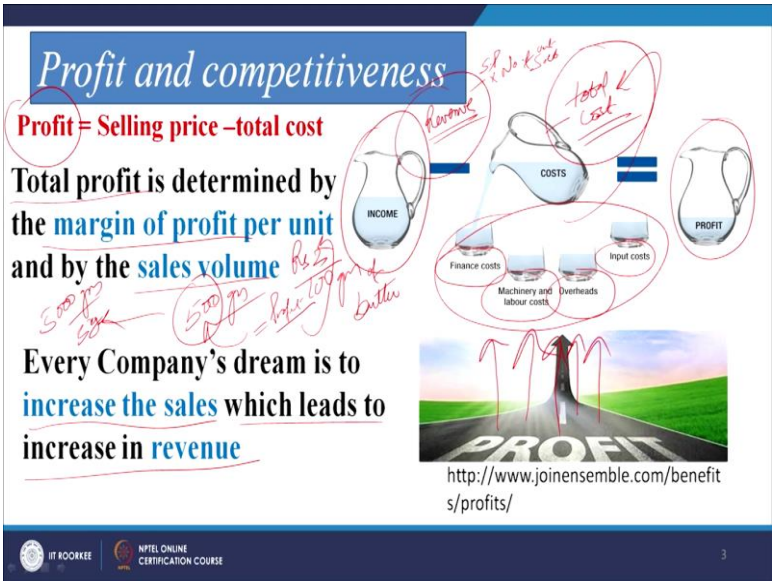

Now, here we can see since our topic is profit consideration, how the companies will be able to generate a large amount of profit? So, first what is profit, everybody knows profit is selling price minus the cost that we have spent for making that product.

Profit= selling price- total cost

So, suppose somebody is selling breads or somebody selling butter, so for butter whatever is the cost of making 100 gram cake of butter plus the profit will add up to the selling price of the product. So, selling price minus the cost will give us the profit which is known. So, total profit is determined by the margin of profit per unit and by the sales volume.

Now, the example that we have taken if we say that we are selling 500 grams of butter in a day. So, each in 100 grams capacity so we say that we are selling 500 grams, so we can say that 500 grams multiplied by the profit that we are getting per 100 grams that will give us the total profit. So, total profit is determined by the margin of profit, so the margin is basically suppose we are getting rupees 2 per unit per 100 grams of butter.

So, that is our margin and then the sales volume which I have already told that suppose we are selling 500 grams of 500 gram pieces or 500 gram packs we are selling. So, may be on that case so we are saying that we are getting certain profit which is based on the sales volume and which is based on the profit per unit.

So, every company now each and every company, each and every shopkeeper each and every trader will always dream to increase the sales, which will if we increase the suppose this 500 gram increases to 5000 grams or we can say 5 kgs automatically rupees 2 per 100 gram will automatically also increase which leads to the increase in revenue.

Now, Total Revenue= Profit× Sales Volume

total revenue maybe the profit multiplied by the sales volume that we are achieving. So, that this is the basic concept of the profit and here also we can see this is the income which in our words we can say it is the revenue generated and this is the total cost. Now total cost how we get the total cost? Somehow you may be wondering, I have taken an example of a 100 grams of butter.

So, how it is produced it may have the financial cost associated with it, machinery and labour cost it may have over heads so this is all input cost may be the set up cost. So, different types of costs will add up to the total cost. So, the income minus the total cost will give you the profit so this is our total profit. So, in this way we can see this diagram

also each and every company have the target to always increase the profit. Now how this can be done that we will try to see in this diagram. So, on your screen, you can see a diagram, the source is also mentioned here.

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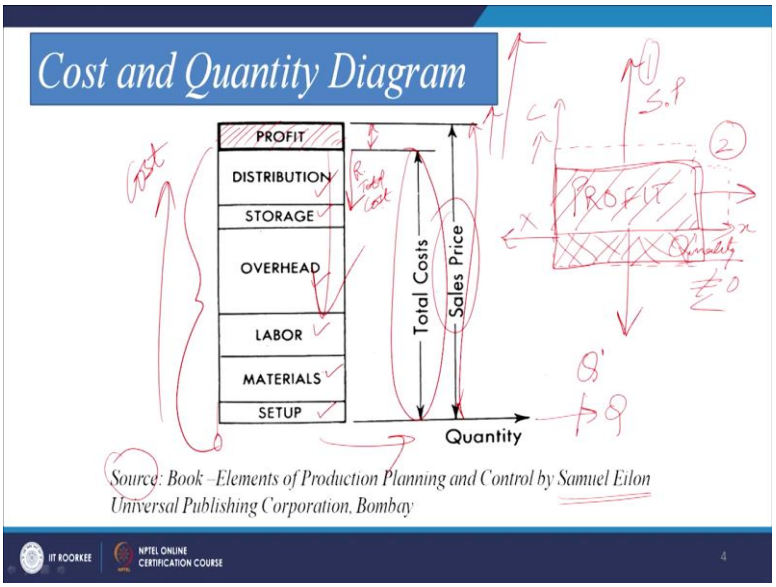

Elements of Production Planning and Control, a good book written by Samuel Eilon and the publishers name is also mentioned on the slide. So, this is a cost and quantity diagram. As we have seen in the previous slide if you go back if we can go back and see in a previous slide there is the total cost, and there is a revenue that is generated this revenue can be calculated by the selling price which can be multiplied by the number of units sold and we subtract the total input cost that will give us the profit. So, the revenue minus the total cost will give us the profit.

So, here again we can see that this is the total costs which are already clearly depicted here. So, we can have a set up cost materials, labour, overhead, storage, distribution, so all these add up to the total cost of the product. Now, we have profit. So, we add this profit to the total cost, we get the selling price or the sales price. Now we see, we have a profit here and on x axis we are taking the quantity of the products sold because this is also required to calculate the profit that we are accruing in doing our business. Now the question arises that how to increase this profit, as you can see that the profit is being represented by this rectangle here.

And suppose we say this is 0, quantity and this is some quantity Q dash suppose here. Now, we can see, we can easily calculate what is the total cost because on y axis suppose we take the cost and on x axis, we have the quantity. So, we can calculate what is the cost that has been spent to produce this product and the cost components or the elements of the cost can be the set up material, labour, overhead, storage, distribution, so this is a total cost that we can get.

Now, if we plot this on a graph paper our target will be to increase the area of this rectangle which is having the profit. So, here on x axis we have the quantity and on y axis we have the cost component. So, we want to increase this area of the profit, how we can increase now? You can see that there are three different directions possible; one direction is this we can increase in this direction, another direction is this and the third direction is this.

It is not possible to move with the negative x direction, because on x axis we are talking about the quantity and quantity will never be less than or equal to 0. So, it will always be the quantity we have to sell some number of products certain number of products in order to get the profit, if we are not selling anything we may not be able to get the profit when we are talking about the tangible products.

So, in case of tangible products if we are producing something suppose, we are producing the toothbrushes, so if we are producing toothbrushes, we need to sell that toothbrushes to get certain profit. So, if the quantities cannot be negative, so we have three options available on your screen, you can see

Now, the first option if we want to move in the positive y direction it can be increase the selling price this is our selling price. So, if we want to move in the positive y direction, we can have one option that we can increase the selling price of our product. Obviously, our profit will increase that is a first option that is available with us, but it will have it is own advantages as well as it is limitations.

The second option available is that we can increase the quantity, obviously, when we increase the quantity? As we have seen in the previous slide the quantity has to be multiplied by the sales volume in order to find out that what is the total revenue. If you go to the previous slide. Let us see, here again we can see this is a cost, this is a total income how we can get the income? The income we can get by multiplying the sales

volume with the number of units sold and then if we reduce the cost price from that we will get what is the actual profit we are getting.

So, we can see that we can increase the quantity also, so once the quantity is increasing as we have taken an example in the previous slide, if from 500 grams we go to 5000 grams or 5 kg. So, the quantity have sales has increased obviously the related profit will also increase, so that is a second option available with us. What can be the third option; the third option can be if we are able to reduce the cost price of our product.

So, if we are able to reduce the cost price of the product, again the rectangle or the profit rectangle, the area of that rectangle will increase. So, now we will have this area as our profit so our total cost has reduced, so this is a third option available that is we can reduce the total cost which is written here. So, we can increase the quantity, we can either increase a selling price or we can reduce the cost or the total cost of the product.

Now all these three options that are available with us will have their own advantages as well as their limitations. So, one by one we will go to the advantages and limitations of these, so these are the three options that already we have mentioned.

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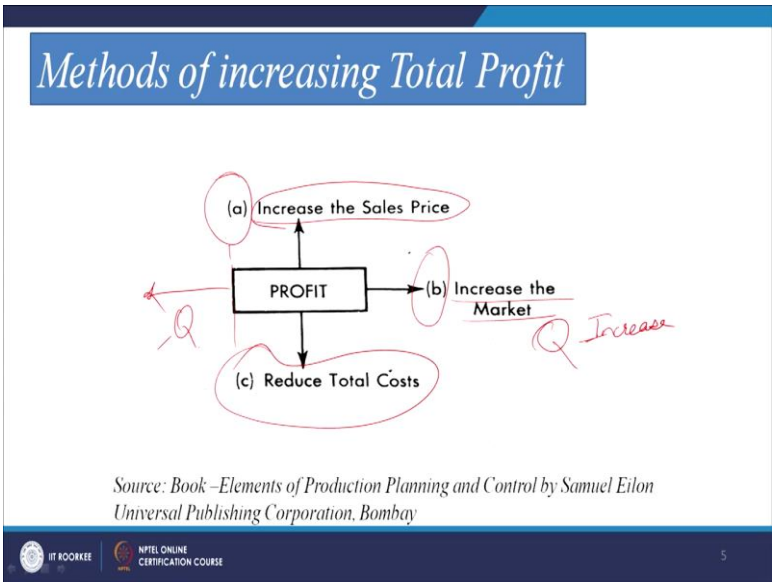

So, the option number A is, increased the sales or the selling price, so obviously the profit will increase. The second option available with us, is increase the market, so we can improve the Q or increase the quantity sold or the third option can be reduce the total

cost. So, we have seen all these three option, so this rectangle and this option of minus or the negative sales is not possible. So, we have now three options available how we can utilize these three options and under what type of circumstances we can take the advantage of these three options that we will try to cover now in the next slides.

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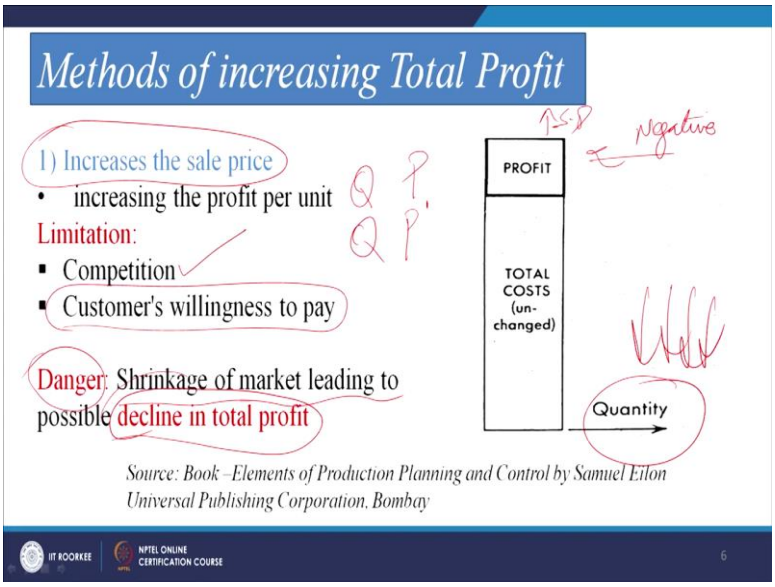

So, let us see the first option one by one. So, this is our option number 1 increase the sales price. So, what will it do, suppose we are selling quantity Q, so our total profit is P dash. Now, suppose if we increase the sales price our Q remains same, but now we are selling price per unit has been increased. So obviously our profit is going to increase, because now we are charging more profit per unit because we have increased the sales price of our product, is it really possible. It is possible in certain specific circumstances only and is not possible in each and every circumstance. So, what are the limitations? First limitation on your screen you can see is competition.

Always there will be competition there are companies who are also producing the same product and they have their worth to price ratio. So, they know that what worth they are providing, what is the price they are charging, we also know that what is the worth, we are providing, what is the price, we are charging.

So, we have to keep that balance if we increase the sales price significantly, the customer base may vanish or the customer base may be deteriorated or it may decline. So, we may use certain amount of customers they may switch over to the competitors product. So,

that is one limitation then the customer's willingness to pay is also equally important, if we increase the selling price the customers may not be willing to pay even if we have the monopoly in the market.

So, customer's willingness to pay is also a limitation if they may not like to spend their money on our product, because it is priced significantly higher. Then, what is the danger here, the danger here is that the shrinkage of the market our market base as I have already mentioned may significantly be influenced by the increase in our selling price of our product. So, if the shrinkage of the market, our sales, our value Q significantly reduces how it will affect our profit, our profit may decline. So, if our increase in the selling price has a negative impact on the quantities that we are selling, obviously our decline in the total profit is going to be the resultant of that.

So, basically increasing the selling price is a very challenging task and we can only increase the selling price, if we are adding certain additional features to our product. If we are not compromising with the performance and quality in, but on the other hand, we are increasing improving making our product more worthy of the cost that we are charging or the price that we are charging from the customer.

So, it is not an easy task to increase the selling price and in today's scenario for mostly different types of products, you will see, that a companies are reducing the cost price or reducing the selling price of their product they are not increasing the selling price of their product.

So, this is one challenging task, obviously, it has a good output in terms of you can increase your revenue by increasing a selling price, but with additional dangers also. So, we have to be very judicious when we decide on strategy to be adopted for increasing our profit.

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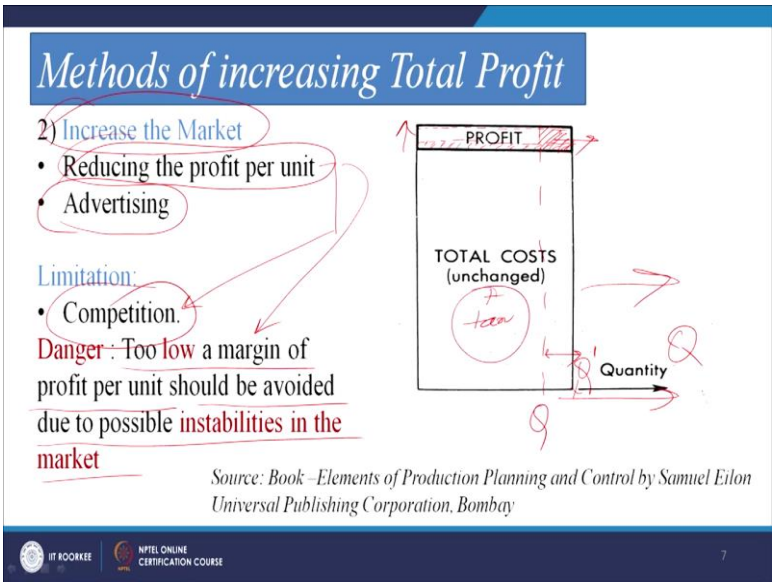

Now, the second is increase the market. So, you can see here, the Q has increased. Q has increased so initially, suppose we were here, this was our Q, now this is our Q dash and this is the additional profit that we are getting by shifting from Q to Q dash this was a initial profit.

Now, our profit has increased because we are selling more quantity. Now this can be achieved, now we can increase the market, how we can increase? We can increase easily by advertising you can see in the TV channels, so many advertisements are there for different types of product. So, the advertisement always lead to maybe increase in the market and also we can compromise on the profit per unit. So, we can think that if we reduce sometimes you may see that there are schemes that buy two get one free or buy three get one free.

So, in those type of schemes, the companies try to compromise on the profit margin per unit, but they try to increase the number of sales or increase the number of units sold and in those scenario when we are selling more number of units our quantity is increasing. Obviously, a little compromise in the profit here may be per unit if we talk slight reduction in the profit per unit, but significant increase in the profit by additional sales that calculation has to be checked and it has to be found out.

So, what is the limitation here? Because here we are reducing the profit per unit. So, the competition again comes into picture that ours is the only company which is resorting to

resorting to advertisements. If you see so many competitive advertisements are there on the television, these days on social media also. So, we see company is advertising through different channels.

So, when the advertisements are there, there is competition also and we are risking by reducing the profit per unit. So, that may sometimes lead to may be compromise in the quality performance of the product also. So, we have to be careful when we are compromising on the profit per unit. So, danger is too low a margin, as we have seen this is a danger reducing the profit per margin, too low a margin of the profit per unit should be avoided due to possible instabilities in the market. They will never lie to sell a product at loss, so we should be very careful when we are taking this decision of reducing the profit per margin which I have mentioned.

So, if we come here, we reduce the profit to this level, if we reduce the profit to this level we have a very thin margin here and there may be additional text which the government has put on a specific market segment. Obviously, that text will add up to the total cost, so that is total cost plus some additional text has been added. So, our total cost now becomes equal to the price at which we are selling, because we had a very thin margin of profit here so our profit is compromised or it is gone.

So therefore, then we will have to increase the sales price because of the addition of this text and when you increase the sales price in the previous slide we have seen that increasing the sales price also has got it is own limitation. So, we have to be careful in deciding the strategy that we must follow for increasing the profit of our organisation. Two things have become clear, we can increase the profit by increasing the selling price, we can increase the profit by increasing the sales volume and the last strategy can be if somehow we are able to reduce the total cost of our product.

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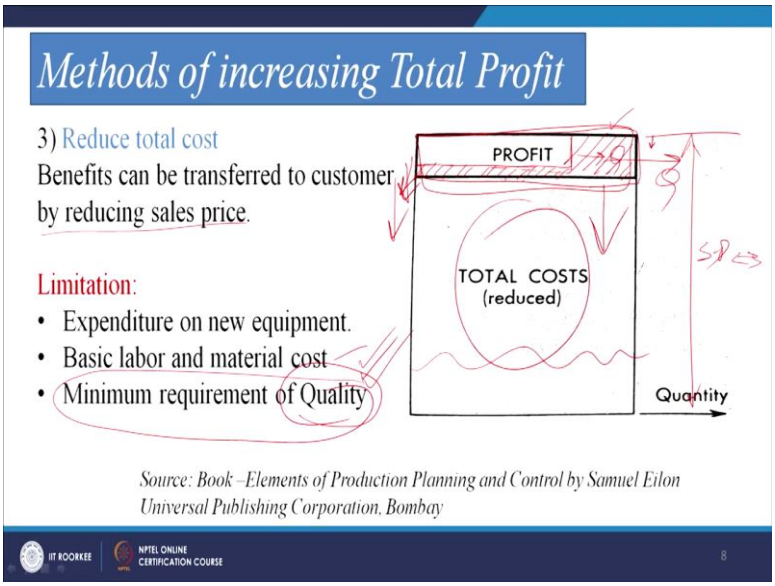

So, here we can see suppose earlier the profit was here we have been able to increase the quantity Q, so this is because of the additional sales that we are doing. Suppose we are keeping our selling price as constant we are not touching it and if we are able to reduce the cost price this is the additional profit that we are getting. So, we can if we are able to adopt both the strategies we are able to sell more, we are able to reduce the cost also; obviously, our profit is increasing, our final profit now is this much.

So, this strategy also has got it is own advantages benefits can be suppose, we are able to make the product at a slightly lower cost or total cost is reduced, the benefits can be transferred to the customers by reducing the sales price. So, if we keep the profit margin same, our total costs have come down, so we have now more margin for profit.

So, if we reduce the sales price of our product that may lead to increase in the quantity. So, we are reducing the sales price it is leading to increase in the quantity of sales and we are getting more profit, so that can be one strategy. On graphically, we can see the total cost is reducing here, we can reduce slightly the selling price it will lead to increase in the quantity of sales which will lead to additional profit.

What can be the limitation? Now in order to reduce the cost may be suppose some work is being done manually. Now suppose, we automate the things, and on automation the price can be reduce down because, the productivity has increased, accuracy has

increased, precision has increased, failure rates have reduced because of the minimum value intervention.

So therefore, we are getting profit easily or we are able to reduce the total cost of our product, but for doing that in order to bring the automation in the industry we need to spend some money on the equipment. So, in that case we require expenditure on the new equipment, which will certainly has to be accounted for somewhere in the total cost, basic labour and material cost also has to be taken into account suppose, we are able to reduce the total cost by changing the material that we are using for making the product.

Now the new material is slightly may be costly, so then we have to see that the product the material is costly, how the total cost can be brought down so that is one challenge. Another challenge can be if we are able to make the product with the slightly inferior material, again it is a challenge that it may compromise the quality and performance of the product. So, that is another limitation that we have to take into account when we are trying to reduce the total cost of our product.

Minimum requirement of quality is also there which I have already mentioned. So, when we are changing the material, we have to take into account that the quality is not at all compromised, so that is the thing that we have to keep in mind. So, if you do comparative analysis of all the three options available with us, that first option being increase the selling price, second option being increase the quantity of sales, third option being reducing the total cost of the product.

So, the third option seems to be little reasonable, because here we are not compromising with the quality, if we are not compromising with the quality we are able to reduce the total cost. We pass on certain benefits to the customer, our customer base increases the quantity of sales increase and when multiplied by the profit per unit will give us a additional revenue. So therefore, we will focus on this third aspect more when we discuss about the concept of value engineering.

So, with this we can close the today's session, we will start our discussion on this third part that how to manage these total cost, so that we are able to deliver a product to the customer as per his requirements, as per his needs with a very high worth to cost ratio or worth to price ratio.

Thank you.