

**Manufacturing Strategy**  
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**Module No. #05**  
**Lecture No. #24**  
**Quality Management and Manufacturing Excellence**

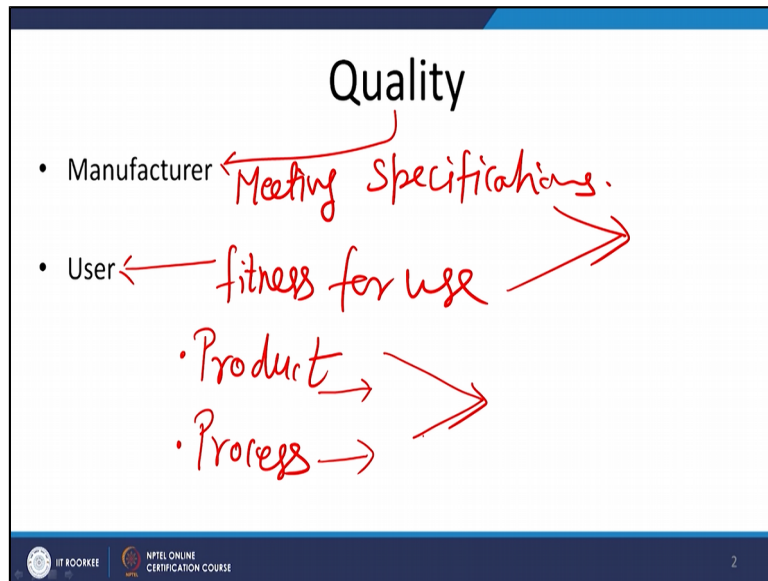
Welcome, friends. This is the twenty fourth session, of this course on, Manufacturing Strategy. We discussed about, various Order Winners Qualifiers, in our earlier sessions. And, based on those Qualifiers and Winners, we discuss that, Manufacturing Strategy will be developed. We discuss that, how, different types of Manufacturing Strategy taxonomies, were developed. And, in all those taxonomies, Quality was one very important aspect.

Even, when we were discussing, the Order Winners and Qualifiers, we discussed the role of Quality, as a very important Order Winner or Qualifier. Though, the characteristic of Order Winners and Qualifiers which we discussed, we discussed that, these will change, with respect to market, these may change, with respect to products, these may change, with respect to time. So, therefore, for the same product, Quality may be, sometime qualifier, sometime it may be a winner.

During the same time, for one market, Quality can be qualifier, for other market, Quality can be a winner. But, it is very, very important to understand, that Quality is at the centre of, manufacturing excellence. Without Quality, it is impossible to conceptualise, the concept of Manufacturing Excellence. And, Manufacturing Excellence, is important for Manufacturing Strategy. And, Manufacturing Strategy is important for, achieving the stage of world class manufacturer.

So, you can say, this whole series of activities, starts from Quality management, and will finally take you, to world class manufacturing status. So, therefore, in this session, we will be discussing about, that what is that strategic role of Quality? How Quality can provide, that strategic aspect, strategic advantage, to an organisation? So, when we start this discussion, let us initially focus for some time, about the meaning of Quality.

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And, when I say the meaning of Quality, I like to define Quality, from two point of view. And, these two point of views are, one point of view is of manufacturer, and the other point of view is of the, user, customer. Now, when I say, Quality from the manufacturer's point of view, so this meaning of Quality is more related, to meeting the specification. This is, meeting specifications.

And, when I say, Quality from the user's point of view, this meaning of Quality is more, related to fitness for use. And, when I say, the strategic role of Quality, we need to converge, these two perspectives of Quality, so that, you can achieve, the manufacturers objective, that is the meeting specification, conformance to specification, and fitness for use. And, if my manufacturing capabilities, can achieve both these things simultaneously, then I am able to use Quality, for my strategic advantage.

If I am not able to do this thing, then I will be either focusing, on my manufacturing processes, or only on the product aspects. Rather, I need to focus, on product quality, as well as, process quality. So, both these dimensions, if I am able to fulfil, so you can have, one more way of defining the Quality. One is the, product quality. And, second is the, process quality. So, both product quality, and process quality, is equally important, to achieve the strategic role of Quality, in the manufacturing excellence.

Now, what is this product quality, and process quality? The product quality is, what is the final product. You have, a very good product design. And, this product is able to fulfil, the expectations of the customer. So, the good design product, defines the product quality. Now,

you do not have proper machining system, you do not have proper measurement system, you do not have proper storage system.

So, even if, a product is very well designed, a product is very well conceptualised, but because you do not have, a good system, a good manufacturing capability, to produce that product, you will not be able to achieve, customer satisfaction. So, you have high product quality, but poor process quality. On the other hand, it is also possible, that your product design, is not very appropriate, that product may not be liked, by the customer.

But, you have, a very good inspection system, you have a state-of-the-art, CNC machines, you have, a very well developed warehousing system, you have a state-of-the-art logistics system, in your organisation. So, you have, a very good degree of process quality, but you have poor product quality. This is also not going to serve the purpose. Because, ultimately, the product, which will come out of this excellent process, has poor result. It is not going to fulfil, the purpose of the customer.

So, customer will not be willing to, purchase that product. So, we require, simultaneously, both, a very good product, which can fulfil, which can meet, the customer requirement. And, that product should be produced, from the process, which is able to deliver, that type of product. So, product quality and process quality, are again required, simultaneously, to achieve the strategic role of Quality, in our manufacturing processes.



If one is missing, other is not going to provide you, the strategic advantage. That is what, we wanted to mention here. Now, when we have understood, that what is the meaning of, manufacturers view of Quality, what is the meaning of, users view of Quality, let us try to understand, one very interesting thing about Quality, that how, because in our earlier sessions also, we have emphasised about Quality.

And, there is so much, available about Quality, that you can read, in hours and hours, about Quality. Because, people have defined Quality, in their own ways. So, if you read American literature, you read Japanese literature, you read European literature, you will find, lot of variations. And therefore, you will not be able to draw, proper lines in black and white, that what is Quality, and what is not Quality.

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### Modern definitions of quality

Past	Enlightened <i>(Strategic)</i>
<p style="text-decoration: line-through;">Ideas related to 'high end' 'exclusivity', 'prestige' items</p>	<ul style="list-style-type: none"> <li>• <u>Knowing customers requirements</u> for every segment in which the firm is competing.</li> <li>• <u>Providing customer satisfaction</u> ( as a minimum criterion);</li> <li>• <u>providing customer delight</u> (as an ideal) by combining <u>product and process quality</u> for customers,</li> <li>• <u>then adding special features which heighten the customer's enjoyment</u></li> </ul>



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But, just for a generic understanding, if I say that, how the Quality has moved, from the past era, to the current strategic view of Quality. So, you see, earlier, our meaning of Quality was related, with high end products. Those products, which are used by, elite in the society. These are the Quality products. Those products, where some kind of, exclusivity is involved. So, those exclusive products, are the Quality products. The products, where some prestige is associated.

If I am using that product, so it enhances my prestige. So, these types of attributes, were associated, when we were defining the Quality, in past. Your exclusivity, the prestige, the high-end, these were the important words, by which, we mean that, it is a Quality product. But now, what is happening. Now, it is a totally different type of scenario. And, I am saying that, it is the enlightened view of Quality. Now, what is this enlightened view of Quality?

It says that, knowing customer's requirement, to understand your customer requirement, this is one important aspect, of Quality. So, a firm, a company, may be in various segments. A company is in segment, A, B, C, D. So, you need to know that, what are the requirements of different segments. So, for each segment, if you are able to understand, customer requirements specifically, that this segment looks for low-cost, this segment looks for faster delivery, this segment looks for more safety.

And therefore, if you see the post office, a very good example. So, post office knows, that customers are coming to me. And, there are options, where you can post your letter, with just 5 Rupees stamp. So, these are the customers, who are looking, low-cost solution. Then, you

can do, registry of your envelopes, where you are charged, somewhere between, 15 to 20 Rupees. So, some kind of assurance is there, that your packet will be delivered, to the receiver.

And then, you have, speed post, those who want assurance, as well as faster delivery. And therefore, they are ready to pay, higher price, for the same service. So, you need to understand, that what different types of customers are requiring, in different segments. And accordingly, you need to develop, your products. So, that is the first fundamental thing, to know about, Quality. And therefore, it is known as, enlightened view of Quality

Then, the minimum thing. Now, the minimum thing. Once you understand, this customer requirement, of a segment, then the minimum thing which we need to do, is to provide customer satisfaction. That is the bottom line, that is the minimum criteria, that we need to provide, customer satisfaction. And, nowadays, the English has also changed. And, this customer satisfaction, is no longer, taken into a positive way.

If I am not very much satisfied, I am not happy with the product. And, I do not want to talk negative about the product. So, I am say, okay, it is good product. It is, I am okay, okay, kind of thing. So, you can say that, satisfaction is just a bottom line, about the Quality of your product. It is not a good Quality product, If I am just satisfied with that product. So, now, what I need, I want customer delightness. We have moved from, customer satisfaction to, customer delightness. Customer satisfaction, has become a thing of past.

And nowadays, modern organisations believe, that we need to delight our customers. And, how do I delight our customers? By providing, the combination of, product and process quality. If I am able to match, product and process quality, which we just discussed, that what is the meaning of product quality, what is the meaning of process quality, if we are able to do, this kind of combination, then it will help us, to give customer delight. And, that is now desirable, for the organisation.

And then, we can also add, some additional features. Nowadays, when we have, simple Gmail, to send our messages, from one party to another party. So, we were very satisfied. But, now we have, so many added feature, which are continuously increasing our, you can say, bonding with use of Gmail. And, it is very rare, that a new user, which is coming on

email facility, will go to any other email service, other than Gmail. Because, they are continuously adding new features.

You can have, google chat. You will have your, google drive. You have, lot of sharing facilities. Google Docs. So, there are continuously new features, which are added. And, because of the adding of these new features, we actually heighten, the customer's enjoyment. So, now you see that, in the enlightened view, we are talking about, customer satisfaction, then we move to discuss about, the customer delightness.

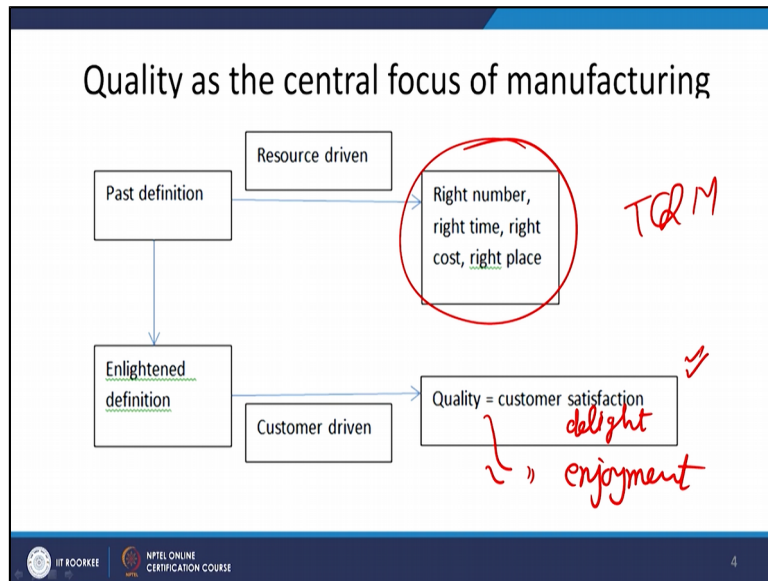
And, now, finally we are talking of, customer enjoyment. So, this customer enjoyment, is possible, with respect to, all types of products. You need to see, that what value I am offering to customer. So, therefore, this idea of high end, exclusivity, and prestige, is no longer valid. Depending upon, the type of product I want, and if in that product, I am able to find all the features, and I also get some additional feature, this will provide me enjoyment.

So, whether this product is adding prestige, it is a high-end product or not, but if it is fulfilled my purpose, if it is providing me some additional benefits, I will be more than happy. And, that will also create, a bonding between, me and that product. So, that is the enlightened understanding, that is the strategic understanding.

So now, organisations need to understand, that the concept of high end, and prestige product, is no longer valid. Rather, we need to provide, this customer enjoyment. A customer should enjoy, using my product. So, different types of examples are available, where some companies provide, only the customer satisfaction. While, other companies, which are more successful, in the same business, they are providing, customer delightness, or customer enjoyment.

And, the concept of customer delightness and customer enjoyment, is basically oriented, or is basically taken, from the field of Quality management. Now, this whole idea, where Quality is the central part of manufacturing activity, can also be simplified, can also understand, by this simple diagram. Now, in this simple diagram, you see that the past definition of Quality, was the resource driven.

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Earlier, when we were talking of, high-end products, exclusive products, prestige products, so that was the idea, which was driven by resource, that I should be able to provide, right number of products, at right time, at the right cost, at the right place. So, all these things, were the meaning of Quality, in the previous periods. And, this whole idea was about, how you are using your resources, to achieve this particular objective of, right numbers, right time, right cost, and right place.

But, now, in our enlightened definition of Quality, when we are seeing, that how Quality is a measure of customer satisfaction, then it is delightness, and then it is enjoyment. So, this whole idea of Quality has moved, from resource driven, to customer driven. So, you see, this is one fundamental change, which has happened, in the area of Quality, which was earlier the resource driven, and now it is customer driven.

And here, the simple meaning of Quality is, Quality is equal to customer satisfaction. Or, you can say, customer delight. And then, you can also say, that Quality is more equal to, the strength of Quality is more, when you get the customer enjoyment. So, Quality starts with, customer satisfaction, in our enlightened view. And, Quality can go up to, customer enjoyment, from satisfaction.

And, if we are able to achieve this, with the change in mind set. Therefore, the discussions related to TQM, because this particular aspect, cannot be achieved on machines. This require, a change in mind set. And, the concept related to TQM, Total Quality Management, will help us, in understanding that change in mind set, which is required for achieving, this enlightened

view of Quality. So, in one of our sessions, we will discuss in detail, about Total Quality Management, and the strategic role, TQM can provide, in world class manufacturing.

Now, once we have understood this distinct framework, that how Quality is central to manufacturing, now quickly, we will go to discuss, some important attributes of Quality, which was given by Garvin. So, Garvin gave, eight attributes of Quality. We have already discussed, these attributes of Quality, in our discussions, when we were discussing, Order Winners and Qualifiers.

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**Attributes of Quality**

- Performance — 1.5T. (Satisfaction, delight)
- Features — IoT (Enjoyment)
- Reliability
- Serviceability
- Durability
- Conformance
- Aesthetics
- Perceived Quality

Diagram: A tree structure with 'A' at the top, branching to 'Eu' on the left and 'Developing BOSE' on the right.

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So, we will not be spending much time, on these attributes of Quality. But, it is important that, we discuss these attributes of Quality, to maintain the continuity of our present discussion. Now, the first important attribute of Quality, is related to performance. Now, performance is, basically that, what is the primary characteristic of your product. So, the primary characteristic of the product, is known as performance.

So, if you remember, that if I am having, an Air Conditioner, in my room. So, if that Air Conditioner, is giving me cooling, at some particular efficiency level. Or, if I say that, the Air Conditioner has a capacity of 1.5 Ton. That is the performance, of that Air Conditioner. So, this is the primary characteristic of my Quality. Then, the second characteristic of Quality, second attribute of Quality is, the feature.

Now, additional characteristics, which I had in my product, to increase the enjoyment. Now, just we discussed, customer satisfaction, and then enjoyment. So now, when I am trying to



achieve that enjoyment, so for that purpose, I may add, the Wi-Fi facility, or I may add, IOT Sensor, in my Air Conditioner. So, that adding the IOT Sensor, so that I can operate my Air Conditioner, using my Smart Phone, is an additional feature, is an additional characteristic of that Air Conditioner. And, that is known as, feature.

So, actually performance helps me, in achieving the satisfaction, or maybe delight, but features help me, to achieve the enjoyment. So nowadays, features are also equally important, that how I need to enhance, the enjoyment of my customers. Then, third is reliability. So, during the life of product, how many times, whenever I require the product, the product is readily available to be used. That is the meaning of reliability. It is very hot and humid, now.

And, if I want to switch on the AC, whether AC is in working condition or not, that is the meaning of reliability. So, wherever I require a product, product should be available in working condition, during its useful life, that defines the reliability. More reliability, I get more satisfaction, I get more enjoyment, because whenever I require product, it is readily available. So, high reliability, high enjoyment, high delightness.

Serviceability. A product fails, how quickly I can repair. A product fails, if after sales services are easily available, I may be able to use the product, immediately. Something happened, in my Air Conditioner. And, now this Air Conditioner is not giving me, proper cooling. So, if it is properly serviceable, then I may be able to, reuse, restart Air Conditioner, after a small maintenance of, 15 minutes, or 20 minutes.

But, if serviceability is low, I may be required to send that AC, to some bigger service centre. And, it may take, 1 week, or 2 weeks' time, to get my ac repaired. So, that is poor serviceability. So, this will reduce, my satisfaction, delightness, enjoyment. Durability. How long I can work, with that product. Whether, I need to change that product, in 3 years, 4 years, 5 years. So, more the durability, longer the period of service of the product, more happiness, more delightness, more enjoyment.

Because, on one side, I am getting good performance, better features, and longer duration of the product, so my cost of using the product per day, also decreases. So, durability is also one important dimension, of the product. Conformance. Whether the product is able to fulfil, the specifications or not. If I am expecting, that the AC is of 1.5 Tons. So, whether it is exactly of

1.5 Tons, or not. If I checked, by using some measurement criteria, and I found, that AC is actually, 1.3 Tons, or 1.2 Tons.

The company is saying that, this is 1.5 Tons. This will lower my satisfaction. Though, the cooling is good enough, for my purpose, but still, if it is not matching the specification, it will lower down my satisfaction. And, if you know, how the speakers, a very popular company, which is world leader in the field of speakers, Bose. If you read the story of development of Bose speakers, you will find that, non-conforming to the specifications by earlier speakers, was the reason of development of, Bose speakers.

So, conformance to specification, design specification, is also important thing. Aesthetics. How your product looks like? So, there has to be a proper appearance, of the product. And, that also plays, important role, in my customer satisfaction, customer enjoyment. And finally, the perceived Quality. Perceived Quality is related to, the perception about Quality of a product. So, we can generate this perception, from variety of sources.

Some products, which are coming from a particular country, you may have higher perception, about Quality of those products. While, similar kind of product, which are coming, from some other country, you may have lower perception. If Company A has two plants, one in some European country, and another in some developing nations.

And, if you see, make in some European nation, and make in some developing nations stamp, obviously, you will have a perceived Quality, that if a product has make in some European nation stamp, has better Quality, than for other developing nations stamp. So, that is the perceived Quality. Now, the point is that, these are eight attributes of Quality. In some of the products, you may find, all these eight attributes. While in some of the products, you may not find, all these eight attributes.

In some products, depending upon the nature of the product, only few attributes may be available. So, we need to see that, what are the attributes, what are the dimensions of Quality, which are available, in my product. I request all of you, that in forum, try to think of different types of products, and try to mention, different dimensions of those products, and see, what are the missing dimensions, in some specific products. And, we may have more interaction, off-line also.

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The slide is titled "The strategic importance of Quality". It contains two bullet points: "• The number and capabilities of new entrants into market" and "• The greater amount of choice that customers have". A red double-headed vertical arrow is positioned between the two bullet points, indicating a relationship or interrelation. The slide footer includes the IIT Kharkee logo, the NPTEL ONLINE CERTIFICATION COURSE logo, and the number 6.

Now, when I am talking of strategic importance of Quality, these are the two important reasons, for strategic importance of Quality. And, these reasons, you will see are, somehow interrelated also. The first is, the number and capabilities of new entrants into the market. Earlier, there were limited entrants, there were limited players in the market, very few. But, in last many years, particularly last two decades, 20 years, the barriers are continuously moving away.

And, when these barriers are moving away, it is becoming very easy for new entrants, to enter into the market. If I take the example of India, pre-liberalisation era, no new company can start, any manufacturing activity, without taking licenses from Government of India. So, there was a very strict entry barrier, for starting manufacturing activities in India. But nowadays, all those barriers are not there.

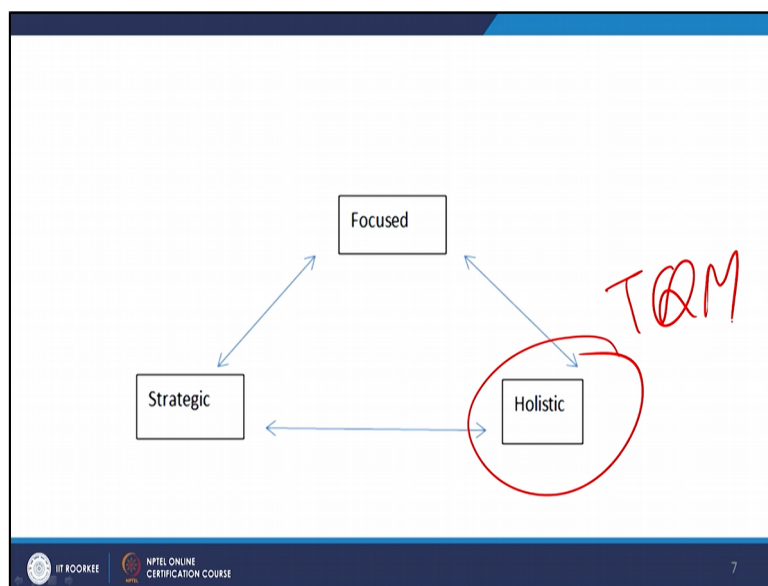
Rather, Government try to provide, how you can encourage, more and more investment. And, there is a continuous emphasis, on increasing our position, on ease of doing business scale. And, therefore, more new entrants are entering into the market. And therefore, the Quality related competition, is increasing. That is one important thing. And then, the second important thing is, the greater amount of choice, that customers have. Now, because, more and more entrants are available.

So, customers also have, more and more choices. Customers are continuously becoming, empowered, may be because of IT, may be because of other type of exposure, global village.

Customers are moving, from one place, to another place. They have more knowledge. They are experiencing, different types of products. So, therefore, the issue is that, both these things are interrelated.

And therefore, Quality is important, even for the new entrants, or for the existing players, that if you do not focus on the requirements of the Quality. Because, now Quality is no more, a precious product. It is no more, a specialised product. It is more related to, understanding the customer requirements, appropriately. So, Quality needs to be handled, in the form of this trilogy.

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And, what is this trilogy? That, you have to have, a very focused attention on Quality, focused attention with respect to, understanding the customer's requirement, how these requirements are changing, over a period of time. And then, you need to understand, that Quality is going to play, a strategic role, in your organisation. Because, in whole order winner and qualifying discussion, we discussed Quality, as simply, one Order Winner or Qualifier.

But, it is much more than that. Rather, I am saying, it is one of the central activity, in modern manufacturing. And then, we have to have, a holistic vision. And, here comes the role of, concepts like, TQM. That, whole organisation should develop, that type of culture, that type of mind set, that we need to provide, Quality products, to our customer. And, when this trilogy is achieved, you will be able to provide, strategic role of Quality, to the manufacturing excellence.

And, in our next session, we will be focusing more on, that how to develop that mind set, how TQM can provide, Quality as a strategic weapon, for the organisation. So, with this, we come to end of the session. Thank you, very much.