Manufacturing Strategy
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Module - 7
Lecture - 31
Critical Success Factor for World Class Manufacturing

Welcome friends. Now, we are entering into the seventh week of this course on manufacturing strategy. In our last many sessions, we discussed about the conceptual clarity for the manufacturing strategy. That, how manufacturing is important for an organization and in how many different ways manufacturing can contribute in getting the competitiveness for the organization; how manufacturing can contribute in the development of your business level strategy.

And for that purpose, the whole process of developing a sound manufacturing strategy was discussed. It included the concepts of order winners and qualifiers. It discussed the role of market driven strategy. And we also discussed that how different types of functional strategies need to be integrated, so that we can have a functional level contribution for the organization's objective.

Because, unless until functional strengths, the capabilities, competencies at the functional level help in delivering the organizational objective, we will not be able to achieve a very high level of performance. And that is what we discussed in our last many sessions. Now, in next few sessions, we will be discussing about certain important tools which are available, maybe in discrete form.

But if you use them in a comprehensive manner, you can achieve the objectives of manufacturing strategy. Or, as I say, the title of this session is critical success factors for world class manufacturing. So, if we want to be a world class manufacturer, so, what are those tools? If we apply those tools in our organization, if we adopt those tools in our manufacturing setups or in our organizational operations, we can achieve a very high level of performance.

So, now onwards, in our remaining sessions, we will be discussing about some of the very popular tools which are discussed in different parts of operation management. But here, we will discuss them, that how these tools are contributing in our journey of world class manufacturing. So, the critical success factors, the list which I am going to discuss is not a complete or you can say exhaustive list.

But, this is 1 important list which can give you idea, that yes, if we implement these tools, if we adopt these tools in our organizations, to some extent we can become a world class organization, we can become a world class manufacturer.

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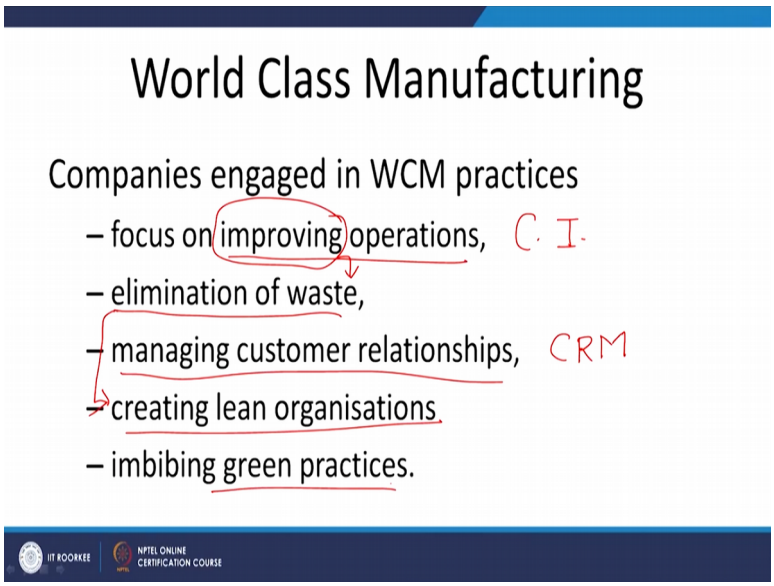

Now, if I see that what companies are doing when they are trying to become world class manufacturing organization; so, for that purpose, they continuously look on improving the operations. So, the continuous improvement is a routine activity in these organizations. They are regularly try to improve their existing operation. So, if I take an example of quality. So, if I have a particular rejection rate.

If I am having a reaction rate of let us say 8%, so, I will try to reduce this further, I will try to go for 7%. If today I have a 7% reaction rate, tomorrow I will look for 6% and so on. So, 1 continuous focus is on the improvement. So, regularly, improvement becomes the part of DNA of these organizations. The another important thing is elimination of waste. These organizations, world class manufacturing organizations regularly try to go for elimination of waste.

So, this is also a type of improvement you can say, that if I can regularly identify waste in my organization. Now, in our subsequent slides, we will discuss that what is the broader meaning of waste. So, there are different types of waste which are possible. And identifying those waste and then doing something to eliminate, to avoid those waste, that is also a regular activity in world class manufacturing organizations.

So, you can see that, elimination of waste is 1 way of improving your operations. If you can do regular value adding manufacturing, that is elimination of waste. Then, another important thing is managing customer relationships. These organizations, they give lot of emphasis on customer relationship. We have discussed in brief about this customer relationship or concepts like CRM when we discussed total quality management.

But, these world class organizations have special emphasis. They even can go for creation of a separate functional activity for handling their CRM activities. So, customer relationship management, that how do you develop long term relations with your customer is a very important focus of these organizations. Then, creation of lean organization. Now, lean organizations are possible when you eliminate waste.

So, the elimination of waste leads to lean organization. The organizations which are lean, will also be agile. Their ability to change with the market requirements becomes much faster. And that is another important dimension of world class manufacturing organizations. So, that is creating lean organization. And nowadays, since in the current circumstances where we are living, we regularly see lot of environmental issues.

And environmental issues are so severe that daily we see new types of natural disasters are coming, because of increased use of natural resources, because of more and more pollutants, more and more pollution we are creating for our air, water, land, etcetera. And because of that, the other very important dimension of world class manufacturing is imbibing green practices. In earlier times, we were not so concerned about the green practices.

We created lot of pollution. We created so many unwanted things in the surroundings. We exploited natural resources like anything. But nowadays, all these things are creating so much problem for human being, that in India itself, we have seen that how disasters are striking

right from Himalayas to Indian Ocean. You see Kerala floods, you see Chennai floods, you see Mumbai floods.

So, all major areas, wherever you go, you will find that problems are coming. And as we are moving away from green practices, these problems are increasing more in number, more in impact. And therefore, there is a very important aspect of manufacturing, that is the green manufacturing. How do you have a environmentally sustainable manufacturing practices? So, that is also one of the important agenda of world class manufacturing organizations.

So now, let us see in slightly more detail about these individual critical success factors. So, the first important critical success factor or you can say tool is the lean manufacturing. Now, when I am saying the lean manufacturing;

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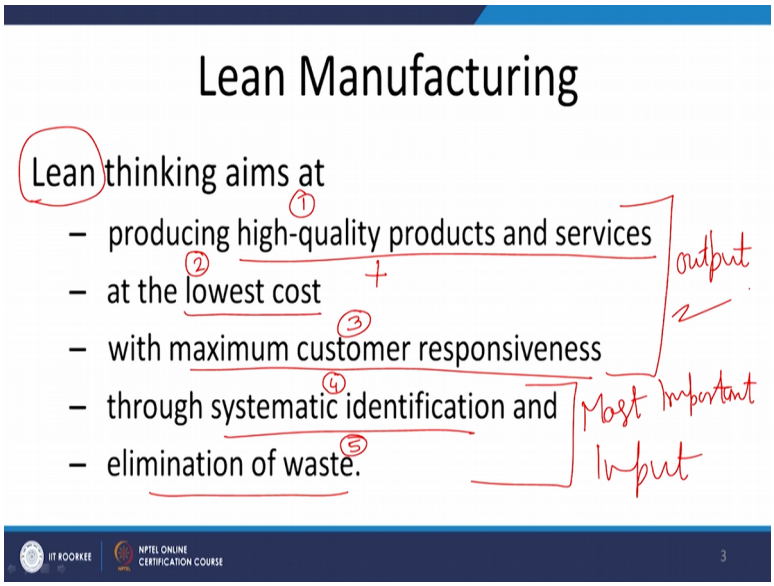

The word lean, already we know from the English literature that what is the meaning of this word lean. Now here, in case of manufacturing, when we are attaching the meaning of lean, it means, high quality products and services at the lowest cost. So, we are trying to club 2 things where we always had a trade-off. If you are producing high quality products and services, you always believed that cost will also be high.

But because of this lean thinking, we are able to produce or we are aiming to produce high quality products and services at the lowest possible cost. So, that is a very interesting combination which is there in lean manufacturing. And at the same time, we want to achieve

maximum customer responsiveness through systematic identification and elimination of waste. So, these are, you can say 5 important things which we do in lean manufacturing.

Point number 1, producing high quality products and services. Point number 2, doing this at the lowest possible cost. Third is, achieving the high level of customer responsiveness. Fourth is, systematic identification of waste. And fifth is, elimination of these waste. So, these are 5 important things we are doing in the lean manufacturing. So, the lean manufacturing basically stands on these 2 particular things.

Systematic; these are the most important aspect of lean manufacturing. That, how systematically you can identify the waste and then eliminate the waste. And when we do this, we can achieve. So, this is the enabler. This is the input. And output is in the form of achieving the high product quality, lowest cost and maximum customer satisfaction. So, that is the output. So, with the help of input of identification and elimination of waste, we are able to achieve high quality product, lowest possible cost and good level of customer responsiveness.

Because your customer responsiveness is only possible when waste is not there. When your system is not bulky, then only you can change your products, you can change your processes as per the customer requirement. When it is not bulky, you will have less cost. You will have more efficiency in use of your resources. And at the same time when you are providing the most important values to your product, that is the meaning of high quality products and services.

So, that is 1 important thing about the world class manufacturing, that lean thinking provides you all these 3 things. That is, high quality products, lowest possible cost and a reasonably good customer responsiveness. And the input is identification and elimination of waste in your systems. The second important thing is total quality management.

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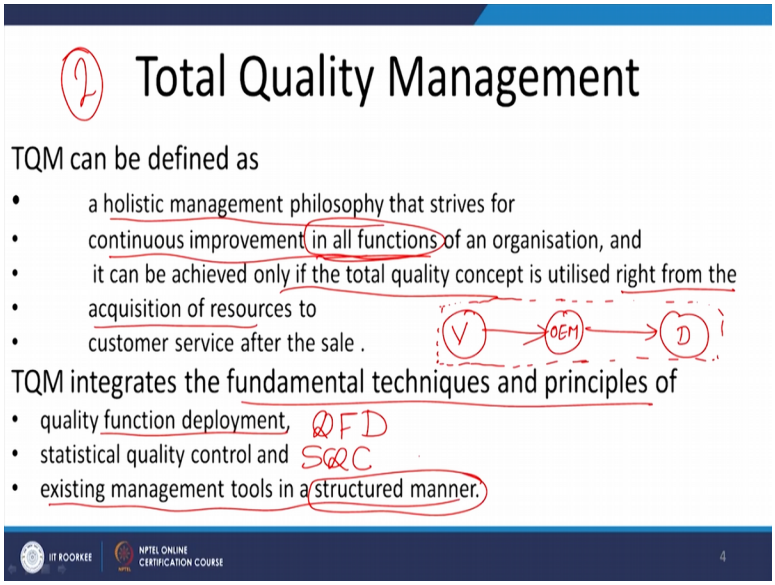

This is the second important critical success factor for world class manufacturing. This is the second important tool in our journey. Now, TQM we have already discussed in our sixth week. And in TQM, we know that we involve all the employees of our organization, whether they are at the top level, at the middle level or at the lower level. And it requires a very strong commitment from our top leadership of the organization.

Top management commitment is the most important enabler for total quality management environment in my organization. So now, when I try to define TQM, it can be defined as a holistic management philosophy. Since it involves all, as I just said, therefore it is a holistic management philosophy. It is a comprehensive way of looking the improvement in the organization. So, that is a holistic philosophy.

Then continuous improvement in all the functions. So, most of the time when we are talking of world class manufacturing, it is related to quality and it was perceived that it is related to something which is happening at the shop floor. But, the idea of total quality management says that it requires continuous improvement in all functions. So, this is very important that we are trying to shift the role of continuous improvement or the scope of continuous improvement, scope of quality management from production activities to all other functional activities in the organization.

That is a much broader way of implementing the quality related revolution in your organization. Then, it can only be implemented and achieved if we have the total quality concepts right from the acquisition of resources. Means, if you have a supply chain kind of

thing where you are OEM, you are having some vendors, you are having distributors on other side. So, in this case, the meaning of total quality management is that, you need to include your vendors.

So, it requires the complete concept of total quality from the stage of acquisition of the resources. So, on 1 side, we are taking vendors into our consideration. And on the other side, you are taking your customer or distributor. And then, you are also providing after sales services. You are providing quality of services and disposing the product. So, that is why it is a much holistic management philosophy, which is not only limited to your organization.

It is not a intra-organization or inter-functional activity. Rather it is inter-organizational concept. So, that is about the total quality management already we have discussed. And TQM, again and again I will say that is a fundamental technique and principal for world class manufacturing. And it is basically based on quality function deployment, QFD, very popularly known.

Where we try to convert, with the help of this QFD, we try to achieve quality of design. Where, what my customer is expecting, what my customer is requiring; we try to convert those subjective assessment of customer requirements into objective specifications of my product. So, with the help of this QFD kind of tools where we prepare house of quality; and in that house of quality, the role is that my customer is not able to give me the specification of a product.

I want to develop this pen. So, I have some kind of subjective knowledge that this pen should be able to do these kind of different functions. But when, as a manufacturer I want to develop this pen, I need some specification that, the pointer of this pen should be of this much millimeter, so that it gives me this kind of smooth writing. So, that idea or that process of converting this subjective requirement of customer into specifications of the product is the role of quality function deployment.

So, this incorporates QFD. Then, statistical quality control. Another very important thing that SQC is included in total quality management. Because you need some kind of measurable performance yardsticks. And SQC provides you that measurable quality quad sticks. And

with the help of those dashboard activities, with the help of those parameters, we are able to check whether our quality management system is working properly or not.

If I calculate the Six Sigma DPMO and if DPMO is going beyond a particular limit, I can say that my process is not in statistical control. So therefore, the use of SQC is also important in total quality management. And then, third important thing is existing management tools in a structured manner. Whether I am using Porter's 5 force model, whether I use the Hall's framework of world class manufacturing, whether I use Michael Porter's strategic model;

So, whatever tools which I am using, how to use these tools in a strategic manner, so that I can achieve the objective of continuous improvement. I can achieve the objective of giving the overall satisfaction to my customer. I can achieve the objective of employee involvement. So, I am not using simply a tool for the sake of using it, but there has to be a very specific purpose. And therefore, I say that, the use of tool should be in a structured manner.

That I want this thing, therefore this type of tool is used. If I am using benchmarking in my organization, if I am using BPR in my organization, so why I am using it? What is the kind of objective I have associated with the use of that particular tool? And that is also an important thing. So, TQM on its own, does not give me the other important understanding which is required. That TQM on its own, does not give me any new tool.

Rather, it says that we need to use existing management tool in a structured manner. So, whatever tools are available, if I want to use SWOT, strength, weakness, opportunity, threat analysis, so use it in a strategic manner. If I want to use any other tool, maybe Kanban, maybe Kaizen, maybe Poka-Yoke; so, all these are the different types of tools, management tools which are available.

And we need to use only these tools for making the TQM. But we need to use these tools in such a structured manner, that the objective of TQM can be achieved. So, this is about another success factor which is required for a world class manufacturing, that is total quality management.

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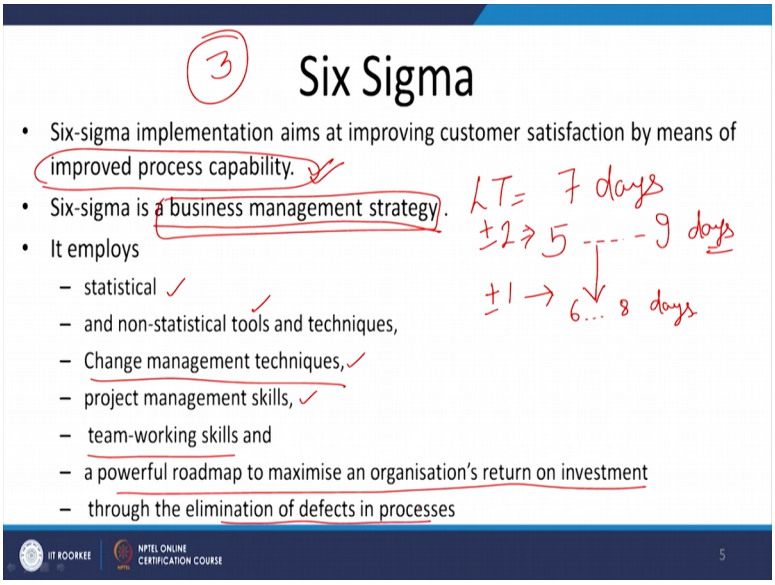

Then, further to total quality management, though we already discussed about use of statistical quality control in our total quality management discussions. But Six Sigma has independently become such an important tool that it requires a separate mention. And therefore, we are discussing the Six Sigma as another critical success factor for world class manufacturing. Now, Six Sigma, as many of us know, is a tool developed by Motorola for reducing the variations in our processes.

So, the basic idea is to improve the process capability. This is the core idea of Six Sigma. And if I want to link it to our earlier discussion of elimination of waste, discussions related to lean manufacturing; in that, what will happen? That if your process capabilities are improved, it will also help us in reducing the waste. And there will be lesser rejections at the output stage. There will be lesser process related waste, time, energy, etcetera, will be less wasted.

And therefore, your productivity as well as quality of output, both these things will improve. So, Six Sigma is taking a very important stage. And it has become an independent success factor for the organization. And organizations, some say that we are implementing TQM. And some organizations say that we are implementing Six Sigma. So, whether we take the name of TQM, or we take the name of Six Sigma, but the only difference is that, TQM is a continuous process.

It is a kind of mindset which is a philosophy in itself. Six Sigma is normally done in a project mode, where we try to take 1 project at a time and try to eliminate the waste, try to eliminate the variations around that particular process. And the capability of process improves. So, that

is the idea of Six Sigma. So, here we are saying that Six Sigma is a business management strategy.

In many books, you will find that Six Sigma is a tool under the statistical quality control. But, if you understand the meaning of Six Sigma in a broader sense, you can say that it is a business management strategy. Why it is a business management strategy? And it can provide you significant order winners and qualifiers. Let me give you just 1 example where you have a lead time.

Now, if you have lead time which is known as, the day you are receiving the order and day you are delivering the order. So, the time between receiving the order and delivering the order is known as lead time. Now, if lead time is 7 days, but because of variations, maybe for any reason, the lead time may vary + – 2 days. So, therefore, you can deliver products either maybe in 5 days or it may take up to 9 days also.

Because some time it is possible to deliver products slightly early, some time it may take 9 days. Now the person, the customer who is ordering you, now that customer will not have a very confident date of receiving his supplies. Because sometime you are delivering in 5 days and sometime you are taking 9 days. And therefore, that customer needs to keep some amount of inventory, safety stock to take care the fluctuation of your lead time.

Now, if you can minimize this fluctuation maybe by 1 day. So, then it may happen that either it will take from 6 days to 8 days. Obviously, when the lead time fluctuations are reduced from 2 days to 1 day, the inventory associated with that at the customer level will also reduce. And therefore, the cost of inventory holding will also come down. So, that is 1 simple example that Six Sigma can help us in improving our process capabilities and which will, in result will reduce the waste.

And I took an example of inventory. And large number of examples are available in various books which are talking of how Six Sigma can reduce the defects. So, most of the time, we talk Six Sigma in terms of defects. But this example of how you can minimize the variation of lead time, will give you an exposure that Six Sigma is applicable in all types of processes. Whether it is manufacturing organizations or service organizations, it is equally applicable.

And therefore we say that, Six Sigma is a business management strategy. If you are able to implement Six Sigma properly, it may give you lot of competitive advantage. So, it actually employees statistical, non-statistical tools techniques. It is, a very important thing is the change management technique. Because, you are used to have a lead time of + – 2 days. Now, when I am saying that, we need to reduce this lead time to + – 1 days; so, lot of process changes will take place.

And when these process changes will take place, it requires lot of you can say change management training and development programs. Because employees will have some kind of resistance in changing their way of doing a particular process. So, it employs change management techniques also. As I already mentioned that Six Sigma things are implemented in the project mode, so it also requires project management skills.

Then, nobody can do Six Sigma alone. So therefore, team working skills are also equally important. It is a powerful roadmap to maximize an organization's return on investment. Because you are eliminating the defects in the processes. So, because you are eliminating defects in the processes, you are actually using the investments for getting the best output or the useful output.

So therefore, it maximize your ROI. Otherwise, your some of the investment is used in producing the garbage, which is a non-value adding thing. So, if your some of the inputs are used in producing the garbage, your ROI will go down. So, that is the usefulness of the Six Sigma for the world class manufacturing. Then, another important thing is the total productive maintenance. Total productive maintenance,

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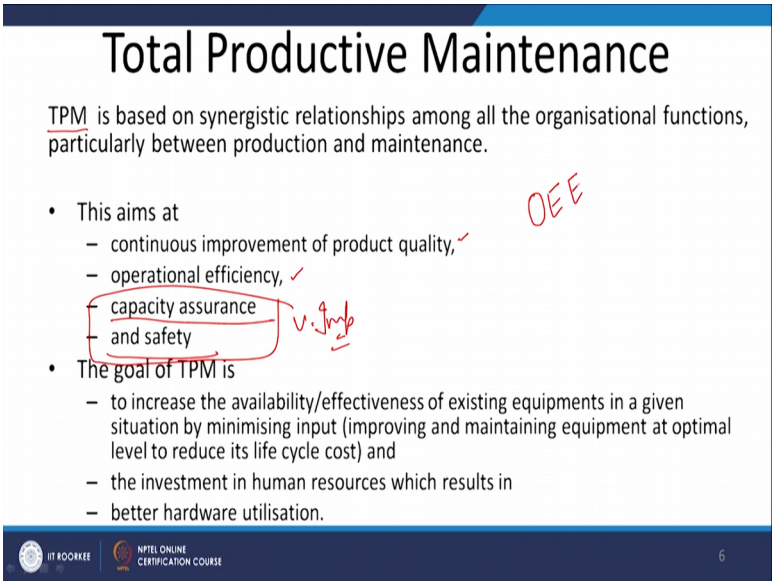

TPM, which combines the concept of total quality management. It also combines the concept of your, how far you are able to do good maintenance of your system. So, on 1 side you have quality, on other side you have maintenance. So, to combine both these things. That how maintenance can provide good quality output, the concept of total productive maintenance is also a very important factor for world class manufacturing.

So, this is also actually doing the continuous improvement of product quality. This also helps us in improving the operational efficiency. It also gives you a very important thing, capacity assurance and safety. These are 2 very important things. Now, when you have a proper maintenance system, you know that how much capacity will be available to you at a particular time.

If I am running a hydro turbine project. And in that hydro turbine project, I have 4 turbines. So, I know that what is the maintenance schedule of those turbines. And accordingly, I can tell my network that this much power will be available during these days. Because my 1 turbine or 2 turbine will be under going through maintenance activity. So, your capacity assurance will be very well defined if you implement the TPM type of concept.

We will be discussing this TPM in more detail in our 1 of the session, where we will like to focus on 1 of the important measurement related to TPM, that is OEE, overall equipment efficiency. And this overall equipment efficiency will be a very comprehensive concept to determine the productivity on the basis of maintenance activities. Then, another important critical factor as we discussed is the customer relationship management, CRM.

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Now, this CRM is normally considered to be a marketing management activity. That customer relationship is the important duty of your marketing function. But the products which are produced; these are the responsibilities of your operation department. And unless until you produce a product as per the requirements of the customer, marketing function cannot develop a good customer relationship.

So, there is a important role of operations also in developing sound CRM. Now, CRM in present circumstances, is a combination of people, process and technology. So, though it is a people centric approach, you are developing relations with your customers, but it requires proper processes. And particularly with the help of information technology, with the help of IT and internet, we are able to achieve higher level of customer relationships.

So, this provides a good way to understand your customer. And according to needs of customer, you can support your business strategy, you can profile your products which are required by the customer. Then, there are certain important outcome of your customer relationship management activities. That it improves the efficiency, it helps you in reducing the cost;

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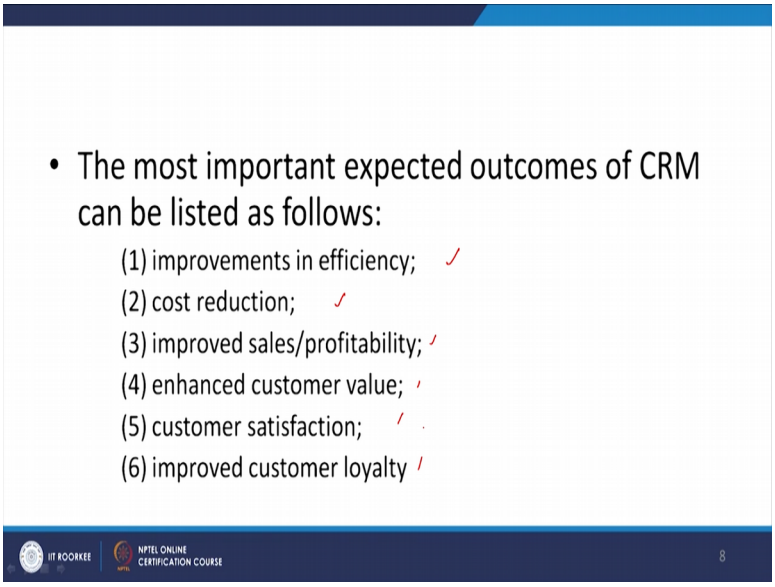

Improved sales profitability, enhanced customer value, customer satisfaction and customer loyalty. So, these are the important outcome of your customer relationship management. This is all related to how you are able to develop a long-term relationship with your customer. Because if you have 1 existing customer, the cost of offering the product, cost of distributing that product is very less.

And when you add a new customer to your market, that cost is significantly high. So, whenever a new customer comes to your market, you do not get much profit. But when your existing customer goes for repeat purchases, you get very high ROI. So, the efficiency in your profit will be much higher if you have a sound customer relationship management. So, that is the outcome related to CRM activities.

Then, another important critical factor which is particularly important in current circumstances; that is the environmental responsible manufacturing. As I said that sustainable manufacturing practices and sustainable particularly in the light of this environmental issues has become a very important challenge.

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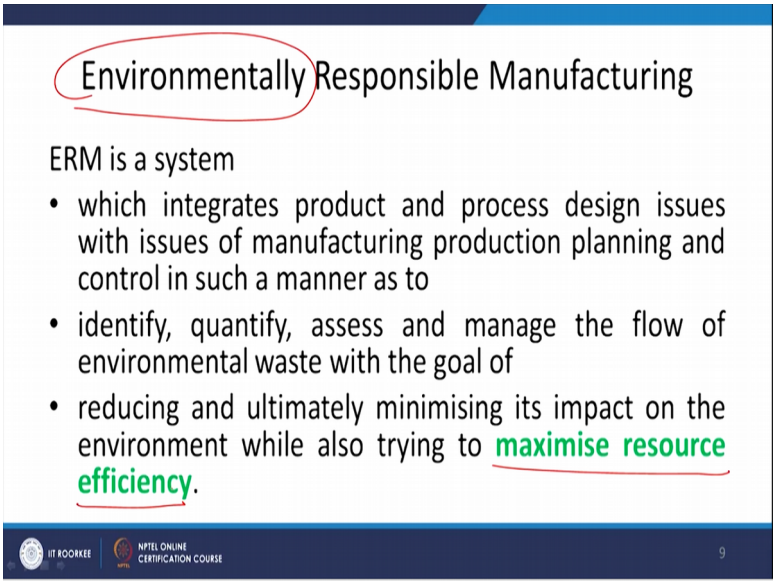

On 1 side, we need more and more manufacturing activities to fulfil the requirements of the large population of this world. But on the other side, we also need to keep a balance between our requirements and the availability of the natural resources. So, for that purpose, we need environmentally responsible manufacturing. And this environmentally responsible manufacturing is basically dealing towards resource efficiency.

That how to have more and more resource efficiency in our uses. Like we take an example of uses of water in agriculture. So, on 1 side, we all know is the example of Israel. And on the other side we have example of India. Now, in India, we have almost 0 efficiency in our irrigation activities. And there is a highest level of efficiency, that is a benchmark of using water in the irrigation purpose in Israel farms.

Now, that type of resource efficiency is required in all the stages of manufacturing. So, on 1 side, this will produce less pollution in the environment. And at the same time, this will reduce the consumption of hazardous material. And your manufacturing will be more environmentally sustainable. So, that is also a very important critical factor for today's world class manufacturing organization.

That how far you are able to keep or you are able to contribute towards the betterment of the environment. So, with this, we discussed various factors which are responsible or which are to be considered for world class manufacturing. And in our subsequent sessions, we will further be elaborating on individual tools. That how these tools can be implemented in our

organizations, so that we can use manufacturing for our competitiveness. So, with this, thank you very much.