

Manufacturing Strategy
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Module - 8
Lecture - 37
Toyota Production System I

Welcome friends. So, we are in the last week of this course on manufacturing strategy. As we discussed in last sessions that we will be using some practical examples to discuss the concept of manufacturing strategy. How some of the organizations have used their operational strategy as a competitive weapon. And when we discuss this particular concept, the name of Toyota company comes to our mind at the very first stage.

Toyota is a burning example that how an organization can use operations profile, operations activities for attaining the world class status. And it is not only world class in respect of manufacturing, but the overall excellence status for the organization based on manufacturing inputs. So therefore, in our last sessions; now we are going to discuss these types of examples that what are the important things, that how they developed their unique manufacturing strategy which helped these organizations to achieve such an important impressive growth and sustained growth over a period of time.

We all know about Toyota company. It is coming from the Japan. And which is a very small country as compared to countries like U.S.A., as country like India, as countries like China. But because of their ability to achieve a very high level of operational performance, Toyota is currently the one of the top 3 automobile companies in the world. And in this particular session, we will be seeing that how Toyota achieved, what is the secret of that success. And when we start this concept of Toyota production system, some of us call it as Toyota Way also.

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The Toyota Way

The key to the Toyota Way and what makes Toyota stand out is not any of the individual elements.... But what is important is having all the elements together as a system. It must be practiced every day in a very consistent manner-not in spurts.

JIT+KAIZEN+KANBAN+...

So, now the Toyota Way is a very impressive thing, where they focus less on tools but more on teams; less on tools but more on leadership; less on tool but more on implementation. So, the success of Toyota is about, how have they developed their teams over a period of time; how are they able to maintain a consistent leadership; and more important, how are they able to implement the tools and techniques.

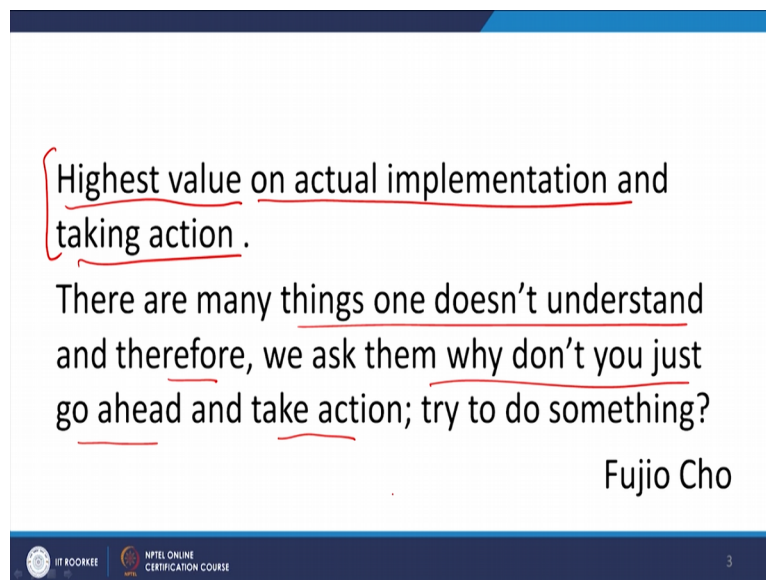
So, the implementation is very very important and when somebody says about Toyota, so they say that, Toyota Way is not about a particular element of your world class manufacturing. Or you talk of only JIT, you talk of only Kaizen, you talk of only TQM, you talk of only TPM. No. It is not about these individual elements. But it is having all the elements together as a system.

So, how are you able to put these different concepts which are known as individual success mantras. So, how you put all these success mantras into a system. So, that is the beauty of this Toyota production system. That having all the elements together as part of your system. And it must be practiced everyday, in a very consistent manner, not in just bits and pieces. So, that is very very important that you have a very holistic approach.

Where you are putting different types of concepts. Like you have GIT also, you have Kaizen also, you have Kanban also; and many more similar concepts. And then, you are putting them under 1 single umbrella of the Toyota Way. And then, you are practicing this Toyota Way on a regular consistent basis. It is not like you do these things on a project basis. Where you do something for achieving a particular objective and then you stop.

Whenever the objectives are repeated, you again start practicing the same thing. But in this particular concept of Toyota Way, we are having a basket of tools. And that basket of tool is known as Toyota Way. And the second thing is, we are continuously pursuing this basket. It is not on intermittent basis. It is on a regular basis. So, there are few important things which are very very critical to the success of Toyota Way.

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Highest value on actual implementation and taking action .

There are many things one doesn't understand and therefore, we ask them why don't you just go ahead and take action; try to do something?

Fujio Cho

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1 important thing is, taking actions; implementation of the tools. Many of us know many good things. We all know that speaking truth is 1 of the greatest human values. So, there is no lack in the knowledge about human values. But the important thing, how many of us speak truth all the times. So, that is more important when I talk of Toyota Way. That how far you are able to convert your knowledge into actions.

So, in the Toyota Way, the more importance or the highest value is given to the implementation. Highest value is given to implement your knowledge into actions. You are a knowledgeable person; very good. But, whether you are able to implement that knowledge into action, that is more important. So, actions are more important than knowledge. That is one of the important aspect.

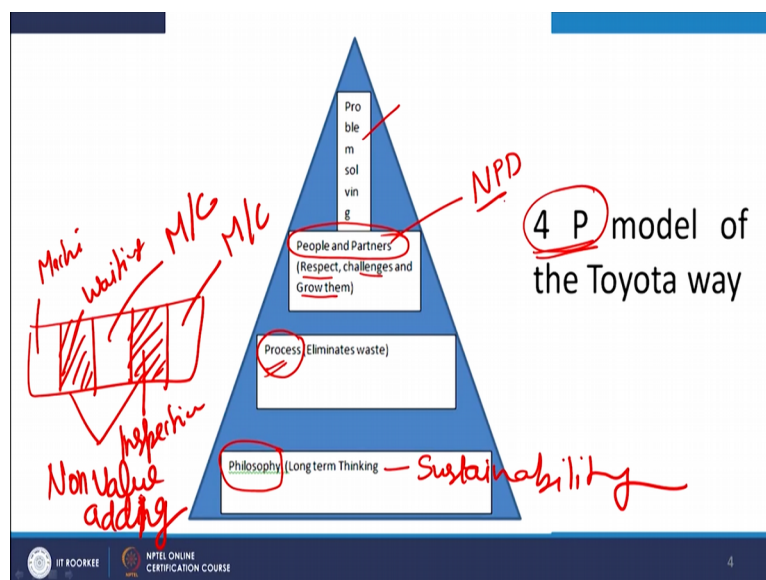
And then, the persons like Fujio Cho, who is one of the top leader in the Toyota hierarchy. He says that there are many things one does not understand. Because you are not able to understand something properly, therefore you will always hesitate to implement these concepts. So, understanding something is not that important. So, there are many things one does not understand.

And therefore, Toyota asked them, why do not you use, just go ahead and take action. So, whatever you know, with that limited knowledge, you start implementing the concept. And while implementing, you will start learning more about that concept. Because, we have that hesitation that I am not completely aware about the concept. So therefore, I will implement this concept only when I am an expert of it.

But the Toyota Way says slightly differently. It says that, whatever you know, you start implementing that. And during implementation stage, you itself will start learning. And this concept is slightly similar to the concept of design thinking. Where we do not invest too much of time in understanding or in analyzing a particular concept. In design thinking also, we keep learning, we keep doing experiment while implementing.

So, the Toyota Way is very close to design thinking concept, where you are not waiting for complete understanding of the concept. But whatever you know, using that particular knowledge, we are trying to go ahead, we are trying to implement our solution. And during the implementation stage, we will be able to learn more and more thing. So, that is the point that Toyota Way is more practical oriented rather theory oriented. So, that is 1 very important thing about the Toyota concept of excellence. Now, to understand the Toyota Way of working;

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We can have this 4 P model. This 4 P model initially looks like your concept of Maslow's need hierarchy. And this Toyota Way is a very simple understanding, that how you can have these 4 Ps. 1 is philosophy, the second is process, third is people and partners and fourth is

your approach for problem solving. So, these are 4 hierarchical labels in your organization. And if you can understand the philosophy of these 4 Ps, you understand the Toyota Way.

Now, let us see what these 4 Ps mean in detail. Now, philosophy, that it is a total game of mindset. It actually focuses on long-term vision. And sometime people say that you can sacrifice short-term financial goals because of your long-term approach. So, many a times, we say that we need low hanging fruits, so that you can motivate people by providing those low hanging fruits.

But Toyota Way is a different approach, where we do not talk of these low hanging fruits. We talk of long-term vision, long-term success of the organization. So, you can say that sustainability is a very important and at core of this Toyota Way. Without sustainability, you are not going into the path of Toyota system of manufacturing. So, you need to have a long-term vision.

And you should be ready to sacrifice some of your immediate benefits for achieving that long-term goal. So, that is the philosophical level that what is it about. Then the second important thing; Toyota Way is very close to lean thinking, to elimination of waste. That is another very important thing. So, the second important focus is on the process. In our earlier approaches, we were focusing more about value adding things.

That we must improve our value addition activities. We need to improve our value adding time. Here, there is a shift in the thinking. That we need to eliminate the non-value adding time. You see, there are some processes which we are doing in our organization. And out of these processes, here it is some machining activity, it is waiting activity, then it is again some kind of machining activity.

Then it is inspection. Then again, it is some kind of machining activity. So, wherever we are doing machining, these are value adding activities. But these waiting and these inspection activities are my non-value activities; non-value adding activities. And when these non-value adding activities are there, it means I have scope of elimination of some of the waste. These non-value adding activities are waste.

And I have scope of elimination of these waste. And I can have my improved processes. So, the focus is on how to improve your processes, how to eliminate the waste. And in our earlier sessions on lean thinking, lean manufacturing, we have discussed the different types of waste which are there in the organizations. So, this time, the waiting time, the inspection time, idle time, all these are the types of waste with respect to time.

So, there are many such waste in the production processes. And we need to eliminate those waste. So, that is another important thing. You need not focus only on value adding activities. Rather, the focus has to shift to those non-value adding activities. And then, once you understand these non-value adding activities, the next step will be to eliminate those waste activities. Those waste which you are generating in your processes.

So, that is second important thing. The third important thing is about people and partners. That is one of the very important thing. If you remember, in 2 sessions we have already discussed about the role of human resource in achieving the world class manufacturing. And even in the Toyota Way also, we talk of people and partners. That the employees, those who are working in my organization, I need to achieve total employee involvement with respect to those employees.

And the second important thing, the partnership. Those, my suppliers, my customers, I need to treat them with respect. I need to give them new challenges. And when I give them new challenges, they feel empowered. That yes, my partner is understanding my capability of achieving the higher values of achievements. And when I set new targets, when I set new challenges for them, they feel elevated.

And that is 1 way to involve my people from the supply chain in my activities. If I am developing a new product; this is respecting your partner particularly helps in aspects of new product development. When I am going for new product development, I require lot of help from my vendors, I require lot of help from my distributors. Now, without respecting them, I cannot expect that they will contribute towards the success of my new products.

And how they will succeed; how will they provide me help in achieving the new product development? I require lot of components. And these components may not be required in large quantities. These components will be required in a very small quantity, so that I can

make prototypes with those components. Now, if I am giving respect and challenge to my vendors, they will be happily providing me components, new varieties, in small quantities.

Which I will be using in making in a new prototype. Now, I require testing of that prototype with my customers. So, if I respect my distributors, they will be helping me to take my this prototype to the customers, so that customers can provide me real time feedback about the use of that product. And therefore, I can go for mass level introduction of the product. So, on 1 side I have vendors, on other side I have distributors.

And there is a particular requirement of respecting and challenging both these sides of my partnerships. And that is why Toyota Way requires not only your own organization or intra-organization partnerships, but it require inter-organization partnerships. So, that is the important thing that we need to respect, challenge. And then, we need to think that how all of us will grow together.

And then, the fourth important P is the problem solving. How to have a approach towards solution of the problem? Many a times, you must have observed around you, that we are running away from the problem. We try to hide problems under the carpet. And when we are hiding the problems under the carpet, problem is only going to magnify over a period of time. And it may magnify to that level, that we may not be able to find solution after sometime.

So, it is very important that we understand the approach towards solving the problem. We need to bring problems to the surface, so that, once you see the problem, that what is actually this problem all about, then you can find the solution of the problem. But if you do not have any mechanism to bring problems to the surface, then all the time you will be having huge number of problems chasing to you for solution.

And this will create lot of imbalance in your organization. You will not be able to focus on long-term vision for the organization. And you will only be working in a war type of atmosphere for looking solutions towards these daily problems. So, it is very important that how are you able to identify problems on a regular basis. Identifying problems, bringing problems to the surface is almost 50% job done in the problem solving.

Once you know that, what is the problem to be solved? Like in India, take 1 example which is not related to manufacturing exactly. But if I say that there are large number of problems which are hindering the progress of our nation. Now, when I am saying that there are large number of problems. So, it is a very very subjective kind of statement. It is a very kind of vague statement. It does not have any substance.

Now, I need to have some kind of specific mechanism through which I can identify a problem. That there is a problem in our primary education system. There is a problem in our health care system. There is a problem in our governance to citizen services. So, if I can identify a particular problem and what is the specific problem in the primary education center. Children are not willing to go to school or teacher is not willing to teach students.

Or there is not proper infrastructure. So, if I go to that particular level of identification of problem, then solution is very easy. But if I do not have any mechanism to identify the problem, how will I solve it? So, that is a very important critical point of Toyota Way, that Toyota Way is a way through which you can continuously identify, you can continuously bring problems to the surface, so that you can identify the solution.

So, these are the 4 Ps. There is a philosophy. And you should be clear about the philosophy, that we are looking for long-term thinking. The second is, how to strengthen your processes, so that you can eliminate waste from your system. Third is about people and partnerships; how you respect, challenge and grow with them. That is important thing. Because you are developing them as your partners.

So, it is not about your individual progress, rather you want to have a progress with your team. And in that team, you have individuals, those employees who are working in your organization. And you have organizations also in that team, those who are your partners, your vendors and your distributors on the other side. And then, the fourth P is the problem solving. How are you bringing problems to the surface, so that you can identify the solution of those problems.

So, these are the 4 P model of Toyota Way. And if we want to achieve success in the modern manufacturing era which is full of complexity; so, if you follow this approach, you will get good amount of success.

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Tools and Techniques	Actual Success came from
Just in Time	Deeper <u>business philosophy</u> based on its <u>understanding of people and human motivation.</u>
Kaizen	
One piece flow	
Jidoka	

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Now, just to emphasize this particular point that there are large number of tools. I am just giving you 3, 4 names of tools, but you can add many more. Like, just in time is 1 particular tool which is extensively used in Toyota system. Kaizen, the continuous improvement activities, very regularly used. In fact, these tools which I am just mentioning: just in time, Kaizen, One piece flow, which is core of Toyota production system.

Jidoka: how to eliminate the waste. All these things are important tools and techniques for Toyota production system. But, the success of Toyota is not attributed for implementation of these tools or for knowing about these tools or identifying these tools. But actual success came from deeper business philosophy. The philosophy, if you are able to understand properly based on its understanding of people and human motivation.

So, there are, you see in our 4 P models, there are 2 things. 1 is process and another is problem solving. So, you can say the process is related to tools, problem solving is also related to tools. While philosophy and people and partner; these 2 things are related to your implementation. So, actual success came that, how are you able to motivate a team? You see, in all automobiles, we have a system of engine, gear, clutch, etcetera.

And we all know that how to drive a vehicle. But some of us are very good driver and some of us are not so good driver. So, how are we able to implement the philosophy? That is the reason of success or failure. So, same thing is in this 4 P model. That your understanding of

philosophy, your ability to take people along you, your ability to take partners along you. So, these are the important reason for success.

And all organizations are aware about what is just in time; what is continuous improvement; what is One piece flow system; what is the Jidoka; what is Six Sigma; what is TQM; what is TPM; all of us know these things. But all of us are not very clear about the business philosophy. That deep rooted business philosophy is not known to all the employees in an organization. They are having no system of proper organizational communication.

So therefore, there is a disparity between the status, between the understanding of your business philosophy. And therefore, all your people and human employees, etcetera are not equally motivated to implement these tools. And therefore, some of the organizations are not so successful. Then, when we talk of TPS, Toyota production system; the lean system, the lean manufacturing is you can say synonyms to Toyota production system.

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TPS and Lean Production

- Often the best thing you can do is to idle a machine and stop producing parts. *for avoiding overproduction*
- Often it is best to build up an inventory of finished goods in order to level out the production schedule, rather than produce according to the actual fluctuating demand of customer orders.

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Now, when I talk of lean. So, normally, the meaning of lean is to eliminate the waste. But, there are few important things which we need to understand when we are talking of philosophy of Toyota production system. Now the philosophy of Toyota production system and lean concept, if we merge together, then probably we can understand lean in a much wider way also.

Now, the first important thing about this, you can say matching of Toyota production system and lean production system is that, the best thing you can do is to idle a machine and stop

producing parts. This is 1 possible way when we are talking of lean and Toyota production system. Because, if you are able to think that I can go to stopping of a machine and I will not produce any product, this is going to eliminate the waste related to overproduction.

So, for avoiding overproduction, you can go to this extent that you can switch off your machine. And this machine will not produce any part. So, if you have this level of clarity that lean and Toyota production system will contribute for non-functioning of a machine, that is elimination of overproduction. So, that type of extreme situation can also come when we are linking Toyota production system and lean production system.

The other possibility is; often it is best to build up an inventory of finished goods in order to level out the production schedule, rather than produce according to the actual fluctuating demand of customer order. This is another extreme. When we are saying lean system, we say that we need to produce as per the customer order. And we should not keep or we should keep minimum inventory of finished goods.

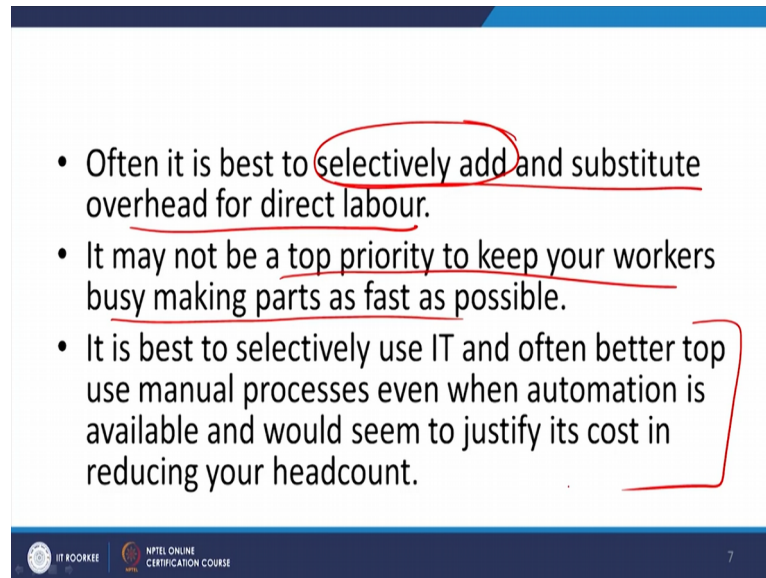
So, whenever, because lean supports pull system of manufacturing; so, whenever there is a order, you will produce it. And this will minimize your finished goods inventory. But, apart from this, if you mix the concept of Toyota production system, you need to have a concept where you are continuously running your system at a particular level of production output, so that, very often, switch on the production system, switch off the production system can be avoided.

Because if you have some time high order, some time low order. So, some time you may work on a overtime basis, sometime your machines are off. And because of that fluctuations, lot of uncertainties will be there. So, another important thing which is not normally understood, that in lean and TPS, if we combine these 2 things, we will like to even accept some amount of finished goods inventory.

Because that is going to help us in some kind of regularity, in some kind of, some predictability will be there in the organization. Otherwise, if you are too much customer oriented, lot of uncertainties will be there, lot of unpredictability will be there. And as a result of that, production will have huge amount of fluctuations. So, that fluctuations are not good. And that is another important meaning of lean.

So, when I am saying lean, it does not mean that you should produce more fluctuations in your production system. We need to minimize that fluctuation. And for that purpose, some finished goods inventory is also acceptable. Then, another important thing with respect to combination of Toyota production system and lean system is that;

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A slide with a white background and a blue header and footer. The slide contains three bullet points. The first bullet point is "Often it is best to selectively add and substitute overhead for direct labour." The words "selectively add" are circled in red. The second bullet point is "It may not be a top priority to keep your workers busy making parts as fast as possible." The words "top priority" are underlined in red. The third bullet point is "It is best to selectively use IT and often better top use manual processes even when automation is available and would seem to justify its cost in reducing your headcount." A red bracket is drawn around the entire third bullet point. The footer contains the logos for IIT ROORKEE and INTEL ONLINE CERTIFICATION COURSE, and the number 7.

- Often it is best to selectively add and substitute overhead for direct labour.
- It may not be a top priority to keep your workers busy making parts as fast as possible.
- It is best to selectively use IT and often better top use manual processes even when automation is available and would seem to justify its cost in reducing your headcount.

Often it is best to selectively add and substitute overhead for direct labour. Sometime, we try to minimize the direct labour. But you need to see that, in doing though, we should not be very random in reducing the direct labour. Rather, it can also be possible that you can selectively add some more employees in your organization who can provide more specialized knowledge to your organization.

And with that selectively adding more employees, it is quite possible that you are able to reduce your overheads. So, everything is not possible. You can say that, this point leads to reduction of waste due to automation. So, if you have highly automation in your organization, it may lead to more waste. So, if you have more skilled manpower, more skilled labour in your organization to some extent, you can reduce the waste generated because of over automation.

So, what is that limit of automation? And for that purpose, it is possible to have or to hire more expert people. So, you see, I just gave you 3 important points which are you can say against the conventional myth related to lean production. So, we need to understand that lean is not just about a particular implementation of elimination of waste, rather it has to be seen in the overall organizational context.

And that overall organizational context may come with the concepts like Toyota Way of working. So, you will have more usefulness from the concepts of lean manufacturing when you combine it with Toyota philosophy. Then, many a times, you see that all my workers should be busy, all my machines should be busy. If they all are keeping their heads continuously down, then means they are engaged.

And I have a very good lean system. I am getting my good efficiency productivity in the organization. But, it is not very important in a lean system or it is not that important priority to keep your employees all the time busy. You may give them some free time also. And it will help your organization to get more creative solutions. So, that is another important thing that, do not keep top priority for keeping your workers busy all the time, so that you can respond to customer's requirement as soon as possible.

Then, another important thing is, it is best to selectively use information technology and often better to use manual processes when automation is available and would seem to justify its cost in reducing over headcounts. So, some of your activities which you can do using automation can be given to employees, can be given to your workers. And with this, you are able to take care of 2 things. 1 is about the excessive cost of automation.

For particularly small and medium organizations in India, the cost of automation is really very heavy. And they may not like to go for that heavy investments in putting lot of automation in the organization. So, you can think of, that what are those task where you can do automation but you are not doing automation; rather you are using employees for those task. So, it is also good sometime that some of the activities where you can go for IT and automation you are doing manually.

So, the Toyota system and this lean manufacturing system is not against employees. It is giving highest degree of respect to your employees. It is creating challenge for them. And when you are challenging the skills, when you are challenging the productivity level of your employees, you will see that they will be giving you results which you have not thought even. So, that is another important point when we talk of TPS and lean in 1 particular line.

Now, when we are talking of lean and Toyota production system, that we very specifically see normally, that what is value and what is not value from the organization's point of view, from

firm's point of view. Because, wherever I feel the cost is increasing, I feel that these are non-value adding activities.

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What value are we adding from the customer's perspective?

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But, in the real sense, we need to see value from the customer's perspective. That what are the things where customer feels this is a value or this is not a value. If I am serving a product for below poverty line or for bottom of pyramid customers; so, I need to be very specific about what type of features I am giving them. Because they do not like large number of features in their products.

They want very specific features which can serve their limited purpose. But what happens normally, you are giving too many features. And then, most of those features are not reliable. So, you actually lend to less amount of customer satisfaction. So, you have to be clear that value needs to be provided from the customer's point of view, not from the firm's point of view.

And when you can understand all these things from the customer's point of view and you can respect your employees, you are clear about the philosophy of the organization, then you can implement Toyota system in your organization. In our next session, we will be discussing some very specific principles of Toyota production system. And that will be the part 2 of this example or the real life case study which will help us in implementation of manufacturing strategy or manufacturing for our competitive people. Thank you very much.