

Toyota Production System
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Module No # 01
Lecture No # 02
Global Environment

Welcome friends, this is the second session of this course on Toyota production system. In our last session we discussed that Toyota production system is a philosophy which is basically based on elimination of waste from your processes. We discussed particularly that the concept originated from a manufacturing organization, but considering the wide applicability of the concept it can be used by agricultural or by services organizations also.

And we discuss particularly that how that processing part is the key of the Toyota Production System where we need to identify value adding activities and non-value adding activities and then to eliminate those non-value adding activities is the key task of Toyota production system. But why there is in need of manufacturing excellence? Why we are so much fussy about improving our manufacturing systems or for that matter, any kind of system.

So, we need to see that all through the globe there is a typical changes which are happening and you have to respond to those changes without responding to those changes. And I will like to take you one step ahead that you have to be proactive with respect to those changes, you have to be flag bearer, you have to lead those changes at when you can lead those changes, you will be one of the top economy of the world.

When you are always in a reactive mode somebody else has done therefore, I should also do this, then you will not be able to take the benefit of these kind of philosophies you should identify that how can I be ahead of others and when I can be ahead of others, I can certainly enjoy a competitive advantage. In this particular course, we are seeing primarily that how manufacturing can provide you that competitive advantage.

And therefore, our focus is largely on manufacturing related examples. But as I said in the previous session, that services and agricultural activities can also be seen from the same optics

and in this particular session, we are going to focus that how the global environment is behaving at this time, what are the key characteristics, what are the key learning's for us, which will help us to apply this TPS into our organizations.

And this will also give us a broader understanding about the business environment and some of the macro trends which are part of our discussion. Now three important global shifts are taking place.

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Global Shifts

- Deflation in factor costs ①
- Decline of China ②
- New Manufacturing Locations ③

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Now, one important global shift is with respect to deflation in factor cost, we will discuss in detail about this. I am trying to identify the second important shift because this is with respect to manufacturing decline of China. Decline of China as a major manufacturing hub of the world is another important thing which is happening. And people in different countries they should understand that there is an opportunity, if decline of China is happening with respect to manufacturing output, there is an inherent opportunity for other nations to take the benefit of this decline of China.

And the third shift which is actually the result of this second one as a result of decline of China new manufacturing locations are coming up the major reason of China's growth in the manufacturing sector was its low cost of production. Now some of the other economies are also able to provide this similar kind of advantage. And these new economies these underdeveloped

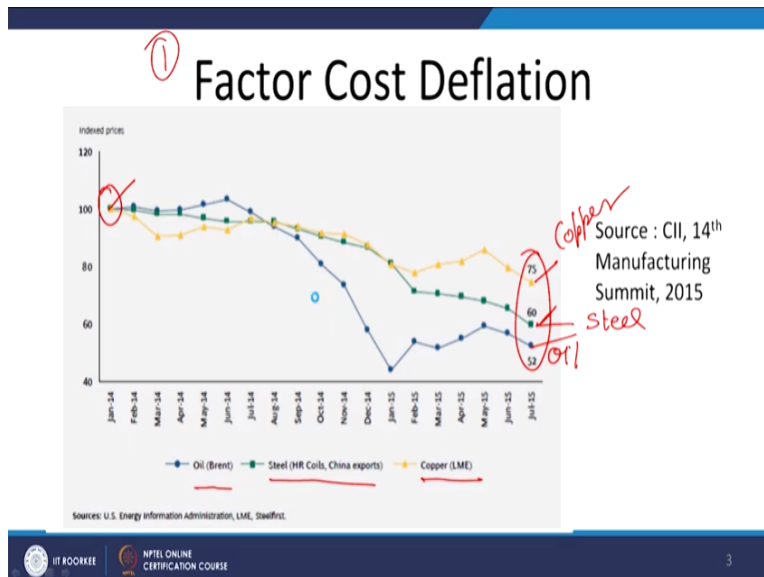
economies, which are now understanding that how this low cost of production can be a major advantage in the world, they are developing their internal systems.

So that they can become a possible alternate to China and the decline of China will shift that opportunity to these new manufacturing locations. So, these are the three important shifts, which are happening, the deflation in factor caused the decline of China and the emergence of some new manufacturing locations particularly with respect to low cost, because the China is known for its low cost advantage.

And the Chinese growth is such a powerful growth that in fact, to some extent, it overshadowed the Japanese advantage of quality with low cost. So, it is only focusing on low cost and we have seen in last few decades, at least the last one decade that how Chinese products have filled the entire global market, whether you travel to USA, you travelled to Japan, you travel to UK you travel to other European countries, everywhere you find Chinese products.

So, that is something phenomenal, but because the advantage was based only on low cost so, now that slowly the new order winners are coming and order winning capability of low cost from the Chinese organization is being taken by some of the new manufacturing locations also. Now going into the detail of these three major shifts. So, the first is deflation of factor cost.

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So, this deflation of factor cost, if I see now, this data, I am presenting from CII's 14th manufacturing summit, and in that, if you see that, this data is available from January 14 to July 15 and almost for all the products, whether it is copper, whether it is steel, whether it is oil, for all these products, you see there is a decrease in cost particularly for some of the products like oil the costs reduced to a very low level in January 15.

But the as you compare from January 14 level to July 15 level, there is a significant decrease in the cost of all the products. So, for the sake of comparison, you can understand that the index price of oil was taken as 100 and it came to 52 almost you can understand a 50% decrease in the cost of oil from January 14 level to July 15 level. So, within one and a half year, the price came to such a low level.

Then you take steel in steel also this green line is representing the steel. So, if I am taking the index prize at the hundred level, it came to 60 that is the steel this blue is oil, this is steel and this is copper. So, you see that, there is a 40% decrease in the price of steel, there is a 25% decrease in the price of copper. So, all these three important commodities, which are input to my manufacturing sector, these are having a significant drop in their prices oil by almost 50% is still by 40% copper by 25%.

And as a result, this is going to impact the manufacturing activities across the globe. Because now how you are able to capitalize you are you should be able to flexible enough so that you take benefit of this reduction in cost and as a result, you should be able to take the competitive advantage into your head you should take the advantage of first mover. So, this is happening and this decrease in cost this pattern is to be understood by the organization.

As we go ahead in our discussions a lot of tools techniques with forecast with the help of economic data that can be used in the manufacturing also and concepts like learning curve etc can also be used in this which will help us to project the future costs, future prices for our output. So, that is one important thing. And now we could see with the help of this data for three important inputs raw materials, which are used in the manufacturing that how the significantly cost has decreased over these 18 months period.

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- Because of strong consumer demand in countries like India, prices of end products have not fallen.
- Decreasing cost of input resources and same level of output pricing have resulted in additional margin for manufacturers.

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Now, when you go to analysis of this particular cost deflation, you see that in though there is a significant decrease in the cost of the input materials, but because of the consumer economies. Consumer economies like India is a consumer economy prices of end products have not fallen relatively. If you see the price of one input material that is steel has reduced by 40%.

So, did we notice that correspondingly the price of output maybe steel is used in cars in motorcycles in various other type of electronic products like refrigerators, your computers etc. So, have these products being relatively cheaper, because of this, that has not happened, why because of the strong demand is there. So now what the manufacturer feels that when the demand is already there so why I should enjoy the higher profits.

And here comes that catch that there may be some manufacturer who can pass this benefit it of reduced lower cost to the customers while some may not. But since India is more like a consumer based economy, this has not happened in India. Now, another important thing, which requires your attention that decreasing cost of input resources and same level of output pricing have resulted in additional margin for manufacturers.

Now, this particular point says that because of this, because the input cost has reduced the output or the end prices have not changed, you have additional margins. So, therefore, this shows the attractiveness of manufacturing that is one important thing that manufacturing has become

attractive, particularly in countries like India, where we have strong consumer demand and prices have not fallen input cost has fallen.

And therefore, now you have higher margins earlier your margins were like this, and many of manufacturers were feeling that it is not attractive proposition to be into the manufacturing. But now, when this gap is increasing, when your output prices are same, and your input cost has fallen, so, this gap has increased and as a result of that gap, it has revived the attractiveness of manufacturing.

So, therefore, it is a very important thing that we understand that manufacturing has become attractive again, it was attractive once upon a time, but then attractiveness was taken by the services sector, because of the shift that how the factor prices are decreasing the attractiveness of manufacturing has come again and we need to actually understand.

That how we can take the advantage that we need to make this understand to our manufacturers or to our small medium large organizations, that you are now in a better position to earn profit, which you can invest for better research and development for involving into the better technologies better managerial techniques, and that all is possible by this additional margin which is possible because of decreasing the cost of input resources.

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Q: **Chinese Magic**

- In 1990s China contributed around 3% of global manufacturing output.

Factor cost advantage and Chinese Government efforts for orchestrate infrastructure and inputs for large scale production

- Presently China contributes more than quarter of global manufacturing output. *→ 25%*

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Now, the second issue is with respect to Chinese magic, we all know that China is another important reason for lot of discussion in manufacturing sector because of this Chinese magic lot of debate, lot of discussions are happening particularly in India, we all the time compare the happenings of Indian economy with respect to Chinese economy. And in China, large number of things are happening only to reduce the cost of your end product.

And their logic is that if cost is low, customers will automatically purchase the product and to some extent, they are successful also in this particular drive that people forget about quality, people do not think of guarantee, warranty or any other kind of thing, just focusing on low cost the Chinese products are able to capture large part of the market in the entire globe. Now because of this many countries have a very negative impact on their domestic manufacturing activities.

And if data says that in 1990's, China contributed somewhere around 3% of global manufacturing output. So, that was the situation in 1990's. And if I talk presently, China contributes more than a quarter of global manufacturing output. So, you see that in just 25 years from 1990's to present time, China's contribution to the global manufacturing has increased from 3% to a quarter that is somewhere around 25%.

So, China alone is contributing that much to the global manufacturing output and what is the secret nobody is able to decipher that correctly. We know a lot of things about Japanese organizations, a lot of research is happening. But unfortunately, we are not that much confident about the Chinese magic of low cost. So, people say different things about how China is able to reduce the cost of their input resources, how they are able to manage the cost of their processes.

And as a result, the final output cost is also very, very competitive. But fact of the matter is that presently China has contributed around 25% of the global manufacturing output, but slowly we are able to see that there is a sign of decline in this Chinese magic. The share of 25% is now slightly on reducing side and that is as I mentioned, is a sign of opportunity for other economies, those economies which are particularly looking for some kind of opportunities in the manufacturing sector.

Particularly if I see from India's point of view, when we want to increase the contribution of manufacturing in overall GDP of our country to 25% this is one very, very attractive proposition

and we need to capitalize this particular time when Chinese economy is slightly loosening up on the manufacturing sector and some of the opportunities are going here and there. So, we need to be very much ready to take that advantage.

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Decline of Chinese Magic

- Chinese Manufacturing started as supply of labor intensive, lower technology products.
- Chinese manufacturing has now entered into design and development of sophisticated engineering products.
- Though China continues to dominate the world in manufacturing, its proposition is no longer as compelling to companies, including Chinese companies, that are looking to expand their footprint beyond China.

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Now, what is happening in the China, if we see in slightly more detail, you see that Chinese manufacturing started as supply of Labor intensive and lower technology products, because of a large number of human resource available in China. So, their initial focus was on labor intensive products, those products where you can use more and more Labor. So, it became a good source of employment.

And that is how low technology products so, in India like we know that a lot of toys a lot of you can say products, which are of low technology are coming from China etc., lot of items of interior decoration are coming from China. So, these are those products, which are more labor intensive and does not require any rocket science for their production. And now, from this China has now entered into the design and development of sophisticated engineering projects.

Initially they started with low energy products, but now China is more into engineering products. Now they are supplying turbines engines and they are ready to supply any kind of sophisticated engineering products. In India also good number of new power plants are having Chinese generators, Chinese turbines. So, China is no longer limiting itself to low technology products, rather it is moving into the other competent products also.

Now if you see because of these two things, China is still dominating it is a force to be considered rather seriously considered dominate the world in manufacturing its proposition is no longer as compelling to companies, including Chinese companies that are looking to expand their footprint beyond China. Now because there are certain issues Chinese laborers they are also started asking for higher wages.

China is also required to invest heavily on research and development because of their entry into the sophisticated engineering products and also these things are increasing the cost of Chinese products. So, they are proposition of low cost is not that compelling to other countries, which it used to be when they were only into the labor intensive low technology products.

As you go into the more sophisticated technology products, obviously, you need to invest into the research and development and when Chinese labor they got employment initially, so, when you get initial employment, you had no conditions, but when you see that, no way organizations have started earning good money. So, you will also raise your voice for higher wages. So, these things are happening in China.

And as a result of that, the new proposition is not very, very compelling and it is not like a threat, which it was few years back and this particular graph gives you an idea that how manufacturing is declining in China. So like if you see from this is from Chinese source itself for National Bureau of Statistics, if you see this data from January 2014 to September 2015, you can clearly see that the Chinese manufacturing production growth is continuously declining, it was around 10% that was the rate of Chinese output.

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Declining Manufacturing Growth in China



And in September of 15, the growth came to just 6.8%. So, they were growing their manufacturing sector was growing at the rate of 10% in 14 2014, and slowly and slowly in that period of 18, 20 months, the growth has come from 10.4% to 6.8% so almost a drop of around 4% in their manufacturing output growth. So which is a very significant and if you see particularly the period of July 2014.

So, growth decreased all of a sudden from 10% to 8%. A very significant drop in though it has already touched a low of 6.5% around April 2015. So, what I am trying to say that this particular graph shows that the growth of Chinese manufacturing is not happening as it was happening during 2010 to 2014 that period from 2014 to 2015 continuously there is a declining trend of Chinese manufacturing growth.

So, this is a very positive indicator that how you can take the advantage, how you can take your manufacturing output to fulfill the gap created by decline in Chinese manufacturing output. Now, why China's decline is happening.

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Factors responsible for Chinese Decline

- ① • Inflation in Chinese Wages
- ② • Strengthening Yuan
- ③ • Cheaper energy in the West
- Declining costs of technology

Now, as I mentioned that there may be one reason that now workers are demanding higher wages. So, there is a chance of inflation in Chinese wages, then, another is because of strengthening of Chinese currency. So, because of strengthening of Chinese currency, the exports are becoming costlier. So, you have less market in the global world then cheaper energy is available in the west.

Lots of research is happening with respect to energy in America as well as in Europe and there are certain non-conventional energy sources, which are coming up Shell gas is one example. And because of these cheaper sources of energy, the cost of production in west is also declining. So, that will somehow affect the Chinese growth and applying the technology is becoming easier day by day.

So, the advantage of low cost by labor intensive operations, where technology is not required, that can be compensated that can be neutralized by low cost of technology adoption. So, the China was having the advantage of labor intensive industries and where technology was less used, but same work can be done by applying the technology and the cost of application of technology is not so high.

So, other countries are able to do that and that can also be a possible reason for decline of Chinese magic. So, these are some of the issues which have contributed for the decline of Chinese magic.

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The slide features a blue header bar at the top. Below it, the title "Newer Manufacturing Destinations" is written in a red, handwritten-style font. To the left of the title is a small red symbol. Below the title, there is a bulleted list of three countries: "• UK", "• Vietnam", and "• Ethiopia". To the right of this list, the word "India" is handwritten in red ink and enclosed in a red rectangular box. At the bottom of the slide, there is a dark blue footer bar containing the logos for "IIT ROORKEE" and "NPTEL ONLINE CERTIFICATION COURSE", along with the number "9" on the right side.

So, as a result of that, if you see some of the new manufacturing destinations, which are coming up UK, which was once upon a time a very popular manufacturing destination, but now again, UK has reviving its manufacturing strength and in Europe particularly, it has become a very popular manufacturing destination, it has created a very good enabling environment to support various manufacturing activities.

If I come to Asia, particularly East Asia, you see that Vietnam, which is a very small nation, that has shown a very interesting footprint and Vietnam is also coming up as a very, very important manufacturing destination in this part of the world. The entire government is creating that kind of enabling environment, which helps Vietnamese to develop good kind of manufacturing infrastructure.

You go to Africa, in that continent, Ethiopia type of countries, that is creating again in a very, very simplified robust infrastructure, because they also realize that it is manufacturing which can give us good support for their economy. And as a result of that, Ethiopia is also coming up and it is not only Ethiopia there are many other African countries, which are giving different types of benefits, if you start some kind of manufacturing activities.

Gabon for an example, they are giving a lot of tax benefits, they are actually during the uninterrupted supply of timber, they are giving you a lot of other benefits also. So, there are

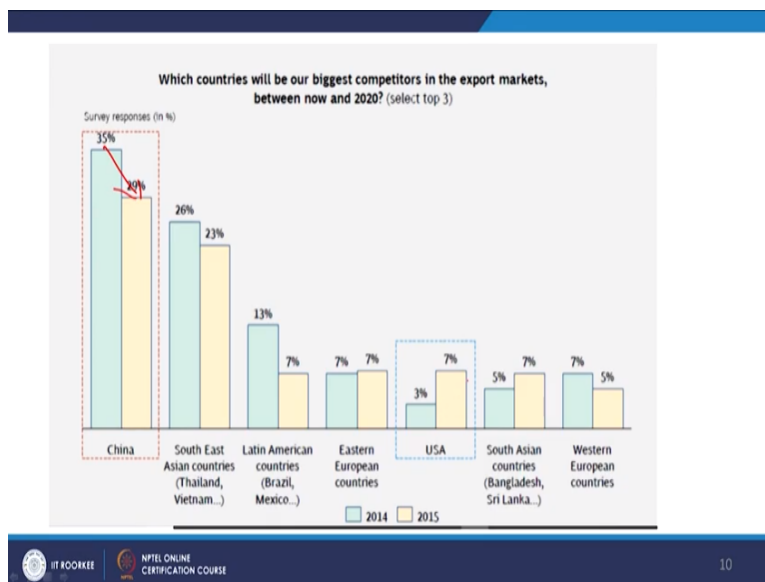
various African nations also, which are trying to capitalize on this opportunity, when the cost of technology is decreasing, when the Chinese magic is also slightly loosening up and people are started to thinking new investment destinations, so that they can take the benefit of those places for developing the manufacturing sector.

So, that is also a major shift, which is happening and I will particularly like to mention that India should also be one of the most attractive manufacturing destination in near future, whenever a new investment has to come, they first consider India and then and if we are able to understand that how Toyota production system becomes the you can say philosophy of manufacturing in this nation.

When excellence becomes the philosophy of manufacturing in this nation, various companies, global leaders of manufacturing will think that India is the most suitable place, because of various other reasons also, we have a very good law and order system, we have very good infrastructure system, we have very good other kind of skill set available in our country. So, all those things will help the global manufacturers to come to India.

So, that is the third major shift, which is happening. Now, if you see the point which I am mentioning, with the help of this data. So, you will see that which countries will be our biggest competitors in the export markets between now and 2020.

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So, now, if you see that biggest you can say competitor, if you see from this particular data. So, China is you can say that having 35% people say that China is one big threat, and it will remain a very important threat in coming future also. But interestingly, South East Asian countries, if I am saying that Chinese magic is slightly decreasing, but you see that countries like Thailand, Vietnam, Hong Kong, all these countries are also our very, very strong threat, because they are representing small nations, but they are representing a very dedicated committed workforces.

So, that is also a matter of concern for us. And in the same period, the only few countries are able to give more competition and one of them is USA, though it is less, but it is increasing from 3% to 7%. And some of the Southeast Asian companies, Southeast Asian Nations, particularly Bangladesh, Sri Lanka, and Bhutan, etc., are also having a significant threat competitor in our export market.

So, this is a you see that how our competitors means we will have some kind of challenge from different competing nations. So, major is China no doubt, but other nations in which these smaller countries have Far East that is there and then the our own five countries are also there. So, we need to see that it is not only China, which is giving you competition, but many other nations are also giving competition.

And we need to prepare for this particular condition in our future that how we are able to compete with these smaller nations, because they also put if you see these Southeast Asian countries plus SAARC countries, so 23 + 7, their force is 30% which is higher than China. So, even if we consider China, but other countries are equally important, if we consider the export market for India.

So with this, we are able to see that what are the global trends, what are the important things which are happening in the market right now, that the cost of input resources are decreasing in China magic is there still it is there, but there is a decline in China magic and some new low cost destinations are coming up like Southeast Asian countries in Africa also in Europe also, we are seeing that how these new destinations are coming up.

So in all these condition, we need to strategize we need to position ourselves and at the same time, we also need to think about the excellence in manufacturing so that we can beat the

competition and that is how we need to understand the application of Toyota production system for the benefit of the organization. With this, we come to end of this session thank you very much.