

Manufacturing Strategy
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Module No. #01
Lecture No. #01
Output Manufacturing

Welcome, friends. We are starting a new course, on a very important subject, the manufacturing strategy. You all may be knowing that, Government of India, is focusing a lot on, make in India campaign. Government feels that, manufacturing is one sector, which can provide employment to large number of youth of this country. Now, when government is looking for the strategic advantage of manufacturing, we also need to see, that how manufacturing can provide, that strategic advantage, to an organisation, to a company.

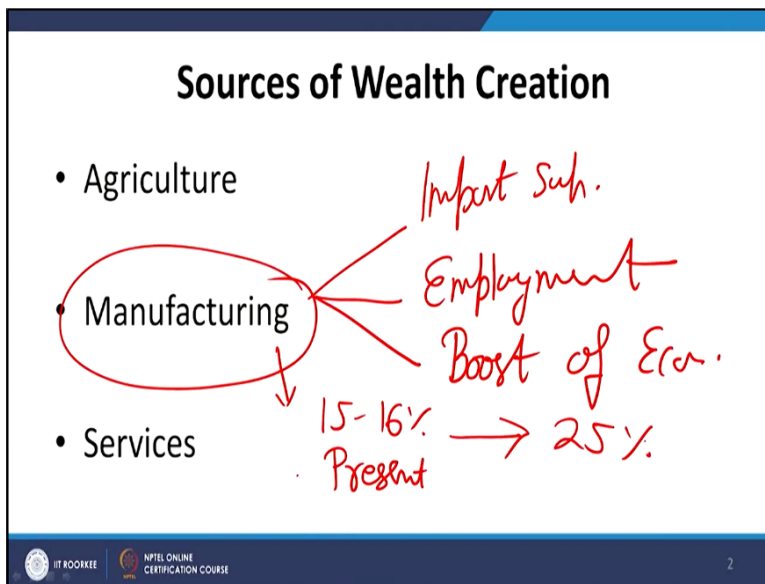
Now, most of the organisations, are marketing driven organisation. We are living in an era, where customer is king. And, manufacturing is considered to be a reactive function, which is meant to fulfil the requirements, as per the marketing of the organisation. Marketing is considered to be, the driving department, and manufacturing is considered to be, fulfilling the requirements of market. But, this subject of manufacturing strategy talks of, that how, manufacturing can also contribute, in the strategic development of the organisation.

And therefore, we need to consider that, not only manufacturing, but all the functional areas of the organisation, can contribute in the strategic advantage, or in providing some kind of competitive advantage, to the organisation. So, in this very course, we are going to see, that how organisations, particularly Indian organisations, can use manufacturing for their competitive advantage. In this session, we are going to discuss that, what are the different dimensions of the manufacturing output. What numbers are propelling, these phenomena of Make in India, in favour of India.

Because, there are more than 100 years of history, of manufacturing evolution. And, unfortunately, India is nowhere, in that 100 years' revolution. Now probably, there is going to come, some kind of golden era, where India can make, a mark on the global manufacturing map.

And therefore, from the India's point of view, it becomes very, very important, to understand the strategic role of manufacturing. Now, when we see that, what are the different sources of wealth creation, since India is always known as, Agrarian Economy.

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So, Agriculture we all know, is the primary source of wealth creation. There was a saying that, India lives in its villages. Most of the Indian population, at the time of independence, were in villages. About 75% of them, were living in the villages. And, most of them, were dependent on Agriculture. But, slowly and slowly, if you see now, that the sizes of our farms, are reducing. And, most of the farmers are becoming, marginal farmers.

So, Agriculture is no longer, remaining a winning proposition. Farmers are not able to enjoy, the hard work, they are able to, they are producing in their fields. So, second important source of wealth creation is, manufacturing. Manufacturing started as a manufacturing revolution, or industrial revolution, from Europe. And, from Europe, it went to USA. And then, to China. And now, China has become, such a powerful manufacturing nation, that about a quarter of worlds global manufacturing output, is coming only from China.

But, there are some rays of hope also. And therefore, we are going to discuss, that how manufacturing can provide, that benefit, that advantage, to other nations, and particular to India also. And then, third important source of wealth creation, that is services. Now, India has

particularly excelled, in this field of services. About, 60% of our GDP, is coming only from the services sector. Most of the services are, IT driven services, where Indian talent, Indian engineers, Indian technocrats, have done something exceptional.

And, all through the globe, whether you talk of Silicon Valley, whether you talk of Europe, whether you talk of Australia, everywhere, Indian engineers are doing progress in the field of IT. But, most of these IT Industries, are dependent on the foreign nations. Their clients, are in Europe, are in America, are in some other part of the world. So, whatever is happening in those countries, is directly going to affect, the Indian IT Industry.

So therefore, to depend on our own economy, our own situation, manufacturing because, India is a largely consumer driven economy. We have huge demand of, almost all kinds of products. And presently, that demand is fulfilled, by the Chinese products. So, there is a good scope, sufficient scope, ample scope, for fulfilling our demand, by domestic production. And therefore, it is very important that, we develop our manufacturing setup.

We develop this vibrant setup, so that, it not only fulfils, the demands of the local consumer. It creates, substitute for the imports. And, it also develops, the local employment. So, with this idea, we are going to focus, on this manufacturing setup, that how manufacturing can provide, import substitution. Then, it can also provide, employment. And then, it will also create, lot of boosted economy. Because, many of the services, which are presently done, for the foreign nationals, will be done for local players.

So, that is the basic idea, of focusing on manufacturing, that how, India's contribution of manufacturing in its GDP, is somewhere between 15 to 16%, present. And, we want to increase it, up to 25% in our GDP. And, for that purpose, we need to see that, how can we leverage our manufacturing sector, how can we boost the manufacturing sector, how can we invite more FDI into manufacturing sector, how can we encourage our local businessmen to start new units within the country.

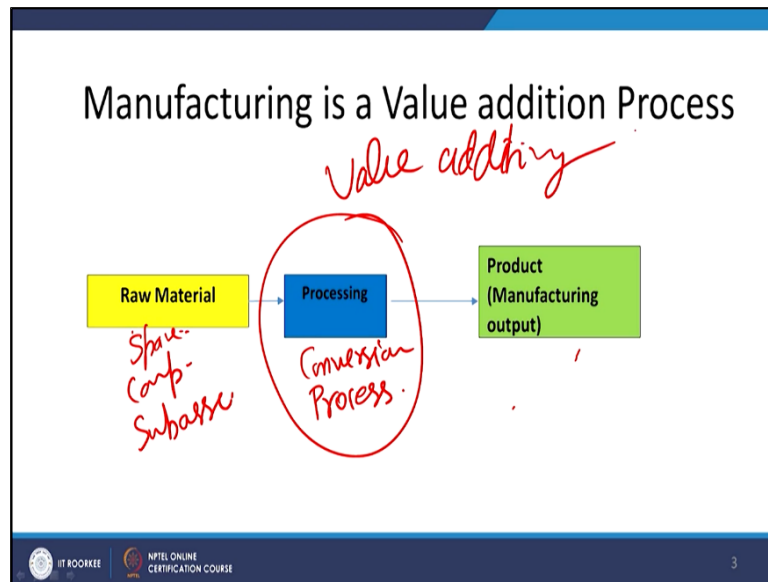
So, that is the whole idea, of the marketing strategy, on one side, which is from the policy point of view. But, at the organisational level also, there are possibilities, that we use manufacturing, for the advantage of organisation. We have, example of Walmart. Where, the success of Walmart, is dependent on its supply chain advantage. The supply chain, which Walmart has developed, that is the core strength, or that is the core reason, for the success of Walmart.

One of the most profitable company, on Fortune 500 is, Apple. The reason of Apple's success, is its ability to innovate. So, each company, when you talk of Apple, when you talk of Walmart, Walmart is the number one company in the Fortune 500, on the basis of turnover. And, the success is because of supply chain. Apple is number one, in the Fortune 500, on the basis of profitability. The reason is, their ability to innovate.

Now, we want that, manufacturing can also contribute, in the success of some organisation. So companies like Toyota, that is the best example to quote that, which company has got tremendous amount of success, because of its manufacturing abilities. Now, we need, that type of abilities, in most of our Indian companies. Unfortunately, that is not the case, at the moment.

So therefore, it is becoming important that, if you want to excel, on the basis of manufacturing, we need to work at two levels. One at the policy level, where we need to create an ecosystem, so that we can promote, concepts like make in India. And, on the organisational level, where we can take the advantage of manufacturing, for getting the competitive advantage for the organisation. So, that is the context in which, we are going to discuss, this whole course.

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Now, what is manufacturing. So, manufacturing is basically defined in, so many authors, in different ways. But, the simplest way to understand manufacturing is, that it is a value addition process. You are doing, some kind of value addition, in the raw material, spare parts, components, subassemblies. These are the inputs. And then, these inputs go for, some kind of conversion process. This processing is, the conversion process. You do some kind of fabrication. You do some kind of assembly work. All these are the physical things.

So, you have raw material, you have components, you have subassemblies, semi-finished components. You do some kind of fabrication, you do some kind of assembly, etcetera. And, as a result, you create manufacturing output, that is the products. So, this is the value addition process. As you are moving from left to right, you see that, you are adding value, in this process. And, that value, is the core of any manufacturing process.

Now, if you are doing processing, where some of the activities, are not value driven activities, then that is going to create problem for your organisation. Problem is, your cost will increase, but your output value will not increase, proportionately. And, that is what, manufacturing strategy means. That, we need to identify that, what are our value addition activities, and what are our non-value adding activities. And, over a period of time, we will try to eliminate, all non-value adding activities. So, it is important that, what is value, and what is not value.

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What is value and what is not?

Value : something which helps in improving customer satisfaction.

Something which is not improving customer satisfaction is non value.



That, we need to understand. And, if we can understand that, what are the values? So again, if we go in to philosophy of value, from our scriptures, to western authors, there are different concepts, which can define value. But, the simplest way, to understand value, in the context of manufacturing, is that something, which is going to help, in improving the customer satisfaction, that is value. And things, which are not going to help, in improving the customer satisfaction, these are non-value.

For example, if we are doing, painting on a job. So because, painting is going to increase, the customer satisfaction. Because, you are doing paint of those colours, which are soothing to the customers. So, painting is a value adding activity. But, if you are storing your products, in between, if your products are in queue, waiting for the processing to happen.

So, this waiting activity, this movement of product from one machine to another machine, these are not adding any value, which are going to help, which are going to increase the customer satisfaction, so therefore, these are non-value adding activities. In our discussion, during this course, we will again and again emphasise, that we need to minimise, these non-value adding activities. So, unnecessary movement of goods in the shop floor, unnecessary queuing of the goods waiting for their processing, and so many similar activities, are non-value activities.

So, we need to see, that as a manufacturing engineer, as a student of management, or as a decision maker in the organisation, we need to differentiate, that what are our value adding activities, what are non-value adding activities, and then we need to continuously focus, in this system of raw material conversion process, and the product. That, in this conversion process, only value adding activities are there. If you are having, non-value adding activities, these are going to damage your manufacturing strategy.

So, one important thing, which is there, that value and non-value. And, continuously, this debate will go on, in our discussion that, what are non-value adding activities. And, we need to eliminate those non-value adding activities, in order to have competitive advantage, from the manufacturer. Now, in the beginning of this course, it is, I think important to discuss, some of the global shifts, which are affecting, the manufacturing landscape. And particularly, I am talking, in the context of India.

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Global Shifts

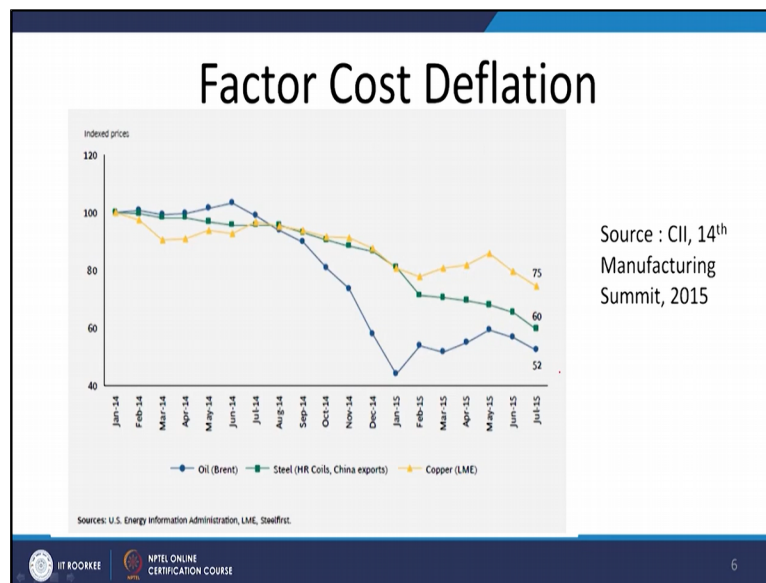
- Deflation in factor costs
- Decline of China
- New Manufacturing Locations

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And, when you see the global shifts, so we can have, these three important changes, which are happening in last, 4 and 5 years. One is, deflation in factor cost. The factor cost, the input cost to the manufacturing processes, are continuously decreasing. Then, decline of China. That is also a very important phenomenon, which is happening nowadays. And, some new manufacturing locations, are also emerging.

As I mentioned earlier, that the decline of China, and emergence of new manufacturing locations, these are rays of hope, that yes, India can also play, some important role, in the global manufacturing map. And, let us discuss these things, in some more detail. Now, as I was mentioning that, the cost of input materials, are continuously decreasing. So, if I see the CII report, which was presented in 14th Manufacturing Summit in 2015.

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So, it says that, according to US Energy Information Administration, that the cost of oil, the cost of steel, and cost of copper, all these things, which are important inputs to the manufacturing setup, are continuously decreasing. You can see, all these graphs. So, these are continuously decreasing. And, this is one big advantage to the manufacturing sector, that your input cost is continuously decreasing.

And, the other interesting fact is that, that in countries like India, there is a strong consumer demand, continuously, because of the factor, which is one very important, that our per capita income is continuously increasing. The size of middle class in India, is continuously on the increasing trend

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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.



And therefore, the demand of consumer is continuously becoming strong in countries like India. And therefore, the prices of end products, have not fallen. Though, the input cost has fallen, because of low prices, of the raw materials, oils, energy, etcetera, but the end products price, have not fallen. And, as a result of that, if you see, because of these things, your input cost is reducing, but output cost, output price, is remaining at the same level. So here, the profit margins, are increasing.

So, you have additional margin, for the manufacturers. Because, your inputs are reducing, output is remaining at the same level. So, either, you can compete, on the basis of price. You can reduce the price. So, you can become, in a more competitive category. Or, you can reinvest, the additional margin, for creating more facilities. Or, you can reinvest that additional margin, for better R&D, innovations. So, all these things, are in favour of manufacturing, because of reducing prices, and strong consumer demand, within the country.

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Chinese Magic

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

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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. ◦

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The second important factor, is about China. As we all know, the industrial revolution started, from Europe. And then, America picked up. And, at that time, the idea was, that if you produce the quality products, the cost is going to up. And, all through the globe, we were following the same idea, that cost and quality are inversely proportional. Then, came the phenomena of Japan, where they did a massive revolution, in this thought process of American industries.

And, Japanese used to say, that cost and quality, can go hand-in-hand. If you are producing, the quality products, and if you understand the meaning of quality in the right perspective, cost of the product will go down. And, the idea of Japanese manufacturing, is basically driven from the concept of value. So, when you eliminate, non-value adding things, obviously, your cost is going to decrease. And, they gave, a much wider definition, much wider understanding, of the concept of quality.

And, slowly and slowly, all through the globe, this started from company like Toyota. And, but within no time, almost whole globe, including country like India, started following the concept of Japanese manufacturing systems. In the end of 20th century, came another magic. And, that magic, is from China. China focused only on, low-cost. And, as a result, they started flooding the markets of globe, with their low-cost products.

And, in 1990's, China was contributing only around 3% of global manufacturing output. And presently, as I mentioned earlier also, that China is contributing, more than 25% of global manufacturing output. So, within just two decades, within 20 years, all these things happen. And, how this happened? They got, some cost advantage factors.

And, the Chinese government also took it as a challenge, for developing favourable infrastructure, and input setup, input ecosystem, for large-scale production facilities. And, all these things favourably addressed, by developing Chinese manufacturing industry. And now, whether you travel to Japan, or you travel to America, or you travel to Europe, everywhere, you find, made in China product. So, this was a kind of magical story. That is why, I write it as, Chinese magic.

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The slide is titled "Decline of Chinese Magic" in a large, bold, black font. Below the title, there are three bullet points, each preceded by a small black dot. The first bullet point states: "Chinese Manufacturing started as supply of labor intensive, lower technology products." The second bullet point states: "Chinese manufacturing has now entered into design and development of sophisticated engineering products." The third bullet point states: "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." At the bottom of the slide, there is a dark blue footer bar. On the left side of the footer, there are two logos: the MIT ROOKIE logo and the NPTEL ONLINE CERTIFICATION COURSE logo. On the right side of the footer, there is a small white number "9".

Decline of Chinese Magic

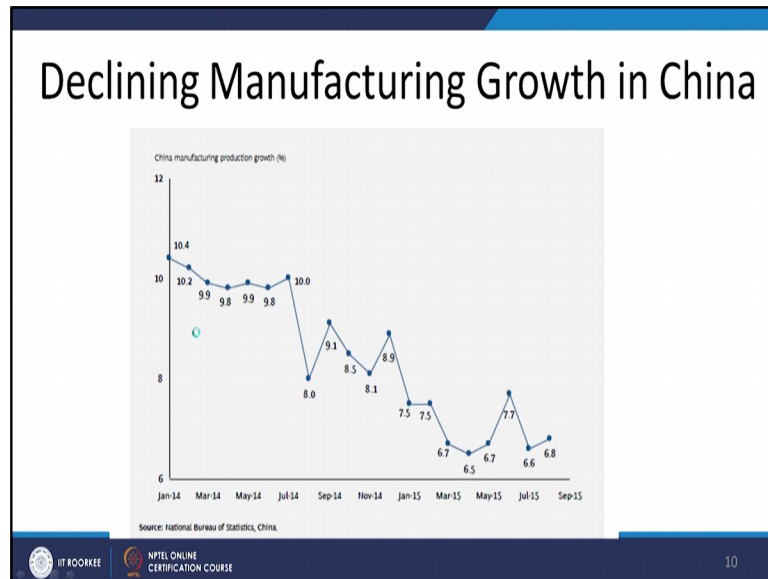
- Chinese Manufacturing started as supply of labor intensive, lower technology products.
- Chinese manufacturing has now entered into design and development of sophisticated engineering products.
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But, what is happening now? Slowly and slowly, we see, this Chinese magic is coming down. Because, there are some factors, which are contributing, to the decline of this Chinese magic. China originally started to supply, labour intensive, low technology products. So, most of the Chinese products, were labour-intensive, and low technology. But, slowly and slowly, when the manufacturing industry and R&D activities in China started growing up, they entered into, very sophisticated, design developed, engineering products.

And now, they are into, very much high-tech products also. But, though, you can see that, China is still dominating, the global manufacturing map. But, to some extent, this dominance is diluting nowadays. Because, there are some factors, which are contributing, to the decline of this Chinese magic.

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And, these factors, this graph can help you to understand, that the growth of Chinese manufacturing, the production growth, is continuously decreasing, since 2014. And, this figure is now coming to around 6.8%, which was once upon a time was up to 10.4%. So, this graph indicates that, the decline is happening, in the Chinese manufacturing. And, the factors, which are contributing to the decline of Chinese manufacturing setup, is one is, inflation in Chinese wages.

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Factors responsible for Chinese Decline

- Inflation in Chinese Wages
- Strengthening Yuan
- Cheaper energy in the West
- Declining costs of technology

The China was taking the advantage of low factor cost. And, in the low factor cost, the wages were very important. Because, most of the products, which China was manufacturing, was the labour-intensive. So, the labour cost was a very important component, of the Chinese products. But now, the Chinese wages are also significantly increasing, as compared to Europe and America. So, the advantage of low cost, low wages, is slowly and slowly eroding from the China.

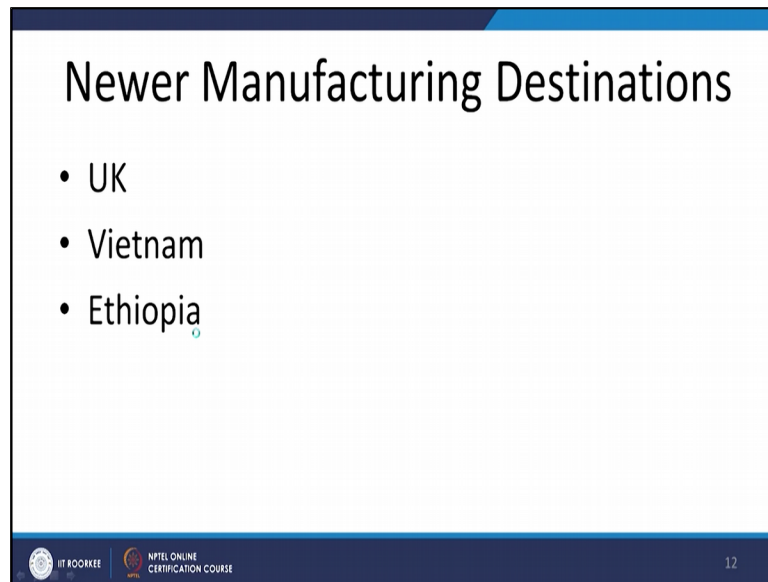
The second important thing is, strengthening of Yuan. Because, earlier, China was not an export economy. So, the Yuan's value was very low. But now, China is mostly an export driven economy. So, lot of foreign exchange is coming to China. And, as a result, when lot of dollar is flowing into China, the Yuan is strengthening up. So, as a result, the export is becoming costlier from China. So, that is another factor, which is contributing in the decline of Chinese exports.

Now, cheaper energy in the west. Energy is one very important input, to manufacturing setup. And, thanks to Shell. Because of that, we have lot of natural gas available, in western part, particularly Europe and America. And, the advantage of that low cost of energy, is now going in favour of USA, and part of Europe also. And then, one very important change, which is happening nowadays, that most of the industries, are going for rapid automation.

And, cost of technology is also decreasing. So now, it is easy for other companies, other countries, to adopt technology. So, Robots are coming, IOT is coming, in the manufacturing setup. And, this degree of automation, is changing the set of manufacturing, from labour-intensive to technology intensive. And, the adoption cost of technology, is also decreasing. So, it is becoming easier for other competitors, other countries, to adopt technology, in their manufacturing setup.

So, that advantage of adopting technology at low cost, is also taking the advantage of manufacturing, away from China. So, these are some of the factors, which are contributing, to the decline of Chinese magic. And therefore, it is possible for other countries, to chip in into that space, which becomes empty, because of decline of this Chinese growth.

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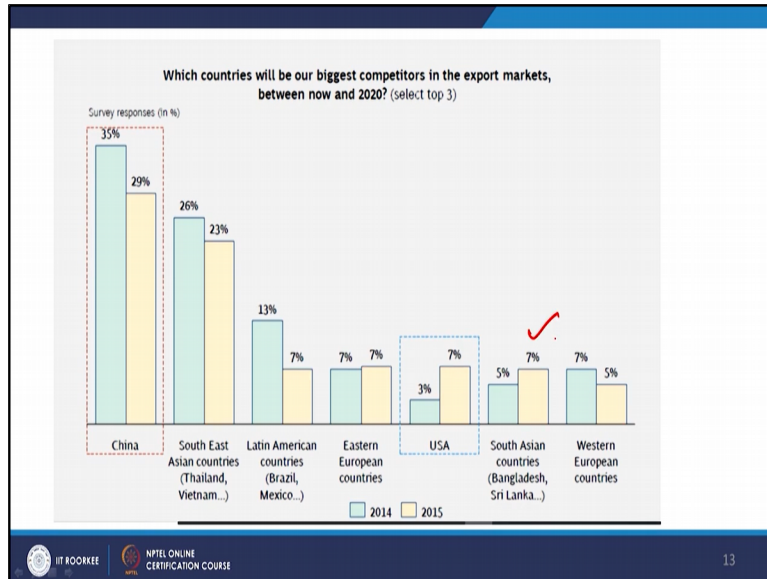


Then, another factor, which is changing the global manufacturing shift. I am taking three countries, just to give you a brief idea. One is UK, which is from Europe. Another is Vietnam, which is from South East Asian countries. And, third is Ethiopia, which is from East Africa. The point, which I am trying to make, that now, all across the globe, UK is coming very strongly, as a low-cost manufacturing setup.

Vietnam is, since last around 10 years, is becoming a possible substitute for the Chinese manufacturing industry, because of low wages, because of disciplined workers, because of other infrastructure, which is coming up, very fast in Vietnam. Ethiopia, that is in East Africa, is another very strong manufacturing hub, coming up in the African continent. It has lot of advantages, for the manufacturing setup like, 100% tax holidays for 10 years, lot of other promises of supply of timber, and other water resources, etcetera.

Energy available at low cost. So, these are some of the new manufacturing destinations, which are almost offering the similar kind of advantage, which China used to have. And therefore, if you consider the logistics cost, as an important phenomena of distribution. So, it will be, in coming days, possible that, people will start manufacturing at different locations, to serve the local markets

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And therefore, if you see, the graph here, which is a survey done by CII, with the help of BCG. And, in this survey, it was seen that, how different countries can pose threat, or the biggest competitor, for Indian industries. And, in this, obviously China is the number one. But, if you see, that South-East Asian countries like, Thailand, Vietnam, etcetera, are another very important promising area, which can be the competitor for Indian manufacturing company.

And, then you see, either USA or Latin American countries, where Brazil, Mexico, Argentina, etcetera, are there. These are also going to be, the possible manufacturing competitor for India, in the coming years. So, it is not only the China, but the manufacturing will be distributed, at various other locations also. Even, smaller countries, in our own nearby like, Bangladesh, Srilanka, etcetera, can also pose good amount of competition, to the Indian manufacturing setup.

So, this gives you idea that, lot of countries will come up, as a potential competitor, for Indian manufacturing organisation. But, on the other side, this also gives you one advantage, that competition will not remain only focused to China, rather it will be distributed, to various other places. So, there will be chances, for India also. But, we have to be proactive, in taking the advantage of the shift of competition, from one country, to various other countries. So, with this, we conclude this session. And, we will welcome you, to the next session. Thank you, very much.