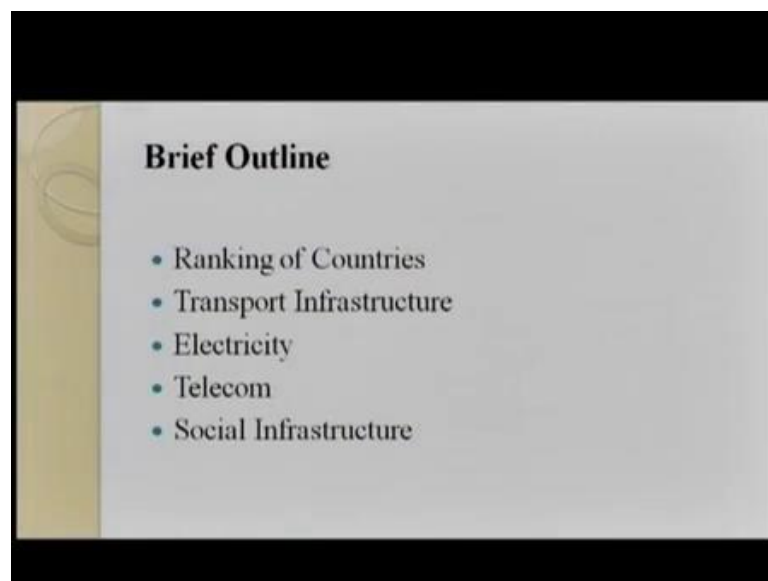


Infrastructure Economics
Department of Social Sciences
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Indian Institute of Technology Madras

Module-08
Lecture - 37
India in the Global Infrastructure Rank


In this new lecture, we are going to discuss India's Infrastructure level and its rank at the global level. We have seen in our previous discussion that, in some of the sectors such as road or railway, we are in much better condition in terms of length and kilometer. But, in terms of social infrastructure we are really not as advanced as other different countries of the world today. So, in this lecture, we are going to have a look on not only on the physical infrastructure, but also on the social infrastructure.

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The brief outline of this presentation is seeing that ranking of the countries, transport, electricity, telecommunication and social infrastructure. So, through these different division of the infrastructure, we will try to see that where India is currently, on which stage of development India's infrastructure is and how far we are from the other developed countries and other leading economy of the world.

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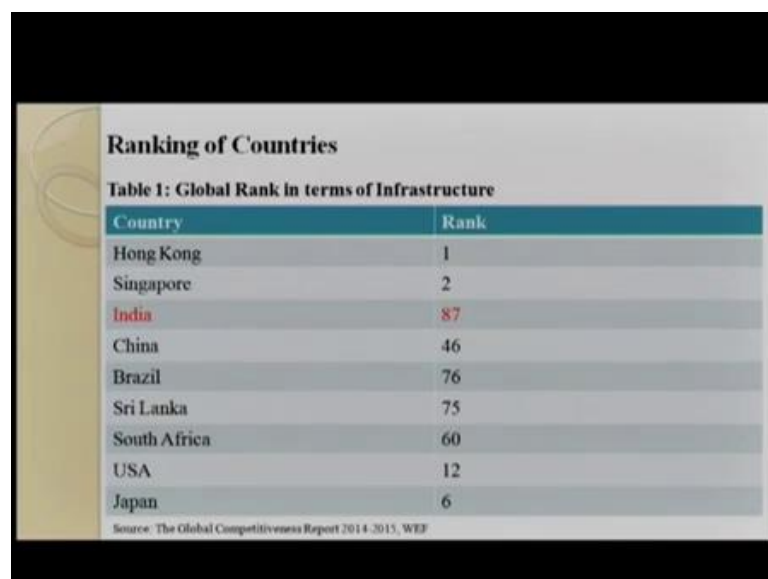


Ranking on the Basis of Infrastructure

- World Economic Forum (WEF) publishes Global Competitiveness Report every year
- One of the pillars of competitiveness is the Infrastructure
- It includes quality of roads, railroad infrastructure, port infrastructure, air transport infrastructure, electricity supply, mobile telephone subscriptions, fixed telephone lines, etc.
- Finally, the overall ranking of countries are prepared for infrastructure
- Ranking of some selected countries are given in table 1 (next slide)

So, World Economic Forum publishes Global Competitiveness Report every year and one of the pillars of competitiveness is the infrastructure. It includes quality of roads, railroad infrastructure, port infrastructure, air transport, electricity supply, mobile telephone subscriptions, fixed telephone lines, etc. Finally, the country's overall ranking are prepared for infrastructure and ranking of some selected countries are given in the table, in the next slide, which you can just see here.

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Ranking of Countries

Table 1: Global Rank in terms of Infrastructure

| Country | Rank |
|--------------|------|
| Hong Kong | 1 |
| Singapore | 2 |
| India | 87 |
| China | 46 |
| Brazil | 76 |
| Sri Lanka | 75 |
| South Africa | 60 |
| USA | 12 |
| Japan | 6 |

Source: The Global Competitiveness Report 2014-2015, WEF

That in terms of global rank, in terms of infrastructure, HongKong is the first one, Singapore is the second one. India's rank is 87, China 46, Brazil 76, Sri Lanka at the level of 75th , South Africa at the level of 60th country in the world, USA at 12th positions, Japan is at 6th position. So, this shows that how India is really far behind China, far behind Brazil, far behind Sri Lanka, also South Africa and these countries are really as developed as United States.

But, at the same time these are the developing country and we find it very difficult that even being the second largest populated country, we are not really good in terms of better quality infrastructure. And this shows our poor condition of infrastructure at the global level and it will take years and years to compete with those economies, which has really ranked their infrastructure at first level or the second level.

And one can say that these economies- Hong Kong, Singapore, these are the smaller economy and that is why they are much better in terms of their infrastructure development. But, it is not only the question of a smaller or bigger economy, but it is the question of... it is basically the question of how planned they are in terms of their infrastructure and United States, Japan, China these are also one of the bigger economies.

But, we have a country like, India has still not thought that, what has to be developed? how it has to be developed? We are developing in different sectors, but not as per the population blast, which we had in last 50 years. With the fast growing populated country like India, our infrastructure has not moved as fast as the growth of population.

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Transport Infrastructure: Railways

- India stands at 4th position in the world in terms of railway route network
- USA is at first position, Russia on second, and China is at third position in terms of railways network
- Broad gauge (1.676 m) in India: 55,956 km
- Meter gauge (1.000 m): 6,347 km
- Narrow gauge (0.762 m and 0.610 m): 2,297 km

So, let me begin with transport infrastructure in terms of railway. India stands at the 4th position in the world, USA at the first position, Russia second and China is at the third position in terms of railway network. The broad gauge line 55,956 kilometer, meter gauge 6,347 kilometer and narrow gauge is 2,297 kilometer in India.

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Railways

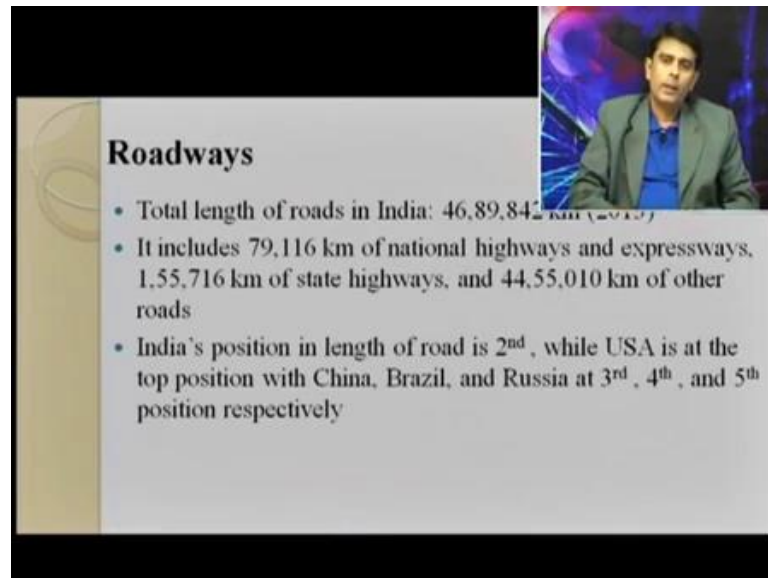
Table 2: Total Length of Railways

| Country | Route Kms |
|--------------|-----------|
| USA | 224792 |
| Russia | 87157 |
| China | 86000 |
| India | 64600 |
| Brazil | 28538 |
| Japan | 27182 |
| South Africa | 20192 |
| Bangladesh | 2835 |

Source: The World Factbook, CIA(2015)

Here the table gives us the idea that, how we are the fourth one in the world and after that Brazil, Japan, South Africa and Bangladesh is in terms of total length of railway in the world.

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Roadways

- Total length of roads in India: 46,89,842 km (2015)
- It includes 79,116 km of national highways and expressways, 1,55,716 km of state highways, and 44,55,010 km of other roads
- India's position in length of road is 2nd, while USA is at the top position with China, Brazil, and Russia at 3rd, 4th, and 5th position respectively

In terms of roadways, total length of roads in India is 46,89,842 kilometer, that includes 79,116 kilometer of national highways and 1,55,716 kilometer of the state highways, where 44,55,010 kilometers of other roads. So, India's position in length of road is second, while USA is at the top position with China, Brazil and Russia at 3rd, 4th and 5th position respectively.

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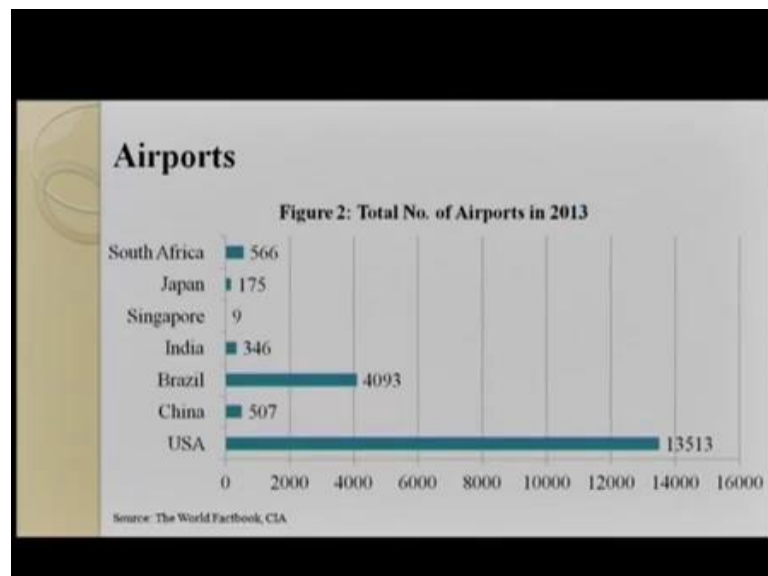
Here it can be clearly represented here, that how we are better in terms of roadways after United States. This is the data from the World Fact Book and this gives that we are the second in terms of the total length of roads in the world.

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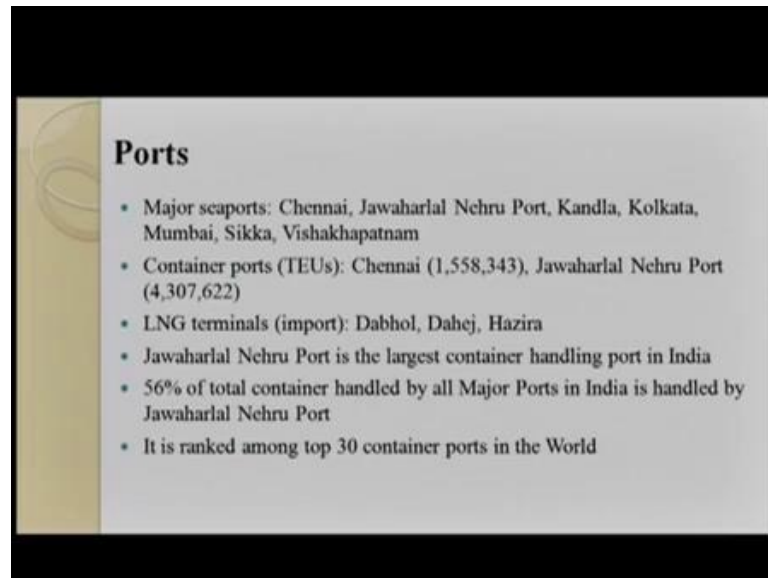
In terms of airport, India's rank in total number of airports is 21st. United States stands at 1st position, while China is on 14th position, Japan at 23rd rank, Brazil second rank and Singapore is at 158th position. Out of total 346 airports in India, 253 airports are with paved runways, while 93 are unpaved. Apart from airports, India has 45 heliports.

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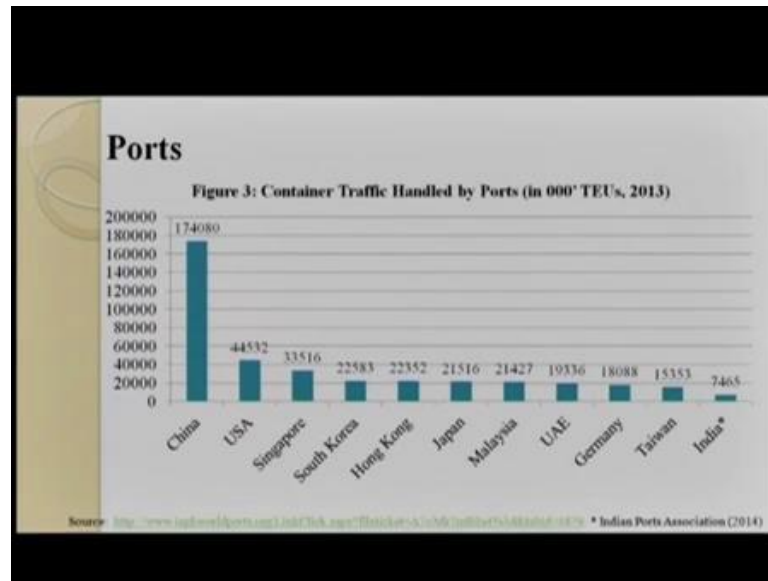
The total number of airports is shown here. South Africa 566, USA 13513, China 507, Brazil 4093, India 346, Singapore 9, Japan175.

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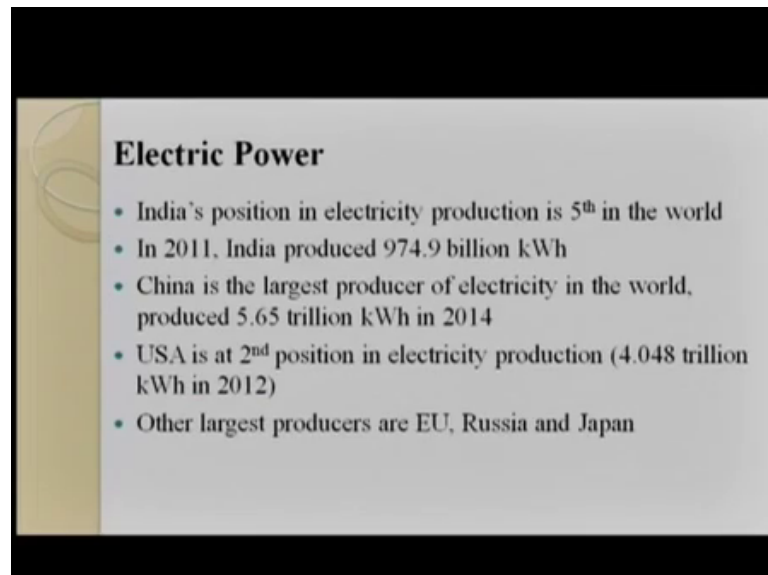
In terms of major seaports: Chennai, Jawaharlal Nehru port, Kandla, Kolkata, Mumbai Sikka, Vishakhapatnam are the major seaports. Container ports- Chennai and Jawaharlal Nehru port. LNG terminals- Dabhol, Dahej and Hazira is three LNG terminals. Jawaharlal Nehru Port is the largest container handling port in India. 56 percent of total container handled by all major ports in India by Jawaharlal Nehru Port only. It is ranked among the top 30 container ports in the world.

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This figure shows that, how China is one of the leading country in terms of container traffic handled by the ports after that USA and Singapore. India compared to these countries are not really a much better positioned country, because we do not have much infrastructure developed in such... in this particular sector.

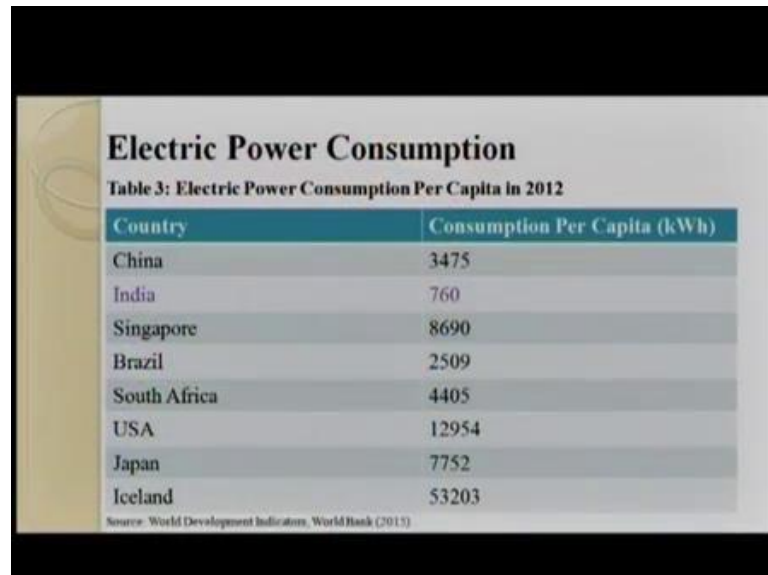
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In terms of electric power, India's position in electricity production is 5th in the world, in 2011 India produced 974.9 billion kilowatt. China is the largest producer of electricity in

the world and produced 5.65 trillion kilowatt in 2014. USA is at the second position in electricity production and other largest producers are European Union, Russia and Japan.

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Electric Power Consumption

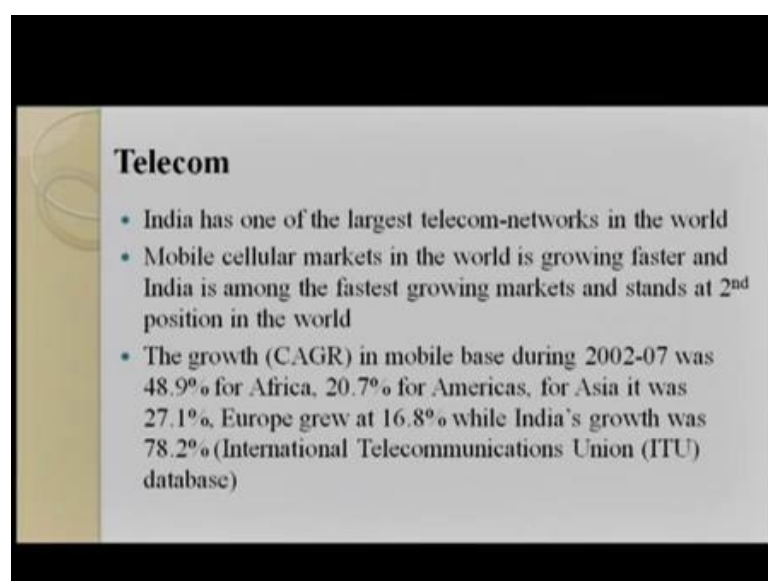
Table 3: Electric Power Consumption Per Capita in 2012

| Country | Consumption Per Capita (kWh) |
|--------------|------------------------------|
| China | 3475 |
| India | 760 |
| Singapore | 8690 |
| Brazil | 2509 |
| South Africa | 4405 |
| USA | 12954 |
| Japan | 7752 |
| Iceland | 53203 |

Source: World Development Indicators, World Bank (2013)

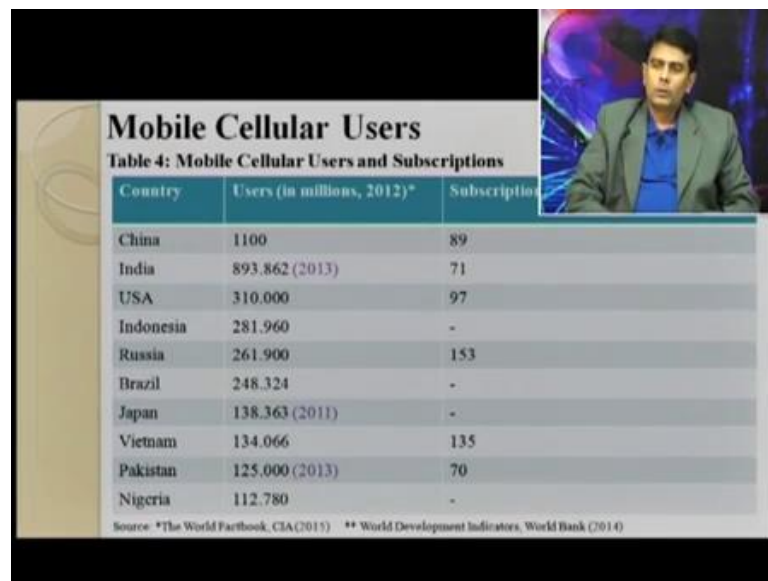
Consumption per capita - if one can see here China 3475 kilowatt, India only 760 kilowatt per capita consumption. Well, Singapore consumes 8690 kilowatt per capita, Brazil 2509 kilowatt, South Africa 4405 kilowatt, USA 12954 kilowatt, Japan 7752 kilowatt, Iceland 53203 kilowatt.

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- ### Telecom
- India has one of the largest telecom-networks in the world
 - Mobile cellular markets in the world is growing faster and India is among the fastest growing markets and stands at 2nd position in the world
 - The growth (CAGR) in mobile base during 2002-07 was 48.9% for Africa, 20.7% for Americas, for Asia it was 27.1%, Europe grew at 16.8% while India's growth was 78.2% (International Telecommunications Union (ITU) database)

In terms of telecom, India has one of the largest telecom networks in the world. Mobile, cellular markets in the world is growing faster and India is among the fastest growing markets; that stands at 2nd position in the world. The growth in mobile base during 2002-07 was 48.9 percent of Africa, 20.7 percent of America, for Asia it was 27.1, Europe grew at 16.8, while India's growth was 78.2 percent. This is the data from the International Telecommunications Union database and this shows that, how fast we had growth in terms of mobile services in 5 years only.

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Mobile Cellular Users
Table 4: Mobile Cellular Users and Subscriptions

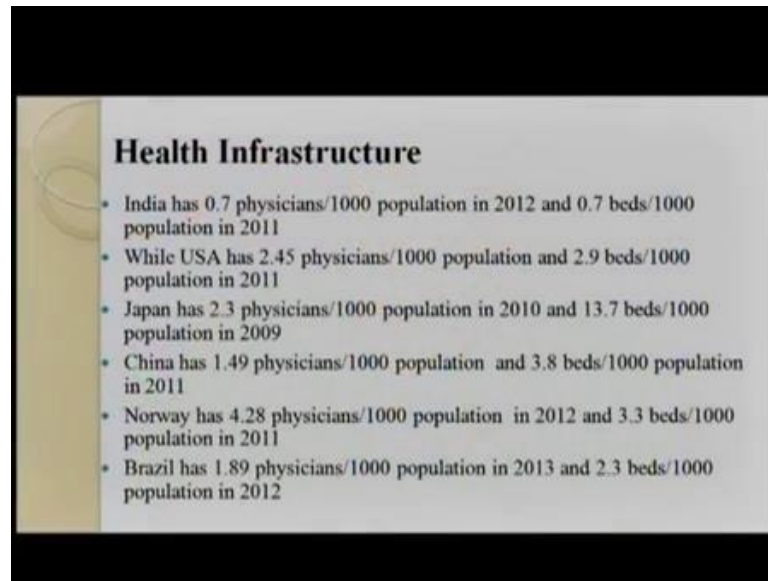
| Country | Users (in millions, 2012)* | Subscriptions per 100 people |
|-----------|----------------------------|------------------------------|
| China | 1100 | 89 |
| India | 893.862 (2013) | 71 |
| USA | 310.000 | 97 |
| Indonesia | 281.960 | - |
| Russia | 261.900 | 153 |
| Brazil | 248.324 | - |
| Japan | 138.363 (2011) | - |
| Vietnam | 134.066 | 135 |
| Pakistan | 125.000 (2013) | 70 |
| Nigeria | 112.780 | - |

Source: *The World Factbook, CIA(2015) ** World Development Indicators, World Bank (2014)

So, in terms of the users, mobile, cellular users and subscribers... we had, China had 1100 million subscribers in 2012, India had 893.86 million subscribers, USA had 310 million subscribers, Indonesia 281 million subscribers. This shows that, how we had grown in terms of mobile subscription in past few years. Subscription per 100 people, China 89 by 2013, while India 71, USA 97, Russia 153, Vietnam 135 and Pakistan 70. This was not the rate prior to the economic reform processes started in India.

So, some of these indicators are showing us a very good result, because in terms of telecommunication we were one of the poorest country, poor density... Tele-density country in the world and which has improved a lot, because of the new investment by the private sector as well as the government policy to liberalize the sector for other partners from the world and this has given a boost to this particular sector and telecommunication infrastructure is really moving ahead.

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Health Infrastructure

- India has 0.7 physicians/1000 population in 2012 and 0.7 beds/1000 population in 2011
- While USA has 2.45 physicians/1000 population and 2.9 beds/1000 population in 2011
- Japan has 2.3 physicians/1000 population in 2010 and 13.7 beds/1000 population in 2009
- China has 1.49 physicians/1000 population and 3.8 beds/1000 population in 2011
- Norway has 4.28 physicians/1000 population in 2012 and 3.3 beds/1000 population in 2011
- Brazil has 1.89 physicians/1000 population in 2013 and 2.3 beds/1000 population in 2012

Coming back to the social infrastructure sector and here we are going to discuss the health infrastructure sector now. India has 0.7 physicians/1000 population in 2012 and 0.7 beds/1000 population in 2011. While United States has 2.45 physicians for 1000 population and 2.9 beds for 1000 population in 2011. Japan has 2.3 physicians available for 1000 population and 13.7 beds available for 1000 population by 2009. China had 1.49 physicians by 1000 population and 3.8 beds for 1000 population. Norway has 4.28 physicians for 1000 population in 2012 and 3.3 beds for 1000 population in 2011. Brazil has 1.89 physicians for 1000 population in 2013 and 2.3 beds for 1000 population in 2012.

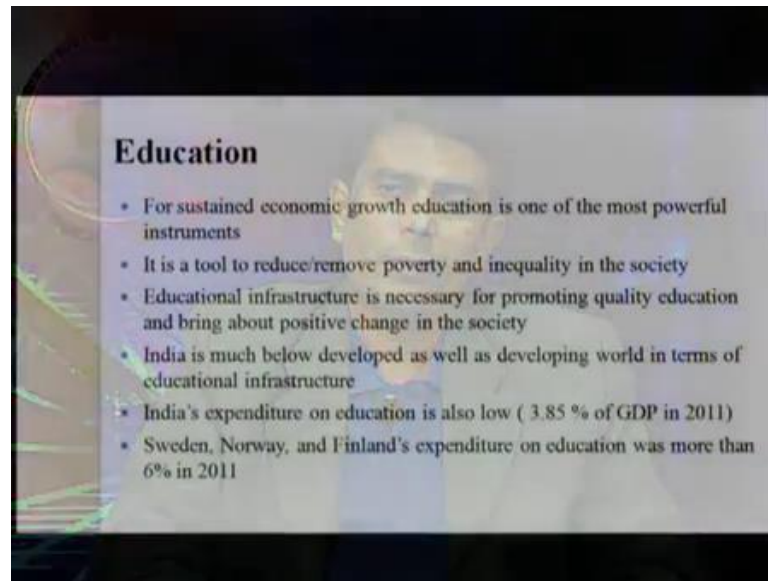
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| Country | Expenditure (% of GDP) | Global Rank |
|--------------|------------------------|-------------|
| USA | 17.9 | 1 |
| Japan | 10.1 | 22 |
| Brazil | 9.3 | 31 |
| South Africa | 8.8 | 42 |
| Norway | 9.6 | 40 |
| China | 5.4 | 126 |
| India | 4.0 | 159 |

Source: The World Factbook, CIA

In terms of health expenditure in the world, United States had the expenditure of as a percentage of GDP, which is around 17.9 percent. In terms of global ranking, it is the first in the world, while Japan is having 10.1 percent as the percentage of expenditure of the GDP and it is the 22nd rank in the world. Brazil has 9.3 percent expenditure as the part of GDP on health and the global ranking is 31. South Africa 8.8 as percentage of GDP on expenditure on health ranking at the level of 42. Norway 9.6 percent of GDP expenditure global rank is 40. China is 5.4 percent of GDP expenditure, global rank is 126. India is having 4 percent expenditure as the part of GDP on health and the global rank is 159. And this is really very challenging and one of the poor data, which shows that we are not really in the position to sustain a big expenditure on health like the developed country. And even some of the developing country are in much better condition compared to India and they are having much better global rank and this shows that one of the poor condition of health expenditure and this expenditure is not going to really help us, because, we are not one of leading country in the world in terms of health expenditure. But in terms of the population growth, in terms of the disease, in terms of the health services we are the most needy country in the world.

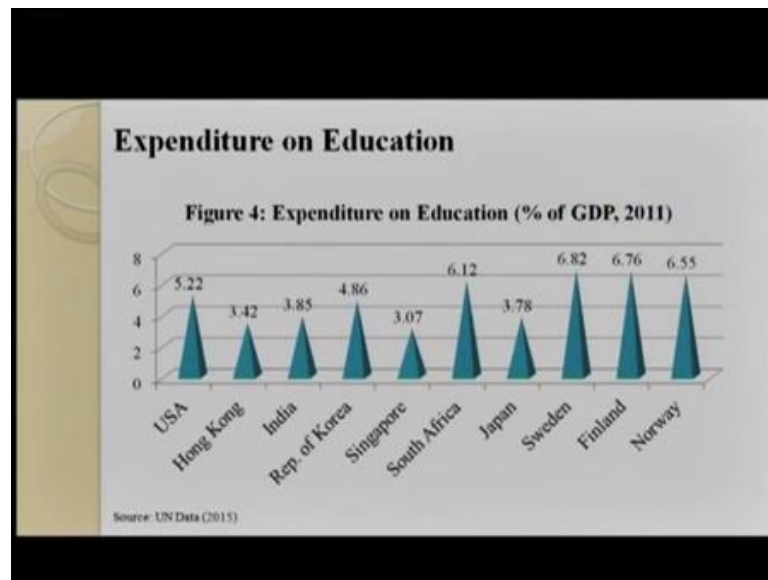
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One cannot forget here to mention the education for sustaining economic growth. Education is one of the most powerful instruments. It is a tool to reduce, remove poverty and inequality in the society. Educational infrastructure is necessary for promoting quality education and bring about positive change in the society. India is much below developed as well as developing world in terms of educational infrastructure.

India's expenditure on education is also low, 3.8 percent of GDP in 2011 while the Sweden... while the Sweden, Norway, Finland these are countries, which had 6 percent of GDP on their education as a part of expenditure. And these noted nations are the best example in the world today, which had a very clear cut idea that if the primary education and the secondary education are not being developed properly than the countries overall development and growth is not going to be much sustainable and much inclusive. So, they are having more investment on education as a part of their based planning for the future.

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Here we can see the expenditure on education as percentage of GDP. India 3.85 percent while the USA 5.22, Hong Kong 3.42 percent, Korea 4.86, Singapore 3.07, South Africa 6.2, Japan 3.78, Sweden 6.82, Finland 6.7 and Norway 6.55. But, here in terms of percentage it may be may not look a very big difference, but in terms of GDP there are few countries, who... which has a bigger GDP compared to India and, so in that case even 6 percent or 5 percent of the GDP is big amount on expenditure.

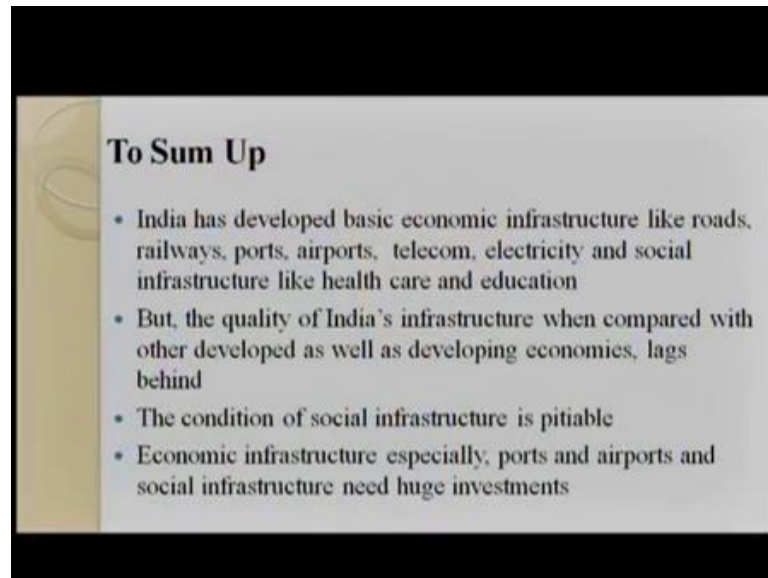
And this is one of the big gap in terms of providing education to all especially in India and the other part of the world. So, there are studies by UNICEF which says that if India and some of the economy in Asia is able to provide education to all, the world will be reducing the illiteracy drastically. More than 50 percent 60 percent illiteracy will be automatically reduced if these few countries are able to reduce their level of illiteracy.

So, to sum up what we have seen here... India has developed basic infrastructure likes roads, railways, ports, airports, telecom electricity, but the social infrastructure like health care and education are still in a very poor condition. So, even in the physical infrastructure sector, if we are comparing airports facility and ports facility with others developed countries we are really in a very poorest stage. The best example of growth is in telecom sector, where we have added more and more subscribers in last few years.

But, in terms of electricity, per capita electricity consumption we are one of the poor country in the world in terms of per capita consumption of electricity and this shows that

how really underdeveloped we are in terms of per capita consumption if we compare to the data with United States or even with Singapore or other country.

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In case of social infrastructures like health care and education also, we are far away from many Nordic nations Netherlands, Denmark, Finland and other country, which has a very clear cut idea that the education is the key for the development. But, the quality of India's infrastructure when it is compared with other developed as well as developing countries that is also lagging behind, because we are not as qualified in terms of providing quality infrastructure as other smaller countries has proved it in providing those better quality infrastructure.

So, one of the major challenge for India is to provide the quantitative infrastructure and the second major challenge is to provide qualitative infrastructure. Quantitative infrastructure means large number of roads, big number of airports, large number of ports, big hospitals, better hospital facilities, large number of nurses, doctors more a schools, teachers. At the same time, when it comes for the qualitative infrastructure it is not only the quantity, which is being supplied.

But, it is also the how good they are performing, how good are the roads, how good are the railway, ports, airports and how good is the telecom services, whether Indian telecom or other telecom, Indian telecom or outside India, what type of cross country comparison, we can find out that how qualified we are in terms of providing those

services. And the gap, which is emerging today in terms of quantifying those infrastructure and having the quality of that infrastructure.

We find that India is not really ranked very good on the both side either in terms of providing certain quantity of infrastructure in certain sectors and at the same time not providing a very qualitative infrastructure facilities in certain sectors. So, the condition of social infrastructure is really one of the major challenge for the policy maker today whether it is recent policies to enhance the sanitation level in India through the Swachh Bharat Abhiyan or by other programs by the previous government are the Bharat Nirman or other programs, which has created a new way of looking India's rural part.

This all helps in connecting India's lacking infrastructure and providing more qualified and better infrastructure facilities for making more progressive. So, economic infrastructure especially ports and airports and social infrastructure like education health need huge investment today, because with current population we cannot really sustain with previous infrastructure facilities. We have to have more infrastructure added on the daily basis India is currently on a stage, where it has to be supported with more and more infrastructure more and more physical as well as social infrastructure support. If we are not in the position to get it, then we will not really able to sustain our growth, because economic growth cannot be achieved without the growth in infrastructure.

Thank you.