

Reflections from experts across the world

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Looking at the first presentation which has given a very comprehensive introduction about the various programs introduced in Kerala that included among others, young innovators program of the K-DISC, one district one idea, and the local government program. I am really impressed to see that you are doing all the right things. I think Kerala may become another star in India, like, India has Bangalore. I think Kerala will be another star in the fourth industrial revolution. All the technologies for the future and the ecosystem for the start-ups are being set in place.

India's economy has taken off since 1990s. It's really going very fast, and India now is one of the emerging countries and I believe India will continue to grow very fast. India has a lot of world class minds and it has not reaped the potential. I have been thinking about how to help in this aspect. Here one of the major aspects is the implementation of the great plans. Implementation issue is not something that is confined only to the innovation or science and technology sector. We need the right institutional, economic, and political background to enable all these bright plans to deliver.

These are excellent plans, but they are very much focussed on the domestic activities in India. My research about innovation in China explains why China has been able to catch-up. One of the lessons that we could learn from China is the role of an open national innovation system. In my book, China's path to innovation, I described that Chinese national innovation system is linked with the global innovation system and global knowledge pool through various links such as international trade, foreign direct investment and both. You are aware that India is

becoming an attractive destination for the MNCs and Indian MNCs are increasingly investing in other countries.

We could observe the active involvement of Indians in some of the major innovating countries and building their national innovation system. This is facilitated by the movement of people. Such mobility of people facilitate the exchange of ideas especially the tacit knowledge that otherwise rarely cross the borders. And then looking at China's experience in trade, it is evident that China has the highest level of trade to GDP ratio among major developing countries and it's higher than Japan and the US. China is the largest recipient of foreign direct investment and in recent years, also become a large investor abroad. Further, China has also benefited from diasporas exchange in the recent years.

I think India's experience is the same while during the early years there was much worry about brain drain, which now increasingly being brain circulation. It's also correctly used to teach the technology to accelerate the knowledge exchange and also innovation. Another key factor is international collaboration. Now countries, increasingly using international collaboration to foster innovation. This is not only for developing countries to stay where they are. They want to collaborate with the advanced industrialized countries for innovation. So industrialized countries like OECD, European Union and US very much emphasize on collaborative innovation and what my research which part published last year also finds Chinese firms benefit from innovation collaboration. So, this kind of open national innovation system in China uses both the domestic and international resources, talents, and markets. There are two major drivers in this process. One driver is market and another driver is the state, although they have different roles. The role however changes at different stages of innovation. The state in the early stage plays more important role in heavy investment and high risk activities and that of market is more at lower end of commercialization. So, I think this open national innovation system approach and could be considered in Kerala.

In UK and in many of the other innovative countries, the Indian scientists are excellent. They are good in science and good in management and the leading role in the technology companies. I think the start-up ecosystem design is also brilliant. However, it is also important to bring the international dimension and put it in the broad context. I think that the support needs to come from the whole country, especially the industrial foundation and infrastructure to make it really deliver the full potential.