

Mission Mode Approach to Prepare India for the Fourth Industrial Revolution

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[Abstract: The world is in the midst of the Fourth Industrial Revolution which is characterised by a fusion of technologies blurring the lines between the physical, digital and biological spheres. This revolution is poised to dramatically change our lives and is evolving at an exponential pace. While available technologies can help a country like India to leapfrog to an accelerated growth trajectory, the Fourth Industrial Revolution poses challenges of reskilling of one billion people and completely reorienting and revamping the entire education system in close understanding with industry and research establishments. Thus, the Fourth Industrial Revolution simultaneously poses the biggest opportunity and the highest threat to a prosperous future. It is being proposed that India should adopt a mission mode approach to prepare its citizens for the Fourth Industrial Revolution.]

The First Industrial Revolution used water and steam power to mechanise production. The Second used electric power to create mass production. The Third used electronics, semiconductors, digital circuits and computer, signaling the onset of the Digital Revolution. With that began the information age, and the information and communications technology shrunk the world into a global community. While both previous revolutions took decades to spread their impact, the Digital Revolution took the world by storm by its pervasiveness, pace and scale of impact. It has changed the way we communicate, live our lives and are entertained. It has impacted businesses, making innovation and continual change a survival rather than a competitive factor.¹

Governments have been forced to find creative new ways of better governance, adaptive framework and greater citizen connect. Status quo is no longer relevant—constant adaptation and adoption is the ‘new normal.’ As we struggle to

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¹ Schwab, K. (2016), “The Fourth Industrial Revolution: What it Means and How to Respond,” World Economic Forum, December 2015. Available at: <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>

reckon with the new dynamism set in by the Third Industrial Revolution, winds of technology are blowing that are setting off the Fourth Industrial Revolution which is characterised by a fusion of technologies that is blurring the lines between the physical, digital *and* biological spheres. To some this may seem like an increment or linear shift from the Third Revolution of the Digital Era, but in reality when the virtual, biological and physical systems come together we cannot even predict the technological advancement it will bring. But the fact is that it will dramatically change our lives in terms of velocity, scope, and the impact of systems. When compared with previous industrial revolutions, the Fourth is evolving at an exponential rather than a linear pace, bringing about transformation of the entire systems of production, management and governance.^{2,3}

Some key technological advances that are driving the Fourth Revolution are in the fields of artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3D-printing, nanotechnology, biotechnology, material science, energy storage and quantum computing. These have come about with billions of people being connected by mobile devices, with unprecedented processing power, storage capacity and access to knowledge.

The application of these technologies affords an opportunity to India to leapfrog to create an accelerated and differentiated growth trajectory for itself in similar fashion as it did from line telephony to mobile telephony.⁴ This would require a major skilling up of many of our 1.2+ billion citizens. With a huge demographic dividend of the under-35 population having a long working life ahead, unlike most mature economies that are seeing a decline in their populations, the future of many generations will be dictated by how India responds to the challenge today. It may be instructive to recall that after being bypassed by the First as well as the Second Industrial Revolution, India's contribution of 25% to global industrial output in 1750

² Ramadorai, S. (2016), "Are We Ready for the Fourth Industrial Revolution?" Nani Palkhivala Memorial Lecture, February 27.

³ *Op.cit.* 1

⁴ Venkatesan, R. (2016), "Is India Ready for the Fourth Industrial Revolution?" *Livemint*, September 18.

declined to only 2% in the year 1900. Having performed somewhat reasonably well during the Third Industrial Revolution, it is imperative that India equips itself well to benefit from technologies which are becoming available during the ongoing Fourth Industrial Revolution.⁵ The Fourth Industrial Revolution will see the emergence of new technologies and increased automation, which would make many of the professions today redundant. Despite the IT sector shaping into one of the world's biggest achievements in space technology and services industries, India still remains a nation with a big base of unskilled and semi-skilled labour at the bottom of the pyramid. The 'Make in India' programme aims to tap into this labour pool besides vying to become the next manufacturing hub after China. However, manufacturing as a sector will experience maximum disruption in its ways of doing things. Automation will make inroads into this industry globally like never before and coupled with the Internet of Things it will lead to creation of new jobs, and thus newer skills. Though the 'Skill India' programme is expected to help, India would need a major revamp of the entire education system.⁶ Universities need to develop futuristic courses which would include high-tech components as integral to every branch of study. Industry and academia together are required to design courses that would be in demand in the next decade or two. India has begun setting up a National Skills Qualification Framework which would define various levels, capabilities and competencies irrespective of domain. Soon the Indian framework so established would get linked to similar frameworks of other countries as people from integrated economies will seamlessly move within and across countries for work. Finally, there would be a 'global digital qualifications identity,' which means that one's qualifications—right from school to college to skill courses—would get stored electronically, enabling worldwide access. If India truly takes advantage of its potential of young population and aspires to be the talent capital of the world, then universities and colleges would have to begin to align with future trends by developing mechanisms to quickly update curriculum, taking

⁵ Puri, A. (2016), "Preparing India for the Fourth Industrial Revolution," Jones Lang LaSalle (JLL), October 06. Available at: <http://jllapsites.com/real-estate-compass/2016/10/preparing-india-fourth-industrial-revolution/>

⁶ *Op. cit.* 2

care to introduce new areas of emerging importance. The current working models for academia and industry would need to be reoriented to meet the emerging challenge.⁷

On a reality check, much of the world's fundamental research and innovation is happening in the US. American companies such as Google, Amazon, Tesla, Illumina and First Solar are the major drivers of disruption. Thus, bulk of the new jobs will be created in the US. During the First Industrial Revolution, Britain and Europe were able to export the job losses caused by the impact of machinery to colonies such as India. Productivity growth and trade eventually resulted in enormous job and wealth creation in Europe even as famines and devastation overtook India, China and Africa. As the scenario stands today, along with job losses taking place in the US, newer jobs are also being created there which have more productivity than jobs being lost. There is net growth of productivity. Countries like India face the prospect of becoming markets for innovations for companies like Google, Pfizer or Monsanto. Majority of the Indians would then be living on subsistence wage-service jobs and India would remain a low, middle-income country. To have an altered scenario for India, it would have to be enabled to take full advantage of the means available during the ongoing Fourth Industrial Revolution.⁸

India has to understand that Apple, Microsoft and Google owe their achievements to fundamental research at world-class corporate labs such as Xerox, PARC or Bell Labs and universities such as Standard and Massachusetts Institute of Technology. The US government has played a vital role in funding high-risk, long-term research projects through institutions such as Defense Advanced Research Projects Agency (DARPA) and National Science Foundation (NSF). An enabling ecosystem was developed towards commercialisation of research.⁹

In contrast, even after the launch of the 'Make in India' and 'Skill India' programmes, all stakeholders such as policymakers, scientists and business leaders are firmly stuck in the old paradigm.

⁷ *Op. cit.* 5

⁸ *Op. cit.* 4

⁹ *Ibid.*

The Fourth Industrial Revolution simultaneously poses the biggest opportunity and the highest threat to a prosperous future. After being bypassed during the First and Second Industrial Revolutions, India did reasonably well during the Third Industrial Revolution. India cannot afford to miss opportunities awaiting to be availed of during the ongoing Fourth Industrial Revolution. It would have to enable itself by bringing on board academic institutions, research establishments, industry and entrepreneurs who work in coordination and harmony and continuously realign themselves in the ever-changing environment driven by newer innovations and technologies. There is need for a Mission to propel India towards the Fourth Industrial Revolution.

The Mission will be tasked to design appropriate academic curricula in close cooperation with industry and research institutions. Additionally, skilling and reskilling schedules would be worked out to match the requirements of the industry within and also abroad. In order to meet the emerging requirement, the objectives of the Mission would include reskilling of those workers whose skills are becoming redundant. For jobs requiring newer skills, manpower planning would ensure the ready availability of workers. Towards this end, the Mission would be required to establish closer links between industry and skill development agencies and also academic institutions. The Mission would also be required to develop technology forecasting systems to monitor new technologies on the horizon and derive mechanisms to become pioneers in taking advantage of emerging technologies and innovations. Such a mission would be mandated to adapt the technologies and innovations of presently disadvantaged areas and segments. Some technologies like 3D printing and solar energy have the potential of developing regions, overcoming the constraints of conventional infrastructure. The Mission would identify technologies and innovations that can be adapted to in order to improve sanitation, agricultural productivity and water management.

The task before the Mission would be such that it would require a continuous, coordinated approach of a host of diverse stakeholders in order to succeed with a strong political mandate and financial and administrative autonomy. The Mission's target would be to enable India to take optimum advantage of the Fourth Industrial

Revolution for all segments of the population. As in the previous industrial revolutions, nations that can take advantage of the revolution will prosper and those that cannot would fall back. The reasonable success of the Third Industrial Revolution should make us feel optimistic about the Fourth Industrial Revolution.