

Injecting dynamism into ‘Industry 4.0’

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Get the basics right: Build a strong digital foundation before ehgaging new tech - Getty Images/iStockphoto

To become competitive, India should synthesise its production processes with new technologies and develop dynamic capabilities

As the Prime Minister reiterated in his Independence Day address, under Atmanirbhar Bharat we will not just ‘make in India’, but ‘make for the world’. The first template has been established — the performance-linked initiative announced for smartphone manufacturing has attracted a slew of MNC and Indian phone-makers, third-party manufacturers and component companies. Significantly, an increasing number of Samsung and Apple phones will be made in India. These two companies together account for more than 30 per cent of the global market share in smartphones. The total value of mobile phones and components manufactured is estimated to be at ₹11.5 trillion over five years, and about 60 per cent by value is likely to be exported.

While production units and investment-linked performance initiatives are a good start, India should use this opportunity to link incentives to the adoption of modern manufacturing practices, including those that are today at the heart of Industry 4.0. This will help Indian manufacturing be globally competitive in the long-term.

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Not surprisingly, Industry 4.0 is on the radar of world leaders who want to transform their countries into manufacturing powerhouses in the 21st Century. “We must...deal quickly with the fusion of the online world and the world of industrial production. In Germany, we call it Industrie 4.0.” said German Chancellor Angela Merkel. Industry 4.0 began as a national strategic initiative from the German government through the Ministry of Education and Research and the Ministry for Economic Affairs and Energy about a decade ago. It has now become an important aspect of national manufacturing technology policies in many countries, including those in Asia — China (Made in China 2025), Japan (Society 5.0), Korea, Malaysia, Thailand, and Vietnam.

Dynamic technologies

Industry 4.0 conjures up visions of robot factories sans humans, and technologies like augmented and virtual reality (AR/VR) to remotely control production lines. Before focussing on these cool technologies, Indian manufacturing companies will do well to get the foundational technologies in place. These include the Internet of Things (IoT), high-speed data communications, the cloud, and data analytics including, those that leverage artificial intelligence and machine learning. Companies can then build on top of this foundational layer and adopt other digital technologies like simulation, AR/VR, autonomous robots, etc.

But, more than the digital technologies per se, it is important for companies to synthesise organisational and managerial processes along with digital technologies into dynamic capabilities. The dynamic capabilities framework, made popular by David Teece, Gary Pisano and Amy Shuen, postulates that the superior performance of companies depends on integrating internal technological, organisational, and managerial processes to address rapidly changing and demanding business environments. The traditional outside-in perspective of strategy based on product-market fit is inadequate in the current context and companies need to focus on the inside-out dynamic capabilities like combining digital technologies that power Industry 4.0, functional and organisational processes, and industry domain-specific requirements to power superior performance.

Innovative work practices

How will such dynamic capabilities help companies? Let us look at some contexts.

India is now the pharmacy of the world. Imagine a pharmaceutical company that has the contract to manufacture a vaccine for Covid-19 for both domestic and exporting markets. One of the challenges in the pharmaceutical industry is the presence of counterfeit products. How can the pharmaceutical company and the drug control authorities ensure a counterfeit-free market for Covid-19 vaccines? One solution is for drug control authorities to generate unique numbers securely and in real-time, and transmit them to the printing and packaging machines on the vaccine assembly line. These unique numbers are printed on each vial. This process is entirely automated and there is no human in the loop. The unique number is used to track and trace the vaccine vial through the supply chain, from the

manufacturer to the patient. A duplicate number identified in any part of the supply chain sends real-time alerts to all the constituents and the appropriate country's drug control authority. Taking stringent measures to block counterfeits upfront will further entrench Indian pharmaceutical companies as preferred suppliers.

Covid-19 has highlighted the importance of good-quality medical devices like ventilators, pulse oximeters, non-contact thermometers, etc. One of the critical requirements of medical devices is to ensure they are calibrated correctly. In the case of expensive medical devices like imaging equipment, the OEMs send their service engineers to re-calibrate the equipment. This approach may not be feasible for inexpensive devices. Why not switch them for IoT devices? These devices can connect to the Internet for correct calibration. As a value add, they can be used to trigger a health helpline based on pre-set parameter limits. Such devices have significant export potential.

The recent lockdown and consequent reverse migration have resulted in a dearth of trained workforce in the warehousing function of Indian manufacturing, logistics, and e-commerce companies. The replacement workforce required a few weeks of training before it became productive. Digital technologies like AR are useful in this context. An AR headset that resembles and feels like normal spectacles can make workers more productive by superimposing the details of a pallet in their field of vision. This frees both hands for picking, pallet building, etc. and improves productivity by eliminating the need to move back and forth between a paper or hand-held scanner and actual work. The AR headset can also directly connect with stock-taking and replenishment systems in real time. This is an example of how an Industry 4.0 cyber-physical system works with humans — a context that is important in a labour-intensive country like India.

Upskilling professionals

All this is possible only when companies have a cadre of professionals that is capable of nurturing these dynamic capabilities to synthesise solutions that generate superior performance. This cadre is proficient in the functional aspects of management, data analytics, industry domain dynamics, and digital technologies. India should ramp up learning programmes that offer a blend of two or more of these attributes.

India also has a large cadre of professionals who are well versed in all aspects of digital technology. This cadre is being upskilled on the latest digital technologies that are useful in the Industry 4.0 context. Mid-career MBA programmes and focussed online programmes provide an opportunity for digital technology professionals to acquire proficiency in the functional aspects of management or in data analytics. So far, industry domain competence is picked up on the job. In the complex context of Industry 4.0, it may be important for formal learning interventions on how specific industry domains will be impacted and transformed by digital technologies.

It is time Indian manufacturing companies synthesise their traditional strength in design and engineering at affordable cost, with strength in digital solutions and data analytics, and

world-class managerial expertise to develop unique dynamic capabilities that can propel Indian companies to global leadership positions in the Industry 4.0 era.

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