

THE FUTURE OF WORK

IN THE NEAR FUTURE, MORE COMPANIES ARE EXPECTED TO AUTOMATE ALMOST ALL PROCESSES IN MANUFACTURING WITH LITTLE LEFT TO DO ON ONE'S OWN.

BY JAYASHREE KINI MENDES

THE FUTURE IS DIGITAL, IS WHAT WE HAVE so often heard. Going by what has unfolded last few years in terms of technology, we have also come to believe it. The old ways of manually working out any task is passé. In the world of manufacturing, how will factories of the future be organised and managed? Are there any implications for the way data will be used, production networks operated, and manufacturing enterprises structured?

According to industry experts, a key factor that is driving transformation to factories of the future is the changing nature of demand. With customers demanding more variable value-adds, the manufacturer needs to support this with much more precision and speciality around the products.

Pawan Sharma, CEO, solutions & services, KPIT Technologies, says, "At the end of the day, the question that should be asked is whether the manufacturer

is in a position to improve customer satisfaction, add to employee experience, and also supplier experience. This includes the way processes are digitised, right from concept to customers. It also includes R&D. Smart manufacturing is what companies in India should have. If you look at the Western countries, they already have factories of the future, which means they have automated to such an extent, that they have a ready blueprint that helps them set up a factory in the shortest possible time. Let's say you have a setup in Chennai, and if you are looking at opening one in another city, it should be done in the shortest possible time. Most things remain the same. Employees too can quickly move and settle in Mumbai or Chennai. It's all about time to market."

Speaking of some of the innovations that Delta Electronics has introduced, **Manish Walia, head, industrial automation business group, Delta Electronics India**, says, "As far as Delta is concerned, we have been working on most product lines used in factories

or factory automation. It's all about making products smarter and we work in a factory-related environment so that we can encourage manufacturing companies to take their production to the next level. The idea is to connect factories and getting all the data at one place thus allowing customers to get the desired results of output, while making processes precise and efficient."

The factory of the future is entering its fourth revolution (a.k.a. Industry 4.0) and is characterised by a merging of the Internet and factories. At each link in the production and supply chains, tools and workstations communicate constantly via the Internet and virtual networks. Machines, systems, and products exchange information both among themselves and with the outside. By optimising production tools, manufacturers hope to speed up production at a lower cost, and in a more environmentally sound way.

DISRUPTIVE ACTS

The Factory of the Future is the product of fast-changing disruptive technologies that has taken the manufacturing sector by storm. **Meenu Singhal, VP, industry business, Schneider Electric**, says, "Digitalisation, automation and networking of processes encompasses all functions, areas and segments of the manufacturing industry – including economic (and macrosocial) action. Manufacturers who have at least partially implemented smart manufacturing initiatives have documented measurable results with 82% reporting increased efficiency, 49% reporting fewer product defects and 45% reporting customer satisfaction gains."

In India, mechanical automation and computerisation has been reasonably well-adopted. Most manufacturing companies have also deployed ERP systems, though they are primarily used for non-core activities such as inventory, ordering, invoicing and billing. However, there is very little digitisation and



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2. It is essential for every company to adopt processes and machinery to become competitive.



"Companies at the forefront of Industry 4.0 will not only have an edge over competitors, but will also be poised to overtake established firms in completely different markets."
— Thiru Vengadam

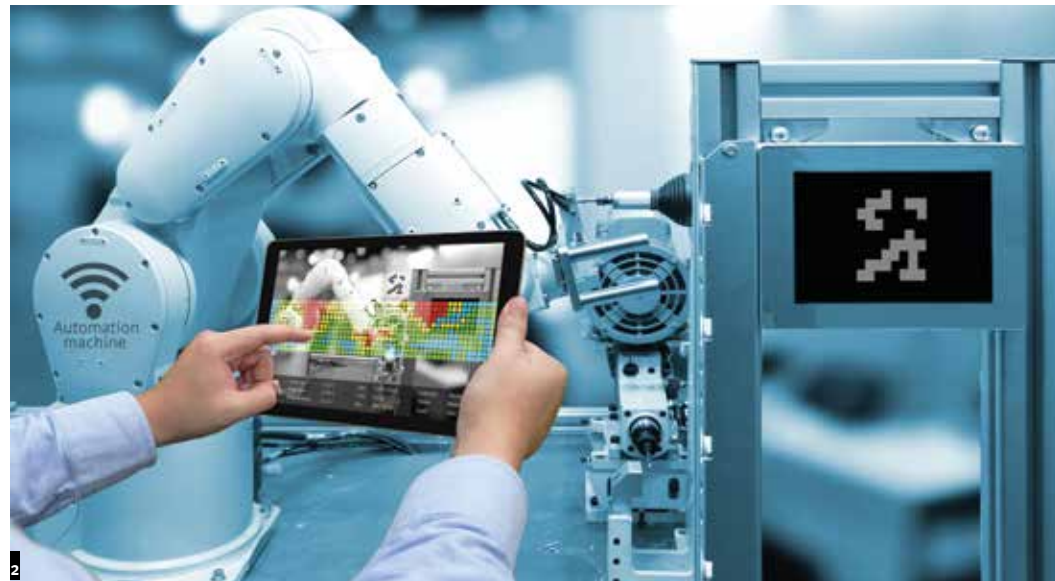


"Seamless visibility and flexibility to drive each worker, to place them at the right jobs with insights in psychology, an amalgam of robotics, AI and IoT around the smart worker is the future of manufacturing."
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"The data and analytics from a lifecycle of products must feed into improvements in designs and products ultimately uplifting the benefits to the end customer experience."
— Kishore Jayaraman

2 & 3. Modern manufacturing helps embrace technologies such as AI, data and predictive analytics, etc.



digitalisation in Indian manufacturing today.

R Venkateswaran, senior VP, IoT solutions, Persistent Systems, "The high-end technologies available globally may not be directly applicable to the Indian scenario. These technologies need to be adapted before they can be adopted for Indian manufacturing. Instead of a big-bang, "all-or-nothing" approach, a phased approach is likely to work better for Indian companies, given that they are usually risk-averse and wary of technology adoption. The first phase is the creation of the Data Lake through digitalisation and connectivity of various factory systems. The dashboards and data visualisation help factory managers in "data-based" decision making, leading to improved business outcomes."

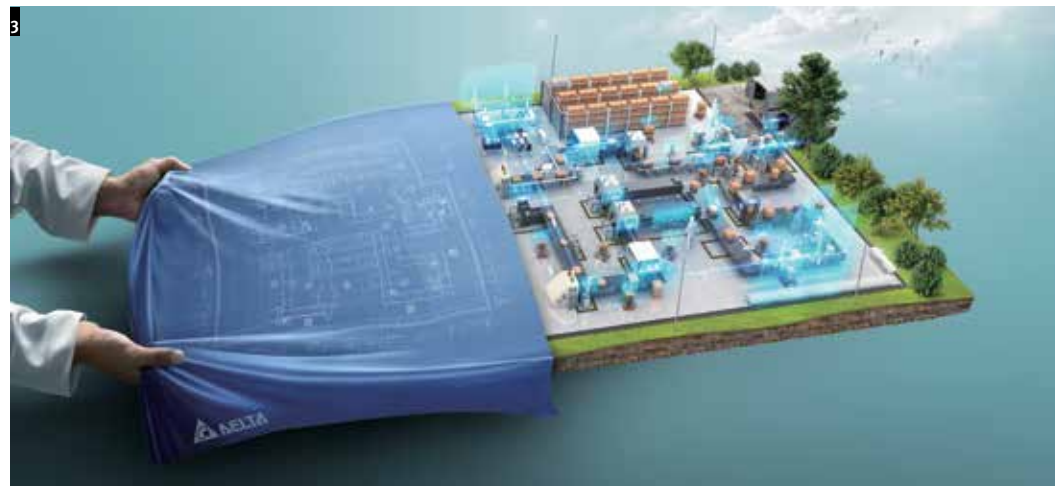
With the data lake in place, the subsequent phase of technology adoption focuses on actionable insights and recommendations from this data, paving the way towards "data-assisted" decision making. With further advancement, the cognitive & deep learning systems can evolve to further improve the "automated data-driven" decision-making towards high-valued business outcomes with minimal human intervention. At each phase, the technology can be tweaked and

adapted to better align with addressing the challenges and requirements of the manufacturing companies.

In a typical manufacturing organisation, most business partners will be SMEs. So how can companies plan to raise them up to Industry 4.0 levels? **Dr Andreas Wolf, joint MD, Bosch Ltd,** says, "Industry 4.0 requires huge investments, but that is not in terms of money, but in terms of mindset. To understand the concept requires asking the right questions, which must come from within. It is the reason we set up Industry 4.0 Academy. We are starting this for the leaders before moving down."

Implementing production levelling across factories also includes the implementation of a Kanban pull system. "The entire system works like an orchestra. So we produce in shifts, de-couple, and ensure that goods reach the customers through a FIFO (first-in-first-out) method. It means we need to have a good plan and a strong execution for the principle of 5S to work well. Total Productive Maintenance and Preventive Maintenance are also part of these principles. So decoupling is very important and the idea is to use it for daily improvement of the performance," he adds.

One of the biggest concerns that confronts manu-



facturers today is education and training among the skilled workforce. "Manufacturing will become more highly skilled; the laws of supply and demand mean that manufacturers are going to have to pay more if they want to attract the talent needed for the next industrial revolution. The sector will also become more sustainable. But the biggest changes to the factory of the future will come from technology. Computer-aided design and simulation reduces time and cost of bringing new goods to market. Advanced robotics makes automation cheaper and more flexible. New production processes shall be adopted. To summarise, manufacturing is no longer just about production. Production is now the core of a much wider set of activities," says **Arjun Bajaj, CEO, Daiwa TV.**

CENTRES OF EXCELLENCE

But all is not lost. In recent times, much innovation and technologies have been recent adopted globally and in India. **James Thomas, country manager, Kronos Incorporated,** says, "Seamless visibility and flexibility to drive each worker uniquely embedded to his skills, to place them at the right jobs at the right time with deep insights in human psychology and guided intuitive decision making, an amalgam of robotics, AI and IoT around the smart worker is the future of manufacturing. So robots, computer vision, the flexible worker who can manage his work from anywhere, may emerge. It's a hugely exciting 3.0 unfolding in front of us."

It's important for Indian manufacturers to stay current if they wish to remain successful. Positioning oneself for growth means looking to the future

and gaining efficiencies through new technologies. Manufacturers that aren't prepared for the coming global megatrends and don't invest in breakthrough technologies could be rendered irrelevant—and more often than not, it will happen at a much faster rate than they ever could have dreamed possible. **Thiru Vengadam, regional vice president for Epicor Software in India,** says, "Companies at the forefront of Industry 4.0 will not only have an edge over competitors, but will also be poised to overtake established firms in completely different markets. We're already seeing this with Google and Apple giving automotive manufacturers a run for their money. Both technology giants are advancing the intelligent and self-driving vehicle trend, forcing auto makers like GM and Ford to play catch-up."

Recently, Siemens in India announced the expansion of its Industry 4.0 offerings with the launch of four MindSphere Application Centres across the country. The



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4. A future factory will ensure that the first product and the 100th product will have the same quality.

5. Smart tools help enable the workforce to unlock their potential with data driven insights into work behaviour, practices, productivity and flexibility.





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6. More machines that collect information can be analysed and made actionable autonomously, with wearable technology and mobile devices, making them more productive and efficient.

7 & 8. Devices that speak to each other help in quick problem solving.



centres will be located in Pune, Noida and Gurgaon (two). Siemens is the first company worldwide to set up 20 of these centres for digital customer applications in 17 countries. Each of the centres spans multiple locations in different countries and specialises in a particular industry in which Siemens is active. "The MindSphere Application Centers will enable us to apply our industry knowledge, scale up our digital enabled solutions and enhance long-term support to customers in infrastructure, process industries and the power sectors. Siemens is taking the Fourth Industrial Revolution from concept to reality," said **Roland Busch, chief technology officer and member of the managing board of Siemens AG.**

The terabytes of data collected each day and the increased speed and power of computers, cloud computing capabilities, human-machine interfaces and advanced robotics is enabling organisations to look at things differently. Digitally connected industrial ecosystems are helping save time, increase productivity in manufacturing, making industrial efforts more efficient and predictable. **Kishore Jayaraman, president, Rolls-Royce, India & South Asia,** says, "For complex industrial companies like us, building digital capabilities will provide an end-to-end view of complex products through an entire lifecycle: from research and design, to supply chain and manufacturing leading ultimately to helping our customers maximise the benefits of their

assets and optimise their operations. The data and analytics from a lifecycle of products could then feed into improvements in designs and products ultimately uplifting the benefits to the end customer experience. Data from end customer experiences and operations will then feed back into the design stage."

And quality? Walia says, "The impact of deploying or adding automation is to improve the quality mainly. Other benefits are continuous repeatability, which means the first product and the 100th product will have the same quality standards. However, advanced automation in the production system will guarantee that in the long run, you will need only one or two people from the start to the final packaging product, which means huge cost savings."

To accelerate the adoption of higher-end technologies and make India globally competitive, the government of India is encouraging Samarth Udyog to provide a platform for manufacturing industries and technology solution providers to interact, understand and eventually solve their challenges. This collaboration will foster and help the alignment and adoption of technologies in the context of the Indian manufacturing scenario that can eventually bring about productivity and quality improvements in a cost-effective manner. **MTI**