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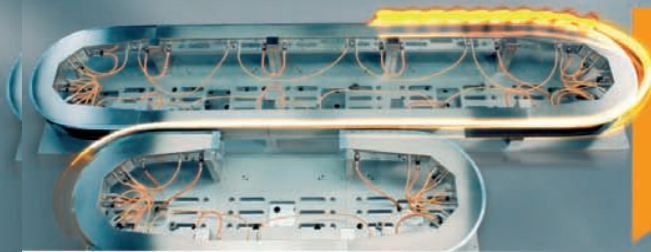
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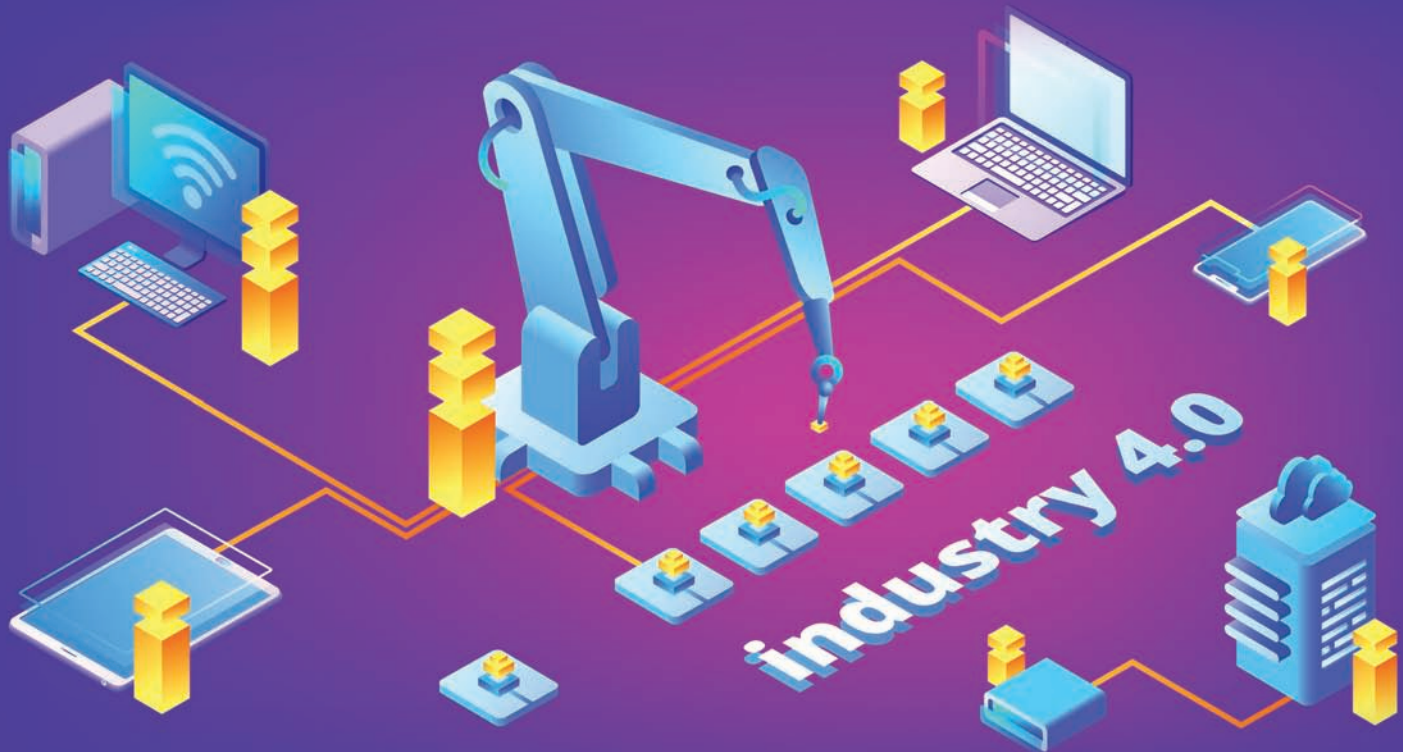
LEVERAGING INDUSTRY 4.0 FOR GLOBAL COMPETITIVENESS

Industry 4.0 is being increasingly looked at as a new-age solution to manufacturing woes. We analyse the plethora of benefits arising out of Industry 4.0 and how small-, mid- as well as large-sized manufacturers can adopt this modern tool to their advantage.

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N ew technologies bring in numerous solutions as well as business benefits for any industry. With the advent of Industry 4.0, manufacturers are looking at bringing in higher efficiency, virtualised machines, lines and processes, higher throughput and productivity. In addition, they are now looking at better resource and asset utilisation, better process optimisation, and easier data and information exchange for analytics that can help them take calculated decisions. This provides a big opportunity for manufacturers to be front runners and leverage various technology benefits for being competitive globally. Instead of Industry 4.0 being a revolution or disruption, it is more of an evolution of the industry.

Significance of Industry 4.0 in manufacturing

Increased visibility of production shop floor activities helps in improving productivity and efficiency. Predictive maintenance and reduced downtime saves costs and makes it accurate to derive production/operation cost. V.G. Sakthikumar, Managing Director, Schwing Stetter India Private Limited, Member of governing council, ICEMA, Chairman of Mechanisation committee, Builders Association of India, elaborates, "Effective utilisation of available resources helps in effective planning and timely delivery of end product to the customer, helping in better customer experience. It helps in increased knowledge sharing and collaborative working and makes a system flexible and agile. It helps to make compliance easier and can create job opportunities."

Rajesh Nath, Managing Director, German Engineering Federation (VDMA), adds to this by saying that adoption of Industry 4.0 by manufacturers provides benefits like higher quality, greater flexibility, higher productivity, standardised development, faster launch of products in the market, continuous benchmarking and improvements, attractive jobs by integration of engineering, automation and IT and new services and business models

Vijay Rajpurohit, Managing Director, Chemical Process Piping tells us, "Industry 4.0 shall impact businesses in general and manufacturing in particular. Connected machines shall collect tremendous volumes of data that can inform maintenance and performance amongst other issues. Analysis of that data will identify patterns and give insights, which would be normally impossible for a human

to achieve. Industry 4.0 shall enable manufacturers to optimise their operations quickly and efficiently by knowing what part of their business needs attention. Logistics and supply chain can adjust and accommodate when new information is presented. Manufacturing units with robots which are more affordable now will bring efficiencies and be able to do work in areas that are generally dangerous and or uncomfortable to humans."

Government to the aid

Regulatory schemes like Smart Advanced Manufacturing and Rapid Transformation Hub (SAMARTH) – Udyog Bharat 4.0 are helping OEMs to increase adoption of Industry 4.0. As Nath says, "Schemes such as SAMARTH – Udyog Bharat 4.0 under the aegis of the Department of Heavy Industries would act as an enabler for increasing the penetration of Industry 4.0 in India by 2025. As implementing Industry 4.0 requires a multidisciplinary approach, I am fully confident that this initiative encompassing various aspects like awareness creation, setting up experience demo centre, training and skill development, industry–academia cooperation, engineering research, and international cooperation would be helpful to create an ecosystem in our country. In addition, setting up five incubation centres and creation of 15 Innovation Technology Hubs, albeit in the initial stages, displays the commitment of the government towards developing Industry 4.0 environment in India."

Rajpurohit states that the mandate of the scheme is to raise awareness about Industry 4.0 among the Indian manufacturing industry through demonstration centres. This initiative helps MSMEs to benefit from various new technologies while closing a quality gap faced with the best in class. It will also help in assimilating new technologies, and ultimately enable the manufacturing of good quality export products.

Ninad Deshpande, Head – Marketing & Corporate Communication, B&R Industrial Automation, adds that through SAMARTH Udyog, the Government of India is not only enabling awareness amongst Indian SMEs and MSMEs, but also providing a platform to witness a live working project on Industry 4.0. He says, "In addition, they are acting as facilitators for such MSMEs and SMEs who wish to move forward in their digital transformation journey but lack awareness and resources in implementing prototypes."

Moving towards an Industry 4.0 environment

Adopting Industry 4.0 requires taking the right steps within a certain budget so that manufacturers do not find it costly and cumbersome in the long run. We ask different manufacturers on how to do this right so that even MSMEs can do this within a strict budget easily. Deshpande says, "This is a two-step process; manufacturers need to understand available technologies and the benefits and RoI of adopting technologies. They then need to identify the gaps in their existing processes and operations. Once these steps are done, they will have clarity on which technologies will bridge their existing

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gap and make operations more efficient and how much investment would be needed. Moreover, it is essential for manufacturers to get a buy-in from all stakeholders to ensure a successful journey."

Venkat SP, Director, Software Development, Detroit Engineered Products (DEP), elaborates, "Manufacturers can take a step-by-step approach. First is to understand and set up parameters that need to be monitored from the perspective of preventive maintenance and then set up systems to gather data. Work with organisations that can analyse data and build predictive models for them that can be validated. This can start from the lines in collaboration with the customer, as the customer is the end benefactor of this. Many manufacturers do have R&D budgets already and this initiative could be 25 percent of the R&D budget. This way it is possible to cover each aspect of Industry 4.0 systematically."

According to the Indian Machine Tool Manufacturers' Association (IMTMA), manufacturers should usher physical automation on the shop floor, cyber automation encompassing capturing live and dynamic data from all assets and sources, analysing data and generate MIS for decision making. Manufacturers also need to move towards digitisation through building a roadmap for Industry 4.0

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transformation and developing human resource in Industry 4.0 competency. They also need to establish communication between all devices, sensorise devices for capturing data, and enhance development and integration of software and apps for monitoring operation, maintenance and product development life cycle. Smaller firms are doing this in phases without disturbing their daily manufacturing activity.

Challenges in adopting Industry 4.0

Hurdles can be broadly classified into adaptation and implementation challenges. Key issues like uncertainty in capex requirement and ROI availability, limited cybersecurity infrastructure and information storage infrastructure, and fear of failure come under the adaptation challenge. On the other side, issues in integration of new and old technologies, customised data selection for decision making, best-fit economical solution, lack of skill set to operate and support new system are some of the issues on the implementation side.

Venkat says, "One of the hurdles is the thought process that it is tech-intensive and could take lot of investments. Another is how to start and where can they get help from. Platforms like SAMARTH from the government are a great way to learn about the possibilities and how to approach I4.0 for their set-up. Exchange of ideas and knowledge goes a long way in bridging gaps. Manufacturers can start setting up small workgroups internally that focuses on the knowledge and skill and then plan the areas of deployment systematically."

Rajpurohit says that besides challenges like supply chain, security, knowledge enhancement and skill upgradation in the process of adopting Industry 4.0, there are other concerns too such as general reluctance to change by stakeholders, business model adaptation, data security, privacy concern, loss of many jobs to automatic processes, lack of regulation, certification, need to avoid expensive production outages, IT security issues, reliability and stability needed for critical machine-to-machine communication (M2M), and protection of industrial know-how. He adds, "Manufacturers need to arrange training of their employees by experts/consultants to enhance skill sets in the new environment. There should be collaboration across industries through bodies such as CII, FICCI,

and PPMAI. We have to include in this team others from IT and electrical industries. In short, collaboration by a whole host of industries will ensure that the entire chain works seamlessly."

Ground reality of the Industry 4.0 journey

To understand how Industry 4.0 has actually helped OEMs in their businesses, we ask manufacturers their actual experience of Industry 4.0. Nath shares, "In order to carry forward this transformational journey, VDMA has established the Industry 4.0 Forum. Together with members, this forum coordinates with industry, research bodies, and policymakers in Germany and Europe on various aspects of implementation of Industry 4.0. VDMA together with Fraunhofer Institute has established guidelines based on the IEC Standard Open Platform Communications, Unified Architecture (OPC UA) for Industry 4.0. These guidelines show action steps that help to implement the Industry 4.0 communication in the organisation and are based on standardised and consistent exchange of information across all layers of automation systems."

Rajpurohit adds, "CPP started its journey towards Industry 4.0 when we planned to set up a Continuous Winding Plant in Vadodara, India for the manufacture of GRP piping for the water industry. We ensured that the main manufacturing processes are connected in such a way that they communicate with each other and ensure minimum human intervention. This allows for consistency in quality and very low rejection levels. Besides, the entire machine can be controlled remotely which helped us when we needed the machine supplier to intervene and suggest improvements in some of the features. We shall now work on creating systems to enable integration of downstream processes such as hydro testing."

Deshpande discusses, "What today is paraded under the banner of Industry 4.0 has been common practice at B&R's own production facilities for nearly a decade. The smart factory in the Upper Austrian town of Eggelsberg has been fully networked since 2006 and is being upgraded all the time. What for us is business as usual has since been given a name: Industry 4.0. We can produce a one-off item with the same efficiency as a batch of 1,000."

Working with a solution provider for implementing Industry 4.0

Sakthikumar explains, "As an end user, we need to know the actual cost spend to manufacture an Industry 4.0 product. Identifying the way starting from production to aftersales helps to cut down the price without compromising on quality and these are possible only by capturing data and deploying analytical tools. These technologies are split into vertical integration, virtualisation, automation, traceability, flexibility, and energy management."

Deshpande concludes, "Such a transformation project is a journey. Hence, end users need to understand that in such a project they need to have trust in the solution provider and look at him as a partner." There needs to be complete transparency while working with the partner. The end user needs to thoroughly evaluate the solution provider's technical expertise, his ability to execute and collaborate in such long-term projects. All stakeholders need to understand that a successful implementation is based on strong collaboration amongst various entities. ⚙