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FOUNDER: R V PANDIT

Printed and published by Tarun Pal for **IPFonline Ltd. Industrial Products Finder**, (ISSN 0970-6895) is a product news magazine. It is a monthly publication with the publishing office located at First Floor, Canara Bank Building, 103, Greaves Road, Thousand Lights, Chennai - 600 006. **Industrial Products Finder** is registered with the Registrar of Newspapers for India under No RN 22739/72. Format and style of presentation Copyright, © 2017 IPFonline Limited, First Floor, Canara Bank Building, 103, Greaves Road, Thousand Lights, Chennai - 600 006.

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EDITOR'S NOTE

Making it smartly in India

India's manufacturing has been taking a steady stride towards Industry 4.0 in the last few years. As per NASSCOM study report, Industry 4.0 is at an inflection point in Indian manufacturing, with more than two-thirds of Indian manufacturers embracing the digital transformation by 2025. It is estimated that Indian manufacturers spent \$5.5-\$6.5 billion for Industry 4.0 in FY21. While 50 per cent of the Industry 4.0 spend was for foundational technologies (like Cloud and IoT), 35-40 per cent of the companies are at proof of concept (PoC) stage waiting for a rapid PoC-to-production transition. In the next 18-24 months, companies are planning to ramp up investments in emerging network technologies, big data analytics, remote-controlled monitoring and automation.



In India, the level of adoption of state-of-the-art technologies varies across industries with export-oriented sectors like automotive, pharmaceuticals, textiles, etc showing higher level of automation. While companies had already started investing in digital solutions before the pandemic, the adoption of these technologies gathered momentum during the Covid pandemic. A cautious approach towards digitalization made way to enhanced interest levels. For example, the pandemic tested the resilience and flexibility of enterprises in verticals like pharma, which had to manufacture and reach vaccines and other lifesaving drugs across the world.

Some of the challenges in adopting advanced technologies are presences of large number of small & medium enterprises (SMEs), difficult to prove return on investment (RoI), low level of understanding about Industry 4.0, lack of skilled manpower, etc. One of the biggest hurdles, especially in large companies, is the presence of legacy equipment, which either need massive upgradation or complete replacement; thus, needing high upfront cost, which dithers investment.

Most of the companies have already taken steps towards modernisation by using factory automation products like PLCs, HMI, VFDs, AC servo systems, etc. Though robotics is not yet fully adopted by manufacturers, slowly things are changing on the ground. Robotic adoption is increasing in segments where repetitive movements and hazardous tasks are involved.

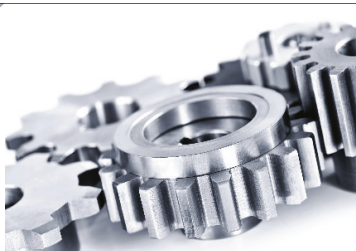
Digital twin is gaining traction among Indian manufacturers. According to Gartner, over two-thirds of companies that have implemented IoT would have deployed at least one digital twin in production by 2022 to increase their effectiveness. Similarly, companies are opting for additive manufacturing (3D printing) to reduce the lead time and raw material needed to manufacture complicated parts.

With most factories switching to IoT, big data analytics and intelligent machines for increasing their operational efficiency, the smart manufacturing revolution is upon us. Shifting focus from cost to incentives for quality and globally competitive solutions will further boost adoption of smart solutions. Smart factory concept is driving the future of manufacturing by bringing new changes in manufacturing plants across the globe.

The Government of India has set an ambitious target of increasing the contribution of manufacturing output to 25 per cent of GDP by 2025 from 16 per cent currently. To achieve this objective, Make in India must be integrated with the principles of Industry 4.0 and make the transition to smart manufacturing.

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Reducing costs with smarter solutions



India's manufacturing sector has come a long way - from adopting an import-substitution approach to building world-class products. The government's Make-in-India (Aatmanirbhar Bharat) policy and Production-Linked Incentive (PLI) schemes for various industrial segments are expected to give a further boost to the sector. Global firms are opting for China-Plus-One policy and this presents India a great opportunity to become an alternative manufacturing hub of the world.

To become a front runner in today's competitive environment, Indian manufacturers will have become "smart" with respect to product, manufacturing technologies, business strategies, etc. For smart manufacturing, integration of OT (Operational Technology) and IT (Information Technology) is imperative. As the factory automation products are becoming more intelligent and robust, companies will have to integrate these products with various software for fetching accurate manufacturing-related information to increase the productivity, better manage supply chain issues and improve overall business efficiency. Net effect of all these will be reduction in cost of doing business.

In India, small and medium enterprises (SMEs) play a big role in the Indian manufacturing sector. So, in a globalised world, are there cost-effective ways for SMEs to make manufacturing more efficient? Well, that depends on which sector the company is in. For example, if a company manufactures low-volume,

highly precise products, then additive manufacturing (3D printing) can help them scale up intelligently. SMEs can also opt for smart manufacturing by having digital inventories and digital twins. This way any part can be manufactured at any given point at any given time and scale.

Besides, there are various low-cost automation solutions available in the market. These solutions are scalable and can be implemented in phased manners. But before you start the modernisation journey, it is very important to define the objective in terms of improving product quality, reducing energy consumption, lowering maintenance cost, integrating supply chain, etc. With clearly defined objectives, a scalable solution can be implemented.

Trends and developments in the world of IT like 5G, artificial intelligence, edge computing, machine learning, and digital marketplaces as well as new forms of collaboration are providing additional momentum to the manufacturing world and are changing industrial workflows. With complexity and uncertainty increasing in the world, what really matters (for both large companies as well as SMEs) is the agility to manage business efficiently in a volatile market. This is where smart solutions come in handy.

This Edition of "Smart Manufacturing" highlights on how factories are switching to smart solutions like IoT, big data analytics, intelligent machines, digital twins, additive manufacturing, etc to increase the efficiency of their operations and keep cost under control.

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Indian manufacturing sector taking strides towards Industry 4.0

India's manufacturing industry aims to increase its share to 25 per cent of GDP (or \$ 1 trillion by 2025) and become a global hub. To achieve this objective, Make in India must be integrated with the principles of Industry 4.0 and make the transition to smart manufacturing, says **Ramesh Bhorania**.

Indian manufacturing industry and its ecosystem is making strides in the Industry 4.0 revolution. The participation by the industry may not be big in size and scale, but smart moves are going to have great impact. According to a NASSCOM study report, Industry 4.0 is at an inflection point in Indian manufacturing, with more than two-thirds of Indian manufacturers embracing the digital transformation by 2025; thereby, contributing to the goal of raising India's manufacturing GDP to 25 per cent. Indian manufacturing has started pivoting to digitalization, with \$5.5-\$6.5 billion spent on Industry 4.0 in FY21.

While 50 per cent of the Industry 4.0 spend is on foundational tech (Cloud and IoT), 35-40 per cent of the companies are at PoC stage and will need rapid PoC-to-production transition. In the next 18-24 months, companies plan to ramp up investments in emerging network tech, big data analytics, central and remote-controlled monitoring, and automation.

It is clear that measurable RoI, consistent data policy, ecosystem support, and investments by GoI are the key to accelerate adoption of Industry 4.0. India's manufacturing clusters or industrial corridor policy will be critical in creating smaller hubs for focused investment and innovation. MSME incentives through dedicated GoI contracts or industry-led initiatives will transform the 90 per cent base of Indian manufacturing. Shifting focus from cost to incentives for quality and globally competitive solutions will boost adoption.

Need for modernisation to increase competitiveness

Modernisation is the improvement or upgrading of existing code and physical infrastructure (plants,

machines, processes, and so on) to improve product quality and provide consumer value to achieve business objectives. It is also undertaken to engage in proactive competition and gain competitive advantages. This also helps the company to face the workforce attrition, retention, and training scenarios effectively. It is no secret in manufacturing that companies face difficulty in finding skilled and qualified employees. It also helps to understand the key role played by technologies like automation, robotics, advanced instrumentation & sensors, IoT/IIoT, and digitalization in the advancement of manufacturing.

Industrial automation and robotics are the use of computers, control systems and information technology to handle industrial processes and machinery, replacing manual labour and improving efficiency, speed, quality and performance.

Automated industrial applications range from manufacturing process assembly lines to surgery and space research. Early automated systems focused on increasing productivity (as these systems do not need to rest like human employees), but this focus is now shifting to improved quality and flexibility in manufacturing and more. Modern automated systems are developing beyond mechanisation with the addition of artificial and machine learning.

Making Indian industries smart

Smart factory is technology driven concept that is driving the future of manufacturing by bringing new changes in manufacturing plants across the globe. It is setting the trend in the whole new world of Industry 4.0. A new in which latest technologies, including Internet of

things (IoT), Industrial Internet of Things (IIoT), autonomous robots, simulation, augmented reality (AR), big data, cloud computing, additive manufacturing, vertical and horizontal system integration. Here automation come together with robotics connected remotely to systems equipped with machine learning algorithms that can control the robotics with minimum human



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Industry 4.0 has highly intelligent, connected systems that create a fully digital

value chain. Here the objective is that the machines talk to other machines and products and information is processed and distributed in real time, resulting in profound changes in the entire industrial ecosystem.

The manufacturing trends in 2022 include:

Accessible automation: New technologies that have made automation more accessible to manufacturers are changing the way companies operate. "Automation for all" is the next step in the industry. Automation is made possible with easy-to-use robotics solutions, user-friendly Manufacturing Process Management (MPM) systems, and human-robot collaboration. With manufacturing automation, organisations are reducing costs, optimising workflows, and increasing their bottom line.

Mobile robotics: According to the ABI Research 2022 Trend Report, a total of 45,000 collaborative robots (cobots) and 452,000 mobile robots are expected to be shipped in 2022, a 65 per cent and 51 per cent increase from 2021. One of the primary drivers of this manufacturing trend is autonomous mobile robots (AMRs). While robots used to mean ultra-sophisticated technology that required trained roboticists, new robotics technology is making automation attainable for companies of all sizes.

Internet of things (IoT): IoT helps manufacturers connect to and monitor the various components of their operations, gaining insight never before possible. This connectedness gives manufacturers valuable data that enable them to change, optimise, and improve every facet of their manufacturing process. Using smart sensors and cloud connectivity powered by the internet, IoT is propelling the advancement of the industry. Companies are improving safety, saving money, streamlining manufacturing and even creating new products with IoT capabilities.

Enterprise resource planning (ERP): Enterprise resource planning technology has been in the manufacturing industry for years but is gaining widespread usage with the availability of cloud-based SaaS options that are easy to deploy and more affordable for small businesses. ERP systems help manufacturers automate different areas of operations under one comprehensive system. This universal touchpoint then gives manufacturers the insight they need to oversee the entire manufacturing operation and make improvements and adjustments where needed.

Universal connectability: Technologies and innovations in the manufacturing space were traditionally billed as a one-size-fits-all solution. Your operations had to fit the mold of the technology, which limited manufacturers' options and made certain capabilities unavailable to them. New manufacturing trends are seeing that balance flip. Essentially, technology and manufacturing advancements can now be tailor-made to your operations, without the cost of a

fully custom solution.

Industry 4.0: A term created to describe the current trend in manufacturing toward "smart factories," Industry 4.0 is shorthand for the fourth industrial revolution. Many of the trends on this list contribute to and make Industry 4.0 possible. The widespread adoption and understanding of the latest manufacturing tech – IoT, the cloud, advanced computers, robotics, and the human workforce – all work together to empower Industry 4.0. Companies looking to stay relevant, competitive, and thrive in the marketplace must take advantage of the technological advancements that have sparked the fourth revolution in the manufacturing industry.

Artificial intelligence (AI) and machine learning (ML): Because companies have access to more data than ever before, tools that enable them to make the most of that data, like artificial intelligence and machine learning, are having a major impact on manufacturing. AI doesn't mean walking, talking robots, but instead refers to a computer system's ability to recognize trends and infer logical conclusions that can help manufacturers make data-driven decisions.

AI and machine learning can help improve many aspects of a manufacturing operation, such as: Inventory management, Supply chain visibility, Warehouse cost reduction, Asset tracking, Forecasting accuracy, Transportation cost reduction and more

Predictive maintenance: Made possible by IoT, AI, and machine learning, predictive maintenance is helping manufacturers avoid downtime by catching issues before they arise.

Supply chain technology: Overall supply chain operation is being impacted by advances in high mix, low volume (HMLV) manufacturing. Effectively managing the supply chain is vital for manufacturers looking to save on costs, while delivering products to customers when they want it, how they want it. Manufacturing trends are seeing companies invest in technologies that touch every step of the manufacturing process; procurement, inventory, assembly, logistics, transportation, and sales are all impacted by new technologies. For example, adding sensors or barcodes to items allows companies to scan and track parts throughout the process, helping companies quickly see where improvement can be made.

Mobile manipulators: Think of mobile manipulators as the marriage of a robotic arm and an AMR, essentially a fully mobile, self-navigating robot arm that can perform a variety of operations. Robotic arms were traditionally stationary automation tools, helping manufacturers in just one step of the assembly process. But with new-found mobility, they are being used to automate other key areas of manufacturing and can be optimized for collaboration with the human workforce (more on this later).

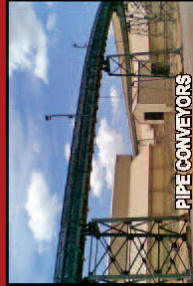
Collaborative robots (cobots): The addition of robotics and automation to the manufacturing industry has sparked concerns about possible negative impact

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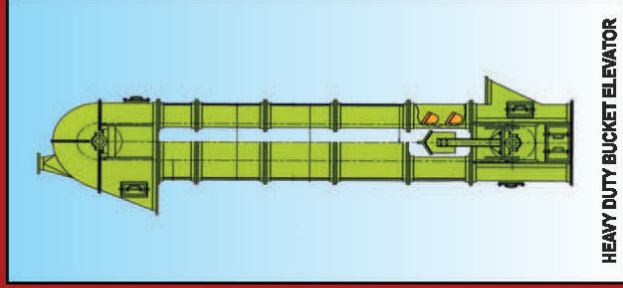
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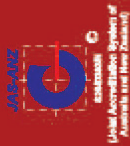
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on the workforce. What manufacturing trends are showing is just the opposite – robots and people working together, collaboratively, in factories and warehouses can get more work done, faster and more safely. Cobots are built for the human workforce to use as a valuable tool that helps improve overall efficiency in the workplace. Consider them as your associate's "ideal co-worker". AMRs are uniquely tailored to this working partnership, as they can be programmed to consistently perform non-value-added work, like moving heavy products, while people focus on skilled labour.

Additive manufacturing: This is the official industry term for what is better known as 3D printing. Using computer-aided-design (CAD) software, manufacturers can now custom build parts and products one layer at a time for their customers. Don't just assume that additive manufacturing is making entire, complete products – this process is also ideal for creating models, prototypes, molds, lost-wax castings, or components of final, finished products. Additive manufacturing is a fast-growing trend in the industry as it is first and foremost a significant time and cost-saving tool.

Automated picking: Speaking of cobots, one of the most common uses of cobot systems in a logistics setting is for picking. In traditional order fulfillment roles, the physical act of walking to pick product accounts for 50 per cent of the entire process, eating up valuable time and money.

Automated picking is achieved when a robot is used to travel throughout the warehouse grabbing the correct product, leaving people to do more skilful work in the fulfilment process. These advances in manufacturing and logistics are improving efficiency – where a human worker could pick between 60 and 80 orders an hour, an automated system can pick up to 300 in the same time frame.

Challenges and solutions on the path

Smart factory challenges come in multiple forms, some of them are as follows:

Technical skills gap: A "technical skill gap" that prevents them from benefiting from their investment. To successfully implement new technology and maintain operations, a company must have a workforce that possesses "digital dexterity"—the people must understand both the manufacturing processes and the digital tools that support those processes.

Data Sensitivity: A 'data sensitivity' culture required from increasing concerns over data and IP privacy, ownership, and management. To successfully implement an AI algorithm, for example, requires that there is data to train it and test it. This means that data must be shared, yet many companies are reluctant to share their data with third-party solution developers. There is also a strong belief that our current data governance policies for internal use within the organization are inadequate to support cross-organisational data sharing.

Interoperability: Lack of interoperability between protocols, components, products, and systems. This is

an ongoing struggle that is not new. Today, however, companies are becoming more frustrated with this interoperability as it limits their ability to innovate. It also limits their ability to upgrade system components, since they cannot easily "swap out" one vendor for another or one part of the system for another.

Security: Security threats are growing concern, both in terms of current and emerging vulnerabilities in the factory. The combination of physical and digital systems in a smart factory makes real-time interoperability possible — but it comes with the risk of an expanded attack surface. With numerous machines and devices connected to single or multiple networks in the smart factory, vulnerabilities in any one of those pieces of equipment could open up the system to attack. Companies will need to anticipate both enterprise system vulnerabilities and machine level operational vulnerabilities.

Handling data growth in amount and velocity as well as sense-making:

As AI usage expands, companies will be faced with more data, being generated at a faster pace, and in multiple formats. AI algorithms need to be easier to comprehend—i.e., how does the algorithm arrive at a recommendation?—and these algorithms must be able to combine data that is often of different types and timeframes.

Role of SMEs in India

Most Small and Medium Enterprises (SMEs) fail to reap the benefits of the latest technological developments (like industry 4.0) in their sector due to a lack of expertise and awareness. Hence MSMEs need to be apprised of the technological developments that are significant for the growth of their businesses. It is important for scientific research bodies to remain involved with the local MSME clusters, and take notice of their technology-related problems and issues. However, there have been concerted efforts to offer solutions to MSMEs on these issues as the government is working towards the launch of E-commerce portal 'Bharat Craft' that will act as a direct interface between sellers and buyers.

Smart manufacturing means bringing the elements of smart technology – sensing inputs, computing power, always-on connectivity, artificial intelligence, and advanced data analytics – to the traditional production process. In order to manage the transition to the smart factory, it is necessary to consider not only the technological elements, but also the human elements, which include the workers' training and the organisation of personal skill building activities.

Making SMEs smarter

Large enterprises can often leverage bigger budgets to tap into more resources to get things done. SMEs, however, need to increase operational efficiency by optimising their resources and are usually more conservative with operational costs. This can be done by implementing smart factory technology applications only after checking the viability and cost imperative. Trying to

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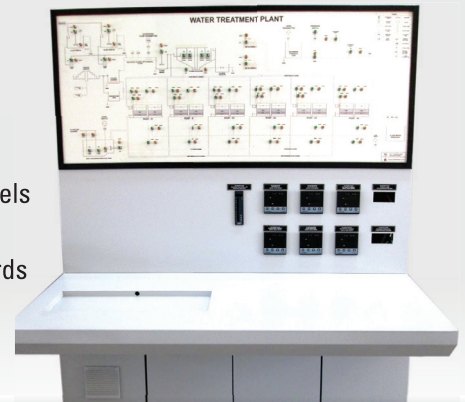


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accomplish more with less doesn't mean that SMEs do less. Streamlining business processes, and identifying and implementing smarter working methods can do the trick. This way, SMEs can significantly lower costs while keeping productivity high.

By implementing following steps, SMEs can create the perfect smart factory and join the Industry 4.0 revolution:

Invest in security: A recent report on smart factories shows, producers today need extremely sophisticated technologies to control the new industrial IoT scenario, that allows the connection of millions of machineries through global networks. The realisation of a safe connection among the operative and IT networks is therefore a very important factor in order to be able to work with data in a safe way.

Develop wireless connections: In order to build a connected factory that is able to perform and answer rapidly to the clients' request and the market's changes, wireless connectivity is fundamental. The industrial equipment that use wireless connection help businesses in the process of improving their productivity, for example by allowing real-time decisions.

Use the collaboration technology: The collaboration technology (software for video calls, data sharing etc.) can help producers to overcome the everyday challenges linked to the improvement of processes, remote maintenance operations and IoT. In the modern industry a collaborative effort coming from the different departments of businesses is required from the initial ideation phase to the final production phase.

Invest in data management: The revolution of the Industry 4.0 allowed the introduction of digital elements in factories, which drastically changed the characteristics of the industry. The connection of network devices, IoT and the application of modern technologies to the industrial equipment allowed to monitor and receive information coming from most of the devices involved in the productive process. In order to build a successful smart factory, personal skills are important too: the next two steps focus, in fact, on the human element of the process.

Digital mindset and soft skills: Soft skills are important to create value within businesses. Think about problem solving, the ability of solving technical problems or find solutions through creative thinking, lateral and strategic, or through knowledge networking, that allows to identify the valuable information in the network useful to meet the business goals. The digital revolution that is making factories more smart than ever, require workers to adopt a digital mindset too, in order be ready to face this ever-changing context.

Be open to change: The new technologies are constantly improving and the innovation is modifying the industrial context: for this reason, it is necessary to be ready and have an open mindset, in order to be able to seek all the opportunities that come from the market.

This is how the fundamental step necessary to realise the perfect smart factory will be achieved.

Road ahead for Indian manufacturing sector

Government of India is promoting Industry 4.0 through various programs and initiatives. India has to move from manufacturing outfits of Industry 1.0 and 2.0 to Industry 4.0 and beyond. Department of Heavy Industries (DHI) is raising awareness on the 4th Industrial Revolution to drive the Indian manufacturing to a 'smart and intelligent manufacturing' hub. Smart Advanced Manufacturing and Rapid Transformation Hub (SAMARTH) - Udyog Bharat 4.0 is an Industry 4.0 initiative of Department of Heavy Industry, Government of India under its scheme on Enhancement of Competitiveness in Indian Capital Goods Sector. The initiative aims to raise awareness about Industry 4.0 among the Indian manufacturing industry through demonstration centres.

Currently there are four centres, which include Center for Industry 4.0 (C4i4) Lab Pune; IITD-AIA Foundation for Smart Manufacturing; I4.0 India at IISc Factory R&D Platform; and Smart Manufacturing Demo & Development Cell at CMTI. The Ministry of Railways and Department of Science & Technology have joined hands in partnership with IIT Kanpur for taking up a unique project on Industry 4.0 by launching a Pilot Project for implementation at Modern Coach Factory, Raebareli.

There is a need for creating a roadmap to fast track the development of Industry 4.0 ecosystem to boost the Indian manufacturing sector, which represents a great opportunity for India by aiding economic growth, job creation and innovations. The Government of India has set an ambitious target of increasing the contribution of manufacturing output to 25 per cent of Gross Domestic Product (GDP) by 2025, from 16 per cent currently. To achieve this objective, "Make in India" must be integrated with the principles of Industry 4.0 and make the transition to smart manufacturing.

India is taking steps towards industry 4.0. India's first smart factory is in progress at the Indian Institute of Science's (IISc) Bangalore's Product Design and Manufacturing (CPDM) Center, with an investment from The Boeing Company. Various Indian companies are increasing their focus and partnering with other companies for developing new IoT and M2M solutions. The Digital India initiative from the Government of India is expected to enhance the focus on IoT in tackling the domestic challenges.

Smart manufacturing technologies can offer a shot in the arm to boost India's potential for long-term competitiveness and sustainability as it works towards earning its position as a global manufacturing hub. **IPF**

About the author:



Ramesh Bhorania is the Vice President (Robotics and Factory Automation) at Prama Hikvision India Pvt Ltd. In addition to the security industry, Hikvision extends its reach to smart home products and solutions, industrial automation, and robotics.

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Harness VR & Metaverse to skill India for smart manufacturing

With smart manufacturing gaining traction in industries, workers need to have the right skills so that they do not become the weakest link. Technology-based solutions complementing brick-and-mortar training centres can work together to bridge the skill gap. According to **Sabarinath C Nair**, if harnessed realistically, virtual reality (VR) & Metaverse can skill India towards its smart manufacturing dream.

The smart manufacturing revolution is upon us, with most factories switching to IoT, big data analytics and smart machines for increasing the efficiency of their operations. While a lot of attention is given to technology, it is important that the humans operating these smart machines — as well as the machines that have not been converted into smart ones — will need to have the right skills so that they don't become the weakest link.

Indian manufacturing has come a long way, from adopting an import-substitution approach to building world-class products. National Manufacturing Policy, Make-in-India push and the recent Production-Linked Incentive (PLI) schemes from the government side are steps that will further improve the overall situation. With close to 70 per cent of our population in the productive age group, India has a great opportunity that is not available to the developed Western world, which has an aging demographic. To reap its benefits, we need to have the right skills within our workforce for competing with the best in the world.

The recognition of the need to accelerate the skill development activities resulted in the creation of the National Skill Development Corporation, and later in the establishment of our Skill Development Ministry.

While a lot of progress has been made, the gap between what is needed and what is currently being achieved on a yearly basis is widening, and conventional brick-and-mortar approach alone is not scalable to the extent required. Hence it is essential that technology-based solutions complementing brick-and-mortar training centres work together to bridge the gap.

Gaps in industrial, vocational training

Over the last few years, the syllabus for most trades that are taught at Industrial Training Institutes (ITIs) have been revised to meet current industry requirements. However, the practical labs at most ITIs are still archaic, and this gap is affecting the quality of training.

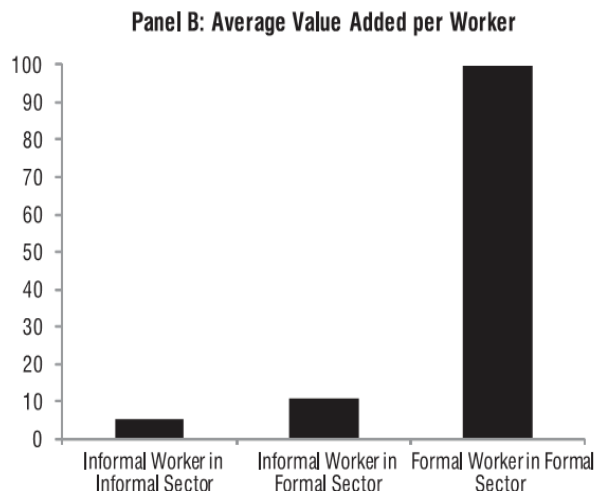
Most industries end up doing in-house training after hiring from ITIs for one year or more, before the hires become productive. It is this area where India falls behind, with 4 per cent of its productive population being trained in vocational skills, compared to advanced

economies like Germany (75 per cent vocationally trained) and South Korea (96 per cent vocationally trained)

ITIs' selection system is also fraught with problems. High-School marks are currently used as admission criteria, with no regard for students' dexterity aptitude. This is another area in which technology can make a difference.

The selection system as well as training delivery and assessment are areas that technologies like Metaverse and Virtual Reality can make a huge impact, especially in skills that require extensive practice that is costly to deliver or near impossible to accurately measure in the real world.

Informal sector worker output vs formal sector



Source: Economic Survey 2012-13, Ministry of Finance

The output of the formal worker in the formal sector is 20 times that of informal worker in informal sector. The quality-of-work output expected in Smart Factories is much higher than conventional ones. At the same time, working-environment quality too has improved manifold. Therefore, upskilling the unskilled and semi-skilled workforce to have the right skills to be in the formal sector is a win-win approach.

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Where do VR, AR, & XR fit in?

We are seeing a lot of hype around these terms, with a lot of overpromising being done. It is important to understand where these technologies can be applied, and identify the right use cases where they will provide maximum returns, rather than implementation for technology's sake. Let us break it down into the basics, specifically in the context of manufacturing.

Augmented Reality (AR) is when a picture or video of the real world (as seen through a camera) is enhanced with additional information on a 2D display. This has a lot of applications in remote maintenance and troubleshooting in manufacturing.

You could put a mobile or tablet loaded with an AR app in front of a machine, and the app will identify the parts and guide you through the steps needed for maintenance or repair. The limitation is that since you see everything on a 2D screen, and therefore not feeling immersed, it is not very effective for training on dexterity skills, or in applications where judgement of depth/distance is needed.

Virtual Reality (VR) is when you are immersed into a computer generated or "virtual" world in 3D, and you can interact in a very natural manner with what you see. This is achieved by shutting out the real world by wearing a headset which has a display for each eye, and headphones to deliver surround sound.

This has a lot of applications for training, and is highly effective as it gives the complete feeling of "learning by doing". VR applications are particularly effective when it's costly to train using actual equipment, or situational-training is difficult or impossible to implement, or in-training mistakes can prove costly or dangerous.

For example, operating a very costly crane incorrectly can result in component damage. The limitation is that while VR is very effective for dexterity training, it is not that useful for real-time maintenance guidance, in which AR fares better.

Extended Reality (XR) is an umbrella term for a combination of VR and AR. You can build tools that selectively bring real-world objects into the virtual world. If designed well, such software and hardware systems can be highly effective for both training and guided-maintenance activities on shop floors. XR technology is still evolving, since most devices are closer to either VR or AR.

We are yet to see a device that can switch perfectly between AR and VR modes, but this is changing as we speak. A Mixed Reality (MR) device, like Microsoft HoloLens, is closer to AR (it works through display goggles that can change transparency, and therefore become VR by increasing display opaqueness of the display).

On the other hand, VR devices like Oculus (Meta) Quest and HTC Vive Focus are adding AR capabilities by providing a "passthrough" view of the real world through their cameras without the need for taking off the headset. The passthrough view is usually monochrome, and you lose the perception of depth/distance in this



mode. These technologies are constantly improving, and soon we will have devices that can switch easily and effectively between AR and VR.

Indian industry needs a realistic Metaverse approach

Metaverse is now a commonplace term, but no one seems to be able to define what it exactly is. The broad consensus is that it is a collection of VR platforms on which people can interact and collaborate in an immersive manner. Technologies like Web3, Blockchain, 5G, etc contribute to the Metaverse.

One way to understand what the Metaverse can do for Smart Manufacturing is to ignore these fancy terms, and treat it like XR along with these capability extensions:

- 1) Multiple people can simultaneously operate on it
- 2) More geographically-dispersed working together through 5G enabling
- 3) Authentications handled by Blockchain and similar technologies, enhancing safety.

For example, an expert sitting at a factory in Chennai wearing an XR/MR headset can guide/train a technician wearing a similar headset sitting at a factory in Durgapur, be it for dexterity skills or for other shop-floor operations. The one-time cost of hardware and software will most often result in payback in less than two years.

What lies ahead

Technology has a huge impact on skill training and shop-floor operations. But it is important to not get caught up in jargons. Rather, a clinical understanding of smart manufacturing use-cases of Metaverse and XR is the best way forward, be it for business or for operational goals.

IPF

About the author:



Sabarinath C Nair is the CEO & Co-founder of Skillveri - a Metaverse XR technology company headquartered in Chennai. Sabarinath is also a member on the Prime Minister's Champions of Change Panel for Edtech and Skilling. After starting-up at IIT Madras, Skillveri has become a world leader in the Metaverse XR multi-skill

simulation space, and has won many awards, including the NSDC's National Innovations for Skills Challenge, which comes under the purview of the Ministry of Skill Development.

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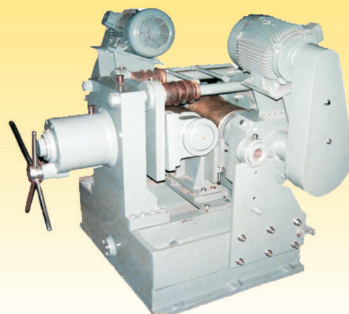
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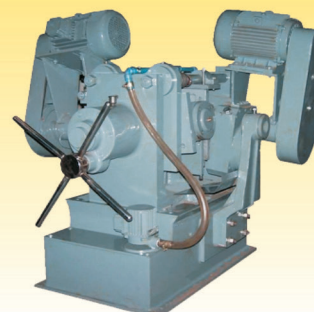
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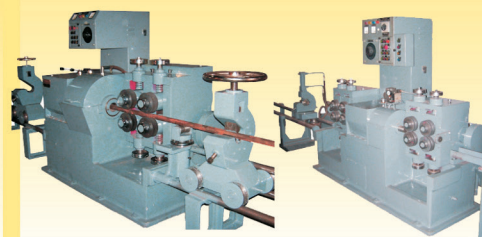
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“It is important to be ‘Smart’ in today’s competitive world”

Though investments in modernisation are increasing across various industries (especially post Covid 19 pandemic) in India, the level of advanced automation in India is still low compared to developed countries. Initiatives like Make in India and Atmanirbhar Bharat are expected to increase the pace of adoption of automation and digitalisation. In this interview with Rakesh Rao, **Sunil Mehta**, General Manager, Smart Manufacturing Solutions (e-F@ctory) Strategic Planning, Factory Automation & Industrial Division (FAID), Mitsubishi Electric India Pvt Ltd, explains the importance of embracing advanced technologies for increasing acceptance of made-in-India products in the international market.

What is the status of the Indian manufacturing sector in terms of modernisation and adoption of automation solutions?

If we talk about the status of Indian manufacturing sector, there could be mix of situations. In case of industries like automotive, pharmaceutical, textiles, etc automation levels are high and have increased in the last decade. Regarding digitalization and modernisation, investments are increasing across various industries post Covid 19 pandemic and that is a good situation. At the same time, there are small and medium sized industries (SMEs) where automation is not up-to the mark till date.

There is a long way to go for us to adopt the latest technologies and achieve digitalization. In developed countries, automation levels including adoption of robotics is much higher and that could be also linked to availability of space and expensive manpower. As far as adoption of robots and cobots (collaborative robots) are concerned, we are far behind the developed countries. But, initiatives like Make in India and Atmanirbhar Bharat will definitely increase the adoption of automation and digitalisation manifolds. If we embrace advanced technologies, then only products manufactured in India will get larger acceptance in international market.

What are the key challenges faced by manufacturers in India today? How can automation/digitalization help them overcome some of these challenges?

There are various challenges our manufacturers are facing these days. One of the key challenges is less



availability of skilled resources for production. This challenge can be overcome by way of skill improvement programs at various levels. There are various training programs that are organised by factory automation product suppliers and also offered by various institutions in India to inculcate the desired skills in the upcoming generations. Systematic training, periodic evaluation will enhance the skill of existing employees. Employing young talent in the organisation will also result in improvement of technical skill of existing manpower in certain way.

Another bigger challenge is legacy equipment. We have large numbers of brown-field manufacturing plants where many of the equipment are old and equipped with old controllers. Many times, it becomes difficult to get necessary data from this equipment to integrate for digitalisation purpose. In this case, it can be possible to upgrade the existing control systems or install necessary sensors to pick up the data.

Third challenge is related with the RoI (return on investment). Various manufacturers look forward for RoI calculations before implementation of digitalisation and many times it becomes a bit difficult to make convincing proposals. While implementing small or big digitalisation projects in manufacturing industries, it is very much essential to involve all stakeholders for successful implementation. Periodic reviews of the progress of implementation and outcome of such projects need to be presented to increase the awareness and confidence with-in the organisation. Formation of cross functional teams and giving confidence to members involved in digitalisation projects will lead to a successful

implementation. Through the years, Mitsubishi Electric India has executed many small and big digitalisation projects at various end users in different industry segments.

High upfront cost is a big put-off for companies (especially for SMEs) who intend to adopt automation. Are there low-cost entry routes into automation?

For small and medium scale companies' low-cost automation is available. One such product is introduced by Mitsubishi Electric India Private Limited – GOC (Graphic Operator Controller). We have introduced this product few years ago in Indian market and we have seen good success with this product especially for digitalisation. Based upon the success and demand, we have further introduced upgraded version of this product in last year (GOC43).

Apart from this product, there are various other products and IoT gateways that are available in the market. Our solutions are scalable and can be implemented in phased manners. For the small and medium scale industries, it is very important to define the objective – it could be to improve quality of product, reduce energy consumption in the manufacturing plant, to implement preventative and predictive maintenance in the system, to integrate supply chain, etc. Once the objective is defined clearly, a scalable solution can be implemented.

What are key hurdles faced by companies when they adopt (or plan to adopt) automation/robotics? Any tips to make adoption hassle-free?

In my view, most of the companies have already adopted automation to certain levels. In case of automotive OEMs and auto component manufacturers, automation has been adopted in a large part. Factory automation products like PLCs, HMI, VFDs, AC servo systems, etc are being used in manufacturing.

Though robotics is not yet fully adopted by manufacturers, slowly the trend is shifting towards adoption of robotics. As robotics technology is getting matured, a greater number of options are available in the market and the system integrators are also increasing to deploy this technology. Even the old systems can be easily reconditioned with new controllers at affordable costs. While adopting automation and robotics, the user or operator need to make this adoption hassle-free. Robotics adoption is increasing in segments where repetitive movements and hazardous tasks are involved to protect a human operator from such areas and tasks. Also, robotics is adopted to obtain quality products at high speed. Our manufacturers in different industry verticals like automotive, pharmaceuticals, food & beverage, textile, packaging, printing, batteries, etc are adopting automation and robotics which holds a potential to expand in the domestic as well as international markets in the near future.

How is Mitsubishi helping the industry?

Mitsubishi Electric has introduced e-F@ctory, the smart manufacturing concept in around 2003 in Japan. Here in India, we are promoting our e-F@ctory concept for various industry verticals. e-F@ctory is an integral concept to build reliable and flexible manufacturing system offering high-speed information transmission over robust and high-speed industrial CC-Link IE Network. e-F@ctory is already implemented at worldwide customers in various fields such as automobiles, pharmaceutical, solar battery, secondary battery, precision equipment, semiconductors, food, metal processing etc. Mitsubishi Electric has developed e-F@ctory Alliance Partners to offer various digitalization solutions for different industry verticals with domain knowledge and integration expertise.

Mitsubishi Electric has already worked upon AI, 5G, ML, AR/VR/MR, robotics, predictive AI at various levels and now we are enhancing our offerings of factory automation products by embedding these upcoming technologies in all our products. Through the Edgecross Consortium, Mitsubishi Electric India and Japan have introduced various hardware and software for integrated solutions. We have also introduced cobot (collaborative robots) product range in recent past. In India, Mitsubishi Electric has also introduced latest products like GOC (Graphic Operator Controller), IoT Gateways etc addressing the needs of low-cost automation required for the digitalization journey.

With "Smart" becoming a buzzword for everything in the industry, how important is the adoption of intelligent (smart) software systems and solutions for increasing India's competitiveness?

In today's competitive environment, it is very much required to be "Smart" from product to software. As the factory automation products are becoming more intelligent and robust, integrating them with various softwares will be required to fetch necessary information from these automation products. As we are talking about digitalisation and smart manufacturing, integration of OT (Operational Technology) and IT (Information Technology) is required. It is essential to adopt smart software systems and solutions for increasing the productivity.

In India, as we have presence of various big IT companies and large numbers of software start-ups, different software can be implemented to improve effectiveness by the way of integration. With the help of smart software system and solutions, it is possible to integrate factory automation products to smartphones, tablets, servers, ERP systems and to cloud in a systematic way. With implementation of software like SCADA, MES, etc report generation, quality management, traceability, historical data and energy management will be possible which will enhance our small and medium-sized business enterprise to be more competitive in domestic and overseas markets.

“New-age technologies can help us overcome many challenges”

In this VUCA (Volatility, Uncertainty, Complexity and Ambiguity) world, industries face many hurdles like shortages of skilled workers, supply chain disruption, productivity issues, etc. Hence, manufacturers need to adopt data driven value-creation approach for developing quality and reliable products to stay ahead of their competitors. In this interview, **Sandeep Shukla, Practise Head - Manufacturing Engineering, Tata Technologies**, explains the concepts of digital manufacturing and its advantages to overcome challenges presented by market uncertainties.

What is digital manufacturing? Has Covid pandemic changed the dynamics of manufacturing with respect to usage of technologies & automation?

Digital manufacturing is an integrated approach leveraging digital tool & technologies for connecting physical and virtual world for the advancement of manufacturing processes and operation including manufacturing simulation, connecting machines & processes, collecting shop floor operational data and perform analytics for the effective, efficient & quality output.

Manufacturing has gone through the tough time during Covid 19, which forced industries to look for automated and intelligent system for resilient supply chain and de-risking by embracing data driven approach for strategic, tactical and operational decisions.

India aims to become a manufacturing superpower of the world. How important will be the adoption of modern technologies (like automation, robotics, AI, IoT, etc) for increasing India's competitiveness?

Although India's work force is at peak among the rest of the world, it is very important that resources need to be rightfully utilised in effective manner and provide economical, quality & reliable products to the rest of the world, leading towards superpower.

Industry has many pain points like shortages of skilled workers, supply chain disruption, productivity, new product introduction, time to market, inventory management, talent gap, etc. It becomes difficult to address these challenges with innovative, futuristic, adaptable and robust integrated holistic approach to make sure business decision are adapting right strategy, at right time, with right cost-benefit analysis and with right technological solution. In present situation of VUCA world, embracing new-age technological



solutions is the only way to overcome challenges in a short and longer run.

As challenges are increasing multi-dimension, opportunities are also expanding multi fold for those who are adapting modern technologies. By embracing technology-based data driven approach, they are able to differentiate themselves from others and provide innovative and value driven solution with less efforts.

What are the key hurdles in the adoption of digital manufacturing? Any tips for making adoption hassle-free?

Key hurdles to embark upon digital manufacturing journey are around people, process, and technology. It is imperative that such hurdles need meticulous planning, long-term vision, and concrete plan. It is also evident that hurdles can be converted into opportunities by leveraging on technologies.

Think big, start small and scale fast are the keys to implement digital manufacturing. Fail first, learn first, correct first and achieve first are some of the thumb rules to embark on digital manufacturing journey.

Alvin Toffler is credited with saying: “The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.” The statement is very much true from the perspective of digital manufacturing adoption as penetration of technology, scaling and adaption are taking place at high pace.

Small & medium enterprises (SMEs) are part of the supply chain of big manufacturing companies. Can these SMEs leverage on “Digital manufacturing” to increase their efficiency? Are there low-cost entry routes into automation for them?

SMEs are the key player in digital manufacturing journey, even though few of the OEMs are yet to

Key hurdles to embark upon digital manufacturing journey are around people, process, and technology. It is also evident that hurdles can be converted into opportunities by leveraging on technologies.

embrace it. To bring transparency and connected value supply chain, SMEs need to be agile and proactive to increase their wallet share.

Resilient supply chain largely depends on SMEs agility and keenness towards technology adoption. It has been observed that SMEs usually take first mover advantage and bring the best to big manufacturing companies.

As industry is moving from mass production to mass customisation, it can be achieved ideally by incorporating full scalable technology-based solution, aiming for efficient and highly productive operation to gain competitive advantage.

To make the machine communicable with low-cost option, various edge gateway devices are readily available in industry and can be deployed to fetch the machine data for further artificial intelligence (AI) & machine learning (ML).

'Smart' is a buzzword for everything in the industry - right from factory to products to

components/parts. What does 'smart manufacturing' mean to you?

SMART usually stands for specific, measurable, achievable, relevant and time bound; however, smart manufacturing is synonymous with Industry 4.0.

Smart manufacturing precisely tie together various functions of industry - like product design, manufacturing engineering, manufacturing operation management, supply chain and customer relationship management - under the umbrella of data analytics layers to perform descriptive analysis for business insights, predictive analysis using ML model and prescriptive analysis by implementing AI engine.

Smart manufacturing is a holistic approach towards creating digital image of all physical asset, manufacturing processes, operations and resources used to manufacture the product to optimise the input cost and maximise the revenue output.

What are the emerging trends in the manufacturing industry?

Emerging trends change based on industry segments and their growth patterns. But, the common trends for discrete manufacturing industries are manufacturing processes digitization; mass customisation and modularity; advanced predictive analytics; machine health & condition monitoring; resilient supply chain; sustainable manufacturing; and adoption of AI/ML. **IPF**

It's NOT about
TECHNOLOGY
It's about EFFICIENCY

*Customer Testimonial, November 2018

-29,3%

Inventory
Value

+8,22%

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utilization

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“Adopting the right technology can make India self-reliant”

Fast-changing consumer demands, manufacturing standards, policy interventions and environment regulations are posing challenges before Indian manufacturers. To mitigate these challenges, they are banking on automation and digital tools, the adoption of which had gathered momentum during the Covid pandemic. Latest developments in Industry 4.0 or digitalization along with the domain expertise of sectors like food & beverages (F&B), pharma, automotive, logistics, etc, will play a decisive role in furthering India's manufacturing growth, says **Suprakash Chaudhuri, Head - Digital Industries, Siemens Ltd**, in this interview with Rakesh Rao.

What are your priorities for Digital Industries at present?

A key priority for Digital Industries in India is to help our customers across manufacturing verticals, accelerate their digital transformation journey. With this, we are supporting our customers manage fast-changing market environments, ever-increasing complexity, integration challenges, the need for flexibility and resilience, among others. With our deep domain know-how and vertical experience, we are helping our customers create a blueprint for their digital transformation across the vertical (the digital flow from the digital twin of the product to the real product) and horizontal dimensions (from OT to IT) and co-create solutions. Along with creating a level playing field for Indian enterprises to compete with global players, we are also enabling Indian manufacturing enterprises especially, small and medium enterprises (SMEs), to free up their capital expenditure and grow sustainably.

On September 13, 2022, Siemens officially launched the Xcelerator platform in India. What is the significance of this launch to Indian customers?

Fast-changing customer and consumer demands, changing manufacturing standards, policy interventions, regulations and localisation of various vital processes are among the myriad challenges faced by Indian enterprises in manufacturing, infrastructure, energy and transportation. To navigate these, they need access to a wide variety of tools & platforms for maintaining data integrity, access and security, facilitating business decisions backed by intelligent insights, upskilling of the



workforce and the management of complex cultural changes amongst others. Siemens has launched Xcelerator as an open and evolving digital business ecosystem with a curated portfolio of IoT-enabled hardware, software, and digital services. It is aimed at supporting customer efforts to accelerate their digital transformation and create value for organisations of all sizes in industry, buildings, grids and mobility.

How has Covid pandemic changed the dynamics of manufacturing with respect to usage of technologies – i.e., hardware as well as software?

While customers had already started investing in digital technologies before the pandemic, the adoption of these technologies gathered momentum during the pandemic. A cautious approach towards digitalization made way to enhanced interest levels. For example, the pandemic tested the resilience and flexibility of enterprises in verticals like pharma, which had to manufacture and reach vaccines and other lifesaving drugs across the world. The only way to respond flexibly and efficiently to these rapidly changing demands and new challenges is with the integration of product design & product manufacturing using automation and digitalization - be it food and beverages, pharmaceuticals or the automotive industry where we have close partnerships with our Indian customers.

What are the key challenges facing manufacturers (i.e., your customers) today? How is Siemens helping them overcome some of these challenges?

Manufacturers have been dealing with challenges that arise due to megatrends such as globalisation and climate change (government regulations that mandate sustainable products), fast-changing customer requirements and, increasingly, the occurrence of unforeseen events leading to supply chain disruptions.

There is an ever-greater pressure on manufacturers to lower their costs further to compete, while at the same time introducing more distinctive or customisable products to meet specific customer needs. Manufacturers also must respond to consumers who want - and expect - to buy a product at any time, wherever they are and have it delivered anywhere without delays or errors.

Resources are also getting scarce. So sustainable manufacturing is not a good thing anymore, it is a necessity whether in terms of profitability or in terms of the environment for a better future. We need to make more from less.

Siemens is delivering next-generation solutions to help manufacturers transform their operations through our concept of Digital Thread – which is a distinct, linked, traceable sequence of activities in the product or production lifecycle, that is digitised and automated. With our unique integrated concept combining industrial software and automation, IT & OT, we ensure seamless interaction of all components and competencies. This helps in maximising transparency, not only at the field level, but across all vertical levels up to the corporate management level, shorter time-to-market with simulation tools, increase in plant productivity with additional diagnostics and energy management capabilities, and increased flexibility.

As a technology company, Siemens is combining the real and digital worlds. What does that mean to its customers?

The need to combine the real and digital worlds, including the entire value chains, has become evident to unlock the full potential of digitalization. Developing a new product, planning a new plant, or producing with the help of digital tools creates a detailed virtual image, the digital twin. With the Digital Twin, we enable manufacturing enterprises to create a precise virtual model of a product or a production plant. It displays their development throughout the entire lifecycle and allows operators to predict behaviour, optimise performance, and implement insights from previous design and production experiences.

Thanks to our comprehensive domain expertise and optimized tools, Siemens is the only company that can offer this holistic approach for merging the virtual and the real world. With this, we enable our customers to reduce their product development times while at the same time increasing the flexibility, productivity and environmental efficiency of their production processes.

High upfront cost is a big put-off for companies (especially Small & Medium Enterprises or SMEs) who intend to adopt automation. Are there

low-cost entry routes into automation? How is Siemens supporting the needs of SMEs?

No matter how efficiently and effectively manufacturers plan, the manufacturing process is complex and is an evolutionary process. So, it does not really matter whether you are a large or SME, pharma vertical or F&B vertical, green field or brown field enterprise etc; agility is what matters. This is especially true for SMEs facing multiple issues like resource crunch, manpower issues and even management bandwidth. Some fundamental aspects that we tell our customers before they start their digitalization journey are:

Start small and then scale: The integration of automation and digitalization can be achieved in baby steps starting with the lowest-hanging fruits and then, improved returns can fund continuous investments.

Digitalization is a journey, and the technology will pay for itself: Technology will keep evolving and an enterprise will have to design a blueprint and define milestones with respect to how flexibly they can integrate this into their design & manufacturing cycle.

It is here that platforms like Xcelerator come in. Enterprises can pick and choose where they want to start their digitalization journey using the platform ecosystem and scale up based on one's ambition; whether to build new business models, develop new products or cater to new or diverse customer groups.

In terms of modernisation and adoption of automation, how do you see the current status of the Indian manufacturing sector?

Today, Indian enterprises have the ease of accessibility to the latest technology simultaneously with the rest of the world like Industry 4.0, Edge, IIoT, AI, etc. This was not the case even 10 years back.

The second part is how effectively we are harnessing this. Latest developments in Industry 4.0 or digitalization with the domain expertise of sectors like F&B, pharma, automotive, logistics, etc, will play a decisive role in furthering India's manufacturing growth. While many large enterprises have been quick to transition into this digital world, we are also seeing many start-ups or new verticals like intralogistics, EV manufacturers, and aerospace & defence enterprises that are digital natives, also adopting these early in their manufacturing cycle.

What are the emerging trends in the manufacturing/engineering industry?

We see digital twin adoption in all kinds of organisations. However, its adoption in the manufacturing space is the most exciting. For example, Gartner expects over two-thirds of companies that have implemented IoT would have deployed at least one digital twin in production by 2022, to increase their effectiveness.

Trends and developments in the world of IT like 5G, artificial intelligence, edge computing, machine learning, and digital marketplaces as well as new forms of collaboration are providing additional momentum and

are changing industrial workflows. This is the next stage in digital transformation.

Soon, we will see far greater dovetailing of IT and OT (operational technology). Our MES systems have already demonstrated the first steps for how that can work. And we are also hard at work on developing integrated platforms, for example with edge computing. Edge Computing and AI can be used to increase availability and productivity and to optimise Overall Equipment Efficiency (OEE), thus enabling closed-loop analytics. Artificial intelligence can also support engineers to significantly reduce programming times and virtual reality enables to reduce travel costs in new ways of global collaboration. Industrial communication, e.g. Industrial 5G, is crucial for these applications and we are hoping to see some early deployment of this soon.

With a Digital Enterprise Suite, our customers can begin investing today in future-proof solutions for the step-by-step implementation of Industry 4.0. This means we're joining forces with our customers in thinking

ahead to the future of the industry.

For Siemens, where does India stand in the global scheme of things?

India contributes significantly to the development of digital solutions for global customers. A team of 6,000 software developers is based in India working on a range of technologies such as AI/ML, automation, digitalization, etc.

What are your growth plans for Siemens in India?

We will continue to expand our portfolio of solutions that will address our customer's challenges.

The Indian manufacturers have the aptitude and attitude to meet the growing needs. Adopting the right technology can make India self-reliant. With digitalization, Indian industry, especially SMEs (small and medium-sized enterprises) can achieve constant technical progress as well as the competence to meet the changing requirements of both local and global markets.

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NEWS SNIPPET

Siemens boosts performance with Solid Edge 2023

Siemens Digital Industries Software released the latest Solid Edge software for product design, engineering and manufacturing, bringing a new streamlined user experience, greater interoperability with the Siemens Xcelerator portfolio and greater capability and collaboration across many industry workflows. "Alongside our work to bring innovative technology and capability to each release of Solid Edge, covering everything from 3D design through advanced CAM and into technical publications, it's key that we also evolve how we make these capabilities available to our community. We're now introducing new licensing options designed to better meet the changing business needs of small and medium-sized manufacturers, providing greater flexibility, more value and, with Xcelerator Share, greater collaboration and speed," said John Miller, Sr VP, Mainstream Engineering Software, Siemens.

Solid Edge's new look and feel brings a modern update to include more intuitive ways of working, greater personalisation options and

improved modeling workflows. Updates to the geometry definition tools in Solid Edge include synchronous technology applied to traditional ordered history-based parts and parts created using convergent modeling (using generative design or from 3D scans) can be used in simulations without the need for additional conversion.

Solid Edge 2023 also unlocks the power of design data while future proofing customers' work – data from Solid Edge can be transferred between other solutions in the Siemens Xcelerator portfolio, including NX Mechatronics Concept Designer (MCD) and Process Simulate. Solid Edge 2023 also leverages Siemens' leadership in Model Based Definition (MBD), with a new Solid Edge Advanced PMI add-on that delivers high-quality consistent dimensioning for downstream applications that can take advantage of 3D annotated product data models.

The new Solid Edge Inspector add-on brings tools to automatically identify, label, and extract critical design and manufacturing characteristics for inspection and

metrology purposes, automatically generates high-quality inspection data and reports that facilitate communication in downstream manufacturing processes.

New advanced manufacturing capabilities include new Roughing for 5-Axis Machining in Solid Edge CAM Pro, a new 4-axis Rotary Machining add-on and new wire EDM functionality. For those working at the leading edge of machining, the new Smart Machine Kits library provides easy access to standardized, professionally built machine simulation kits, enabling machinists to get up and running with full machine simulation in a fraction of the time typically needed.

Also introduced with Solid Edge 2023, Solid Edge SaaS brings value-based licensing combined with cloud-connected, anywhere access through Xcelerator Share. The new flexible licensing option available through a Solid Edge SaaS subscription allows capabilities to be added when needed, providing access to integrated add-ons for generative design, point cloud visualization, electrical routing, PCB collaboration, advanced simulation, etc.

IPF

“Wipro PARI is looking to expand into new geographies”

For Wipro PARI, which has around 1,300 employees and a significant global presence, has witnessed robust growth in the recent years by offering automation solutions to manufacturing facilities across the world. In this exclusive interview with Rakesh Rao, **Sundararaman G, Co-CEO, Wipro PARI**, elaborates on changing manufacturing landscape and importance of modern production technologies to gain the competitive edge in the market place.

How has Wipro ramped up its Industrial Automation Solutions business in the last couple of years?

At Wipro Infrastructure Engineering (WIN), as part of our growth strategy, we continuously analyse emerging technologies, applications, and the industry landscape. While doing this, we evaluate new investment opportunities that not only hold the promise of growth but also have a synergistic alignment with our current businesses, capability, and culture. In this context, we forayed into Industrial Automation business in 2018 and acquired PARI in 2021, which is India's leading automation solution provider.

Today, we are the leading automated manufacturing technology provider to the emerging EV segment in automotive industry. Over the last couple of years, we have grown well across all geographies be it in USA, Europe, or India. Wipro PARI offers turnkey automation solutions in EV manufacturing processes like battery assembly, electric drive motor assembly, EV transaxle & gear box assembly, automated structural welding for specialised applications like battery tray, laser welding, conventional ICE powertrain assembly, machine tending, intralogistics & storage automation solutions for pharma, tyre, FMCG, F&B segments, automated car parking solutions, etc.

How is Wipro PARI helping the manufacturing sector to become smart and intelligent?

We offer Industry 4.0 solutions, AI/ML enabled smart manufacturing solutions which help our customers unlock hidden capacity in manufacturing lines using data gathered from the equipment and processes. We help our customers to collect data through data loggers, industrial PC or edge device without any change to their equipment or machinery. The data is analysed through software algorithms to track performance and KPIs with user friendly dashboards and actionable



recommendations for improving the line productivity.

What are the key challenges facing manufacturers (i.e your customers) today? How are you helping them to overcome some of these challenges?

Key challenges faced by our customers are getting appropriate & cutting-edge automation solutions which are reliable and helping them to get the best returns on their investments. The product changes are very frequent, and customers expect the manufacturing lines to be flexible to adopt to these changes in shorter time and with less concerns. We help the customers to zero in on the right

solutions adaptable to their needs and expectations, making sure that what we offer is the latest and ready to meet the near future technological changes. Innovation and at the same deployment of proven solutions is the key approach that we follow.

How has Covid pandemic changed the dynamics of manufacturing with respect to usage of technologies – i.e., hardware as well as software?

Covid pandemic has impacted the manufacturing significantly with the companies investing in automation technologies for people productivity and smart manufacturing for remote monitoring and control. The no-touch or minimum touch requirements are getting implemented in assembly lines, automated material handling options are being explored.

How is Wipro PARI incorporating modern technologies to enhance its manufacturing efficiency? How has these technologies helped your company?

Our own manufacturing facilities for manufacturing automated solutions are fully equipped with latest

technology machines, we use latest hardware and software solutions to assemble, integrate and test our offerings. We are one of the early adopters of Virtual Commissioning, which creates the Digital Twin of the manufacturing process, even before the actual machinery & assembly stations are manufactured. We have a very strong software team which builds our own captive software requirements for business process management, best-in-class project management & integrated design, and engineering platform. These technologies have helped us to scale our business flawlessly, train our people quickly and effectively, and help building our customer confidence significantly.

What are key hurdles faced by Small & Medium Enterprises (SMEs) – who are the backbone of the manufacturing sector - when they adopt (or plan to adopt) automation? Are there low-cost entry routes into automation?

The key hurdle faced by SME segment in adopting automation is their ability to foresee the benefits that automation can provide to them. It is not low-cost entry that will solve their dilemma to invest in automation. But their keenness to look for appropriate automation solutions which will free them from issues of productivity, quality & skilled labour shortage that they face on day-to-day basis.

Do you cater to the automation/digitalization needs of SMEs?

We offer our automation solutions to the entire spectrum of the industry be it small or big. The automation solutions that we provide are repeatable, scalable, and sustainable. The benefits of them can be realised by SMEs when they truly internalise the need for automation and not just look at inexpensive or makeshift (jugaad) options to solve their pains through

The key hurdle faced by SME segment in adopting automation is their ability to foresee the benefits that automation can provide to them. It is not low-cost entry that will solve their dilemma to invest in automation.

temporary solutions. Our digital offering can free the owners of SMEs to focus on business development, customer engagement as remote monitoring of his operations can be enabled and he need not present all the time at his factory to monitor the production & quality.

What are the emerging trends in the manufacturing industry?

The emerging trends in the manufacturing industry are automation concepts that include flexible layout with modern ways of material handling using automated mobile robots (AMRs), deployment of automated storage & retrieval systems (ASRS) and software concepts like Virtual Commissioning, IoT for remote monitoring, control & analysis.

What are your growth plans for Wipro PARI?

Our growth plans include facility expansion to new geographies, significantly expand our existing footprint at Pune, invest in talent increase in our design & engineering teams, strengthen our offerings on Industry 4.0 solutions, and penetrate deep in EV segment including solutions to automated battery cell manufacturing. Besides, we aim to expand our offerings significantly in non-automotive space – especially in the warehouse automation area for consumer packaged goods (CPG) industry.

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NEWS SNIPPET

Rolls-Royce displays automation solutions at Defexpo

Rolls-Royce showcased its MTU propulsion and automation solutions for the naval and land defense at the recently held DefExpo in Gandhinagar from October 18-22, 2022. The company displayed its products including Series 8000 engines for large surface vessels and Series 4000 engines for submarines. Rolls Royce also showcased its MTU NautIQ ship automation solution for control and management solutions, from a bridge to a propeller. A new addition to the portfolio is the Equipment Health

Management System MTU NautIQ Foresight, which monitors and analyses the technical condition of the complete vessel and enables predictive maintenance to help customers achieve maximum vessel availability and minimum fuel consumption.

Also on the display was the Integrated Platform Management System (IPMS) MTU NautIQ Master, a fully integrated turnkey automation solution for complex projects. "We are looking forward to further deepening and developing our collaborations

and expanding our footprint in India through a localisation approach," said G S Selwyn, Managing Director of MTU India, said in a statement.

Rolls-Royce's Power Systems business unit has a strong presence in India with its Pune-based MTU India business that supports sales and servicing of MTU engines. Its engines power many vessels of the Indian Navy and the Indian Coast Guard. MTU engine with a power output of around 1000 kW powers India's first indigenously designed and built Arjun Main Battle Tank.

IPF

“Andrew Additive aims to make AM affordable to every Indian firm”

Manufacturers are looking at ways to incorporate technologies like additive manufacturing (AM), artificial intelligence (AI), etc to increase productivity of the manufacturing plants. The Bangalore-based Andrew Additive - an end-to-end solution provider for additive manufacturing - is helping companies to adopt AM with ease by developing indigenous 3D printers for various industries. In this interview with Rakesh Rao, **Nikhil Andrew, Founder and CEO, Andrew Additive**, explains the advantages of additive manufacturing and how companies can leverage it to increase efficiency.

Could you please brief us about Andrew Additive?

We are a Bangalore based start-up mainly focused on developing & manufacturing 3D printers of different technologies. We also provide reverse engineering, scanning services, AM consultation and design services (DFAM). So I guess you could say we are an end-to-end solution provider when it comes to additive manufacturing (AM).

We, as a company, are doing our best to help companies and industries to adopt AM with ease. We have our R&D facility and manufacturing unit in Bangalore. Our focus right now is to make indigenous 3D printers for various industries and our end goal is to make AM affordable to every Indian company. We are also focused on making printers for educational institutes, colleges and schools.

How are you helping your customers to increase their efficiency and productivity?

We help our customers by providing an end-to-end solution. We provide training and educate our customers right from the ideation stage, next we assist them when it comes to design after which we manufacture the part and even in helping them with the post processing

Like I said earlier, the main problem the companies are facing is the knowledge gap. So we have teamed up with Additive 3D to provide training and workshops to help fill the knowledge gap that is present in these industries.

The main reason many companies are hesitant to change from conventional manufacturing to additive manufacturing is because they are not able to identify the right parts and develop a business case. This is



where we come in. We help the customer in part screening and develop a business case for them to help ease the adoption of these new technologies. We help the customer to understand the potential and challenges faced and make it easy for them to come to a decision.

AM helps in reducing the lead time needed to manufacture a part and can help in reduction of weight. Most importantly it can also help in parts consolidation - which means parts that are manufactured separately can be printed together as a single part; thus reducing significant time in post processing, machining, etc.

What kind of changes are you seeing in the manufacturing plants nowadays?

The major changes I see when it comes to manufacturing plants these days is that many major manufacturers are moving towards digital inventory and digital twin which in turn reduces the need for big warehouses to store inventory. These manufacturers are also adopting additive manufacturing to reduce lead time and manufacture parts when needed.

All major manufacturers are looking at ways in which they can incorporate 'AAA' into their companies (AAA being 'additive manufacturing', 'artificial intelligence', and 'autonomous').

Also, all companies are trying to be energy efficient and we believe AM can provide this.

India aims to become a manufacturing superpower of the world. How important will be the adoption of modern technologies (like automation, robotics, AI, IoT, etc.) for increasing India's competitiveness?

I think it will play a crucial role in becoming a

superpower with respect to the manufacturing industry. Recently, India surpassed Germany to become the 4th largest manufacturer of automobiles in the world, and I'm confident that in due time India will become the leader in this and other industries as well.

There is a lot of untapped potential when it comes to India and modern technologies (such as additive manufacturing etc) are right now only in the initial stages of adoption. As more and more industries and companies start to adopt and see its potential, we can see India leading the race in manufacturing. The problem that many companies face is the knowledge gap that exists, as a result they do not know how to incorporate these new technologies into their existing system.

"Smart" a buzzword for everything in the industry - right from factory to products to components/parts. What does "Smart Manufacturing" mean to you?

The word smart manufacturing to me means to manufacture parts without wasting excess materials and to optimise the part to make it lightweight and efficient. Many times this word gets lost in meaning because generally people consider smart to be fast and spending less time or money to manufacture a part. But whereas smart manufacturing should be defined as manufacturing a product that uses less material, which in turn reduces the cost of the product and also to find ways to optimise the parts design.

I also personally feel smart manufacturing should also compromise a digital twin. This means a company always has a digital inventory and can manufacture a product or part when needed. For instance, let's say I am in Bangalore and I supply spare parts to a company in Delhi. Now instead of have a whole inventory of spare parts that occupy space and dust, I can have a digital inventory so when the need comes for a spare from Delhi I can either print the part immediately and send it to them or if I have a network of printers around India then I can print the part in the closest place to the customer and send it to them. This is what I call 'Smart Manufacturing'.

How can SMEs contribute to make India a manufacturing superpower?

I think SMEs will play a great role in making Indian manufacturing into a super power. When you take legacy manufacturers, it will be quite a tough task to change their operations as they would have to change an already established manufacturing plant and many processes. On the other hand, SMEs have the flexibility and agility to change their manufacturing ways to increase efficiency and try new things out.

What are the key hurdles in the adoption of modern technologies in the SME sector? What are solutions to overcome these hurdles?

The key hurdle will be the understanding of the

opportunities and challenges of the new technology and how to integrate it into the existing manufacturing cycle. To overcome this, the technology must be well taught right from the school/college levels because these modern technologies are going to control the world possibly for the next 15-20 years minimum so students and young professionals need to be educated right from the very beginning on these technologies.

The next hurdle will be to make a good business case for the company that will justify the procurement of the technology and generate RoI for the company as well. For this hurdle, the companies should have a good team of employees who are well educated in this field and can help in the adoption of these technologies.

Today the high cost of machines and raw materials also becomes a hurdle.

Are there cost-effective ways for SMEs to make manufacturing more efficient/smart?

That depends on which sector the company is in. Now let's consider a company that does small scale manufacturing of highly precise products, then AM is the best solution for them as they can scale up from there. But for large companies that would be a tough task. The way SMEs can make smart manufacturing is through having digital inventories and digital twins. This way any part can be manufactured at any given point at any given time and scale.

Any plans to launch new products/services in the near future?

Yes, following the launch of the KALAM series (indigenous extrusion printer) in August, we are planning to launch our food printer very shortly. The recently released KALAM 300 printer has a much sleeker look and has an option of including Wi-Fi printing and camera. Later next year, we will also be releasing a version 3 of our KALAM series printer which will support dual extrusion printing and composite printing.

What are your growth plans?

We are always looking to innovate and make new and exciting printers for our customers. We are integrating IOT to all our machines in the near future, which will help manufacturing semi-autonomously. We have partnered with Additive 3D to help promote AM Labs which is an excellent initiative that helps bring AM to educational institutes and offers certified training, courses and projects.

We plan to make an education version of all our printers for schools and colleges that will be user friendly and easy to learn for the students. We are also working with some colleges to help them in their projects. We have collaborated with Aerone, which is a drone manufacturing start-up in Chennai, to help develop a frame for their delivery drone. We also have a R&D center that helps customers reverse engineer and develop new products.

“Lantek helps companies to increase their production efficiency”

Lantek is the global leader providing software systems and solutions to companies manufacturing parts with sheet metal, tubes, and structural steel. Customers trust Lantek for daily operations designing, planning, and controlling their production with its software. In this interview, **Muralidhar D, Country Head, Lantek Automation India Pvt Ltd**, elaborates on industrial trends and how Lantek helps companies to digitise all their industrial processes effectively and profitably.

How is Lantek serving the needs of the sheet metal and structural steel industry?

Lantek is the global IT company that focuses on the development and marketing of CAD/CAM/MES/ERP software solutions and a pioneer in the digital transformation of companies in the sheet metal sector. Lantek had lead the way to new innovations and break through solutions which enables the best savings in the raw material, execution process and control over the entire plant.



nesting to job planning, from inventory to assembly, from delivery of the finished product to billing. It is paper-less and hassle-free.

Companies that use the Lantek platform are able to increase production efficiency based on measurement, planning, execution, and control.

All the information about the goings-on is available on your cell phone. You get notifications for each machine shutdown, workloads in progress and pending, and real-time status. Control and information to make decisions instantly leads to greater efficiency and productivity.

What are key challenges before the sheet metal and structural steel industry? How are you helping them overcome some of these challenges?

Lantek integrates the most advanced nesting software in the industry with the highest standards in manufacturing management solutions. Raw material saving, infrastructure planning and handy information of the entire plant & process are the key challenges we consider vital and Lantek addresses these issues with our developed applications in most technological way helping clients achieve their objectives.

Lantek product family incorporates significant improvements in flexibility, making it adaptable to the different circumstances of all types of companies; usability, for a better user experience and process visibility; and efficiency and automation to accelerate the speed of the tasks, reducing manual steps.

How are you helping your customers to increase their efficiency and productivity?

Efficiency is achieved when an organisation secures a comprehensive, automated system that minimises the need for human intervention and allows for data to move in each stage of the journey. Lantek offers a system of products that share data so that the process is fully traceable: from quote to manufacturing order, from

How is Lantek helping its customers in their digital transformation journey?

To start and proceed along the route to Industry 4.0 and the smart factory, we need a technology partner to lead us along the path. The unstoppable digital transformation that we have been seeing for years and uncertain and unexpected events such as the Covid pandemic have highlighted the importance of collaborative work and the co-creation of solutions with customers and suppliers.

At Lantek, we have been accompanying our clients in their evolution for 35 years, adapting to their different levels of digital maturity, guiding and supporting them through their digital transformation.

By working extensively on software development, Lantek has been constantly advancing and working towards the smart factory concept. Now, along with the evolution of Industry 4.0 and the increased challenges, this trend is becoming mainstream and companies of all sizes are looking for the best way to apply it.

This is where Lantek can provide a clear advantage for sheet metal companies, as it has sophisticated products such as Lantek MES and Lantek Analytics designed specifically for this industry. These products are designed so that any company, regardless of their

Efficiency is achieved when an organisation secures a comprehensive, automated system that minimises the need for human intervention and allows for data to move in each stage of the journey.

digital maturity, can begin to take easily configurable steps on their path towards becoming a smart factory with digital transformation.

Having been involved in the early stages of this revolution, Lantek has in-depth knowledge of the needs and obstacles faced by manufacturers and has considerable experience in integrating systems with any software that the customer already has, as well as the necessary requirements and configurations for OEM suppliers.

NEWS SNIPPET

Grind Master launches novel robotic grinding technology

The Aurangabad (Maharashtra) based Grind Master has launched a first of its kind worldwide machine for robotic grinding of large castings. Grind Master ROBOFINISH team led by Sameer Kelkar conducted research and development (R&D) over four years resulting in an international project for deployment of this technology.

A leading mining industry casting maker, with worldwide foundries partnered with Grind Master ROBOFINISH in 2019 to solve various problems in fettling shops including poor health and safety conditions, inconsistency in quality and low productivity often leading to large WIP and business loss. The maker had approached several reputed solution providers in America and Europe and had one failed project in the past.

Grind Master ROBOFINISH abilities to solve challenges with innovative breakthroughs in process and software were demonstrated through several R&D projects that were conducted between 2019 and 2021. The results from these finally

gave both the foundry and Grind Master the confidence to build a full machine. This first of its kind machine for automatic fettling and precision grinding of exotic material castings weighing upto 6 tonnes is now being launched by Grind Master.

With five patents filed during the advancements made in process, software and machine design, the resulting product is a landmark in development of robotic machining and places Grind Master in a global leadership position.

Grinding of castings is a major challenge globally – this operation is manually done in very hazardous conditions. Grind Master ROBOFINISH solutions were launched in 2012. With over 150 machines in operation worldwide, it is a well recognised solution. Grind Master has a technical collaboration with Roberts Sinto Corporation of USA for manufacturing and servicing machines in North America using

Are your solutions cost-effective for small & medium enterprises (SMEs) to adopt them?

About 80% of our customers in India are SMEs. We have unique and most adaptive applications which fit into their technological as well the investment cost.

Any plans to launch new products/services in the near future?

Lantek has launched new release for year 2022 recently and these numerous developments in Lantek's product families (Expert, Flex3d, MES, Integra and Analytics) put the focus on efficiency in the user's daily work.

This new version, developed after several months of intense work involving almost a dozen teams, has resulted in more than 80 new functionalities within its portfolio, as well as other internal and architectural improvements that will allow the company to continue guaranteeing the evolution of its products.

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ROBOFINISH Technology. It is an exceptional case where manufacturing technology is being exported out of India.

"Grinding large castings has been a big hurdle. We have a lot of experience with small and medium sized castings and were confident of developing a solution for larger castings. We are thrilled to have succeeded where many other international companies had failed. Our ROBOFINISH Team in particular Amol Ghule, Sohail Shaikh, Prashant Jadhav, Mahesh Kshirsagar, Swati Tekale, Sudeep Khadse, Anklesh Mohabe, Prajwal Mhaske and Onkar Kulkarni worked very hard to make this project a success," said Sameer Kelkar, R&D Head and architect of the ROBOFINISH Technology.

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“Surface engineering plays big role in production of smart materials”

Future smart manufacturing is expected to be a perfect synthesis of advanced robots, artificial intelligence (AI), and smart materials used to improve industrial performance. The Mumbai-based Surface Modification Technologies Pvt Ltd, which has been working in the surface engineering industry for approximately 20 years, has been assisting industries in comprehending smart materials (metals and metal alloys). In this interview with Rakesh Rao, **Dr Umesh Mhatre, Managing Director, Surface Modification Technologies Pvt Ltd (SMT)**, discusses significance of surface engineering in today's manufacturing world and how SMT is helping companies to produce smart materials.

How is Surface Modification Technologies serving the manufacturing industry?

SMT has been working in the surface engineering industry for approximately 20 years. We have been working hard to raise awareness of the value of surface engineering in preserving the equilibrium between product qualities and manufacturing cost effectiveness over all these years of providing surface engineering services. Future smart manufacturing is the perfect synthesis of advanced robots, artificial intelligence, and smart materials used to improve industrial performance. At SMT, we offer services that assist industry in comprehending smart materials (metals and metal alloys) and their proper treatments to prevent or regulate the key features of materials that determine their "life" (such as wear, corrosion and fatigue). One of our key strengths is physical vapour deposition (PVD). Through our cutting-edge coating facilities, we are providing our PVD coating services out of Mumbai, Pune, and Bangalore.



techniques like electroplating and laser melt coating. Painting and surface protection lacquers were also utilised at this era. In the second stage, more complex plasma-based techniques such as physical and chemical vapour deposition along with near surface modification treatments such as ion implantation, plasma nitriding, laser treatment etc. were developed and effectively used. A composite surface coating method, which combines two techniques for a cooperative effect, is used extremely effectively in the third stage of development. Consider a multilayer composite coating with a sophisticated under surface treatment. The fourth

and most recent is nano surface engineering, which combines surface engineering methods with a complex of nano-materials and nanotechnologies. More and more nano-materials and nanotechnologies are being used in surface engineering as a result of the advancement of nano-science and technology.

What kind of changes are you seeing in the surface engineering space?

Surface engineering, which has a significant role to play in the production of smart materials, is aimed at changing the microstructure and/or composition of a component's near-surface region in order to enhance surface-dependent engineering properties. Approximately twenty years ago, surface engineering was discussed and suggested. Since that time, these techniques have continued to change to meet the growing demands of contemporary industrial advancements.

Surface engineering generally went through four stages of development. The first stage is made up of conventional single-layer and single-metal coating

How are you helping your customers to increase their efficiency and productivity?

Today, India is on the verge of a tremendous economic opportunity. This is a once-in-a-lifetime chance. As a result, it is far more critical for our manufacturers to achieve consistency and dependability in production to meet global standards. The current state of the Indian MSME sector is one of low competitiveness due to a lack of knowledge and exposure in comparison to the constantly growing consumer demand for modern domestic technology. This imbalance is forcing the MSME sector to improve the quality of technological machinery and engineering materials. Selecting the right material is critical to its success. Many customers approach to us with a new product at conceptual level or one that is failing in production, seeking assistance in selecting the

appropriate material and material treatments to increase the efficiency and productivity of their products. We then work together to figure out what function they are attempting to perform. We can achieve success by properly understanding our clients' needs and treating these materials with appropriate in-house surface engineering technologies.

How important are efficient surface modification technologies for making smart products/tools?

Surface modification technologies create new materials with desired properties. Along with these distinct capabilities, it also provides material savings and environmental benefits in a variety of applications, such as increased service life, lower emissions and energy consumption, and improved recyclability to support the smart manufacturing concept. Many modern surface engineering processes have little impact on the environment. Constant advancement in the field of surface engineering allows for the flexibility of tailor-made functionally graded structures capable of responding to their surroundings. This adaptability will aid in the expansion of sensor technology use. Overall, surface engineering will play an important role in the industrial era of smart manufacturing.

What are the advantages of Physical Vapor Deposition (PVD) coating? What are latest trends in PVD technology?

PVD stands for Physical Vapor Deposition, a process in which a solid material is vaporised in a vacuum environment and deposited as a coating on an exposed surface. It can be a single metal, alloys or their nitrides, oxides, carbides, or carbo nitrides, and so on. The Physical Vapor Deposition technique is more environmentally friendly than available coating techniques because it significantly reduces the amount of toxic substances that must be used during production. The PVD coating is extremely thin (1-5 microns), ensuring that the product retains its original shape completely. Despite being an extremely thin layer, these coatings help make the product stronger due to their extremely high hardness and more corrosion-resistant than coatings applied through other processes. These coatings are also extremely resistant to temperature and abrasion and are so long-lasting that no top coating or additional support is required.

Current trends in physical vapour deposition methods show that these cutting-edge technologies are being used to deposit thin films on a variety of industrial applications. Thin films are used in a variety of applications ranging from medical devices, microelectronics and nanotechnology to sustainable energy and mechanical properties enhancement. Thin film deposition methods were also found to be more efficient, accurate, long-lasting, and cost-effective than their predecessors. Constant advancements in thin film deposition techniques as this is an evolving aspect of materials engineering,

technology becomes smarter, and materials that support technology are required.

India aims to become a manufacturing superpower of the world. How can SMEs contribute to make India a manufacturing superpower?

It is now well-known fact that the SMEs sector is a very strong building block of a healthy manufacturing hub due to its unique capabilities in innovative manufacturing, operational flexibility, lower costs, and adaptability of new technologies. They can adapt. SME sector also strongly contribute in driving countries' economies by creating job opportunities, aid competition in emerging markets, and have a strong presence in various industrial sectors. All of these characteristics of SMEs make them an undisputed candidate for India's goal of becoming a manufacturing hub. Government assistance, adequate infrastructure, easy access to resources, and ease of doing business could all help to empower our SEM sector.

Are there cost-effective ways for SMEs to make manufacturing more efficient/smart?

Navigating cost-effective production without sacrificing product quality is a part of the day-to-day life of the SME sector. The SME sector is extremely vulnerable to industrial weather changes. As a result, the challenge is to strike a balance between the adoption of high-cost modern technologies and production cost effectiveness. Constant technological advancement also opens up new avenues for lowering production costs. Automation, best digitization, standardisation of equipment and machineries, standardisation of operating procedures with proven tools such as ISO, ERP, 5S, and so on could undoubtedly assist SMEs in becoming cost-effective in the upcoming modern manufacturing era.

Any plans to launch new products/services in the near future?

Yes, Surface Modification Technologies is planning to be ready for future industrial opportunities. We intend to expand in the areas of knowledge creation and intellectual property export in surface engineering and state-of-the-art PVD equipment manufacturing. We intend to meet the high-quality growing demands of the Indian industry by adding new smart coatings for functional applications and glittering new colour shades for aesthetic applications.

What are your growth plans?

We currently have 14 PVD coating machines and a complete PVD coating infrastructure spread across Mumbai, Bangalore, and Pune. We intend to expand our PVD coating business in North India, Gujarat, and South India by adding at least 6 more PVD coating machines and allied state-of-the-art infrastructure to support surface engineering innovation and services by 2026.

Top 10 tips for durable energy supply system on 6-axis robots

Increasingly, medium-sized companies are using 6-axis robots in stand-alone applications. This article aims to facilitate the work of designers, project planners and users who do not configure multi-axis energy chains and prepare robots for integration into production on a daily basis.

Six-axis robots are often used in automated production lines, which the system integrator sets up and commissions on site on a turnkey basis. Increasingly, however, medium-sized companies are using these robots in stand-alone applications and they are asking themselves the question: How should the energy, signal and if necessary, pneumatic supply, be implemented on the robot arm?

This article answers that question with ten tips. In the first part (Tip 1 and 2), it gives guidelines on the selection and configuration of multi-axis energy chains. A key aspect of this is the question: is a retraction system needed, and if so, which one?

The second part (Tip 3 to 6) describes the necessary work steps for installing the energy chain on the robot. In the third and last part (Tip 7 to 10), recommendations are given for testing and commissioning the installed energy chain.

The article is intended to facilitate the work of those designers, project planners and users who do not configure multi-axis energy chains and prepare robots for integration into production on a daily basis. However, it can only provide general information. For further, individual support in the selection, configuration and assembly of multi-axis energy chains, igus offers comprehensive assistance:

- ❑ Online configurators (see Tip 1)
- ❑ Personal advice from energy chain experts
- ❑ Acquisition of the fully harnessed energy chain system as readychain (see Tip 3)
- ❑ Installation service (see Tip 3)

Tip 1: Selection and configuration of the energy chain

The project planning starts with the definition of the required cables and hoses as well as their outer diameter and number. This results in the size of the energy chain from the igus triflex R product range. The bend radius of the energy chain and cables should also be taken into account in the selection.

In addition, the energy chain and retraction system size should always be in relation to the robot size. On the one hand, with small triflex R energy chains (size index 30 - 50), there is a risk that they will get caught more easily between the joints or get stuck on larger



interfering edges. On the other hand, the retraction force of a small system is no longer sufficient to retract the energy chain sufficiently due to the filling and the possible arm length of a large robot.

Rough rule of thumb: From 90 kg payload of the robot, choose a 60 size or larger.

Note: To define the optimum chain size for the required cables, igus offers the ideal tool with the online interior separation configurator. Here the cable package can be virtually tested in every chain size and with every chain type. In this way, the optimum chain size can be determined without risk and subsequent lack of space for the cables.

In robotics applications, cables are subjected to high stresses due to the multi-axis movement. Here it is essential to select cables that have been developed from the ground up for moving applications. With the chainflex product range, igus offers a selection of 11 cable types that have been explicitly designed for use on robots (CFROBOT).

To answer the question of whether the energy chain

Definitions and technical data

Bend radius: Bend radius is the radius with which the triflex R energy chain can be bent to the minimum without damaging it

chainflex: Brand name of the igus product range of highly flexible, torsion-resistant cables, also with special cables for robot applications (CFROBOT)

Fibre rod: Simplest version of a retraction system; allows partial directional control and stiffening of a multi-axis energy chain (see Tip 2)

readychain: Harnessed, ready-to-install energy chain systems (dress-pack) for immediate installation on the robot or in addition with a retraction system that is installed in combination on the robot

Retraction system: Ensures safe cable guidance on the robot arm and prevents looping and collisions of the energy chain with system components (see Tip 2)

Torsion stop: Design element for each chain link of the triflex R energy chains, ensures an even distribution of the torsional load over the complete cable length

Ball and socket principle: In the multi-axis moving energy chains, the chain links are connected to each other according to this principle, which is what makes the 3D movement and torsion possible in the first place

Shortening and lengthening: Each triflex R energy chain can be individually adapted to the application by inserting or removing chain links

should be open or closed, the ambient conditions are critical. If the robot carries out mechanical processing, for example, and metal chips are to be expected in the work area - according to the recommendation of igus a closed energy chain should be used.

Based on this pre-selection, the user can create a drawing of the interior separation with the igus interior separation configurator. This user-friendly online tool ensures an even distribution of the cables in the energy chain. This results in a safe cable guidance, which leads to a long service life of the energy and signal supply system to the tool or gripper of the robot.

Note: Take advantage of the flexibility of the energy chain. Select the size of the triflex R so that you can insert one or two additional cables later if, for example, an additional sensor is to be installed on the tool.

Tip 2: Selection of the retraction system

Retraction systems are available for the three energy chain types TRE, TRC and TRCF, which ensure a controlled movement of the energy chain. There are different systems to choose from. The environmental conditions as well as the available installation space ultimately determine which one is used.

Simple movements: In many applications e.g. palletising, the 6 axis robot performs only simple, barely

superimposed movements. The cables only have to be held and guided above the robot arm. The fibre rod is ideal for this task: a simple component that provides directional control of the energy chain.

Confined spaces: If space is limited in the robot cell and the energy supply must run close to the robot arm and perform a certain length compensation, the RS system is the ideal solution. With its internal spring rods, it ensures directional preload and always returns to its initial position. Loop formation on the robot arm is reliably avoided. This system is also particularly suitable for applications with high levels of contamination.

High retraction forces, long robot arm: Similar in design to the RS system, the RSP retraction system differs in the continuously adjustable retraction force generated by a pneumatic cylinder. The ideal application for this system: When the hose package or dress-pack has a large number of cables and hoses and therefore a high retraction force is required. Another area of application is robots with a very long arm, which requires a long moving end chain.

Linear and compact cable guide: Due to its narrow and straight shape, the RSE linear system is space-saving. In addition, the linear shape makes it suitable for guiding laser welding packages or supply hoses for rivets, screws or bolts. The straight guidance of the cables and hoses ensures less wear with a retraction distance of up to 490 mm.

Lightweight and highly dynamic: When robots with low to medium load capacity are used in dynamic applications, the compact and lightweight RSE system with guide roller for energy chain sizes 40 to 50 is often the best choice.

Space-saving and cost-efficient: The RSEL (Retraction System Expander Linear) and RSSL (Retraction System Spring Linear) are space-saving due to their straight shape and even more price-efficient compared to the RSE linear. With them, retraction paths of up to 380 mm can be achieved.

Space and weight saving: The TRX energy chain completely dispenses with a retraction system, as the energy chain can lengthen by up to 40% due to internal elastomer bands and can also retract itself. This energy chain form combines all the advantages of the TRC and TRE with the characteristics of a retraction system. Only one standard mounting bracket is required to install the TRX energy chain. This saves weight and reduces the number of mounting parts on the robot.

Whichever system is chosen, the appropriate joining links from the robot to the retraction system must now be selected.

Tip 3: Order

Now the selected energy chain system or the one determined in the configurator can be ordered - including the feed-throughs and mounting brackets.

Before placing the order, it is worth taking a look at the diverse igus range of accessories. With components such as covers (for additional protection against external

influences), adjustment units, adapter brackets, etc., the energy chain can be adapted even better to the individual operating conditions of the robot.

At this point, the user must also make a decision:

- ❑ Do they want to equip and assemble the energy chain himself or do they order it as a ready-to-install readychain?
- ❑ Do they want to install the energy chain himself or do they use the igus installation service?

Tip: *In order not to forget any attachments and to define the system that fits your robot, the online configurator for robot equipment is the easiest and fastest way to have the complete system.*

Tip 4: Installing the attachment parts

If the user has decided to carry out the assembly themselves, they first install the joining links that were ordered and supplied on the robot. In the case of the fibre rod module, this includes the universal assembly kit, which can be installed on almost all robots thanks to the slotted holes. When installing retraction systems, it may be necessary to use an adapter.

Tip 5: Filling the energy chain

The next tip (for self-assembly) is to fill the energy chain with hoses and cables and - if not done before - to harness the cables. For the TRC energy chain, the cables should always be inserted first before they are harnessed.

When filling, the cables and hoses should be distributed as evenly as possible but not necessarily spatially separated from each other. Due to the chambers of the energy chain, a spatial separation is easily possible and is a common practice. The heaviest cables or hoses should not be arranged next to each other, but opposite each other.

Note: *In order not to complicate the installation of the connectors, the cables and hoses should have sufficient excess length on both sides compared to the energy chain. In addition, it should be considered after installing the connectors if it is difficult or impossible to pull the cables through the energy chain due to lack of space.*

Tip 6: Connection of the dress-pack to the retraction system

Now the filled energy chain is connected to the retraction system.

The user can skip this step if they order the energy chain generated in the configurator as readychain. Then the ready-to-install energy chain is delivered to him with igus function guarantee and approximately adapted strain relief.

Tip 7: Strain relief of cables and hoses

Generally, strain relief on one end is recommended. The reason for this is that the movement allows a length compensation to take place across the cables. In this case, the strain relief prevents the cables from being

compressed or overstretched, which has a positive effect on the service life of the cables.

The console robots are an exception. Due to their movement sequence ("bent" from top to bottom), strain relief on both ends is recommended here so that the filling cannot move in the direction of the 6th axis.

Light fillings are to be fixed on the moving end side (axis 6) by a mounting bracket with strain relief teeth and cable tie wraps. For heavy filling, for example, with coolant or hydraulic hoses, CFX U-clamps are recommended in conjunction with a C-rail and a heavy-duty connection.

Tip 8: Test run in manual mode

Now, the robot, retraction system and energy chain are mechanically and electrically connected, and the robot is functional.

As a first tip for commissioning, all programmes should be tested in manual mode. In doing so, it is important not to forget the service or maintenance position. The functions in special operating modes (set-up mode, etc) should also be checked.

Tip 9: Test run in automatic mode



When setting up the system, care should be taken to ensure that the bend radius of the energy chain is not undercut by the robot

In positions where the chain is bent at axis 6, retraction should be avoided, as the energy chain is most stable with a linear pull

If the test run in manual mode goes smoothly, the test in automatic mode follows - initially at low speed, the jogging is increased up to production speed.

It is essential that the user has a free view of the dress-pack or the energy chain and also keeps an eye on it, because the energy chain or the dress-pack can behave completely differently at higher speeds.

Tip 10: Fine adjustment and checking

Now the robot together with energy chain(s), cable and dress-pack as well as, if necessary, the strain relief is "tried and tested" and ready for use. As a final tip before starting in normal operation, visually inspect the system and do a fine adjustment. This includes checking all strain relief elements as well as the screws and other joining links.



For more details, contact Matthias Meyer (Email: mmeyer@igus.net) or Markus Hörter (Email: mhoerter@igus.net)

IO-Link of ifm makes sensors fit for Industry 4.0

IO-Link has the potential for replacing analogue transfer of measured values. Since IO-Link data transmission is digital, measured values cannot be distorted by interference on the cable.



Sensors play an important role as “organs of perception” in automated solutions. To implement Industry 4.0 concepts in the automation industry, sensors do not only need to provide measured values or signals, but the latter also need to be communicated. This type of communication should always be simple and efficient – from sensor level via control and process control level up to company level. This is the only way to benefit from the many advantages offered by Industry 4.0.

ifm opts for IO-Link to ensure simple and efficient digital sensor communication. This interface, which is integrated in almost all new sensors that ifm puts on the market, is added to the standard analogue interfaces such as 4...20 mA. What is more, IO-Link has the potential for replacing analogue transfer of measured values. Since IO-Link data transmission is digital, measured values cannot be distorted by interference on the cable. Another great advantage of IO-Link transmission is the option to add further information, such as status information of the sensor, and to communicate it simultaneously. Also when it comes to sensor configuration, IO-Link offers many advantages: since parameter settings can, for example, be directly adopted from an IO master. Hence, time-consuming sensor setting is no longer necessary.

The new generation of IO-Link masters from ifm is extremely robust and offers two Ethernet ports with a switch for Profinet. The LR Device software is used to configure the connected sensors and actuators. The intuitive software finds all IO-Link masters in the Ethernet network and creates an overview of the whole plant. This is something entirely new on the market.

Additionally, integrating sensors with IO-Link makes it possible to use sensor data for higher-level ERP systems. For this, ifm offers the Linerecorder. It enables bidirectional communication between many different interfaces. This allows communication between ERP systems and data from units at field, control and process control level. With this system, the data can be transmitted directly to the ERP system without putting additional strain on the PLC in the automation solution. ifm has termed this direct sensor data path, which bypasses the control level, “Y path” because the data reaches both the PLC and the company management level by splitting up like the letter Y.

ifm is fully convinced that IO-Link is the foundation for a successful implementation of all Industry 4.0 concepts. This is why all new ifm sensors come with an IO-Link interface as a standard feature. Currently, ifm’s product range includes about 500 IO-Link products, and every year 100 to 150 new products are added.

Mallcom India launches FREDDIE lifestyle safety shoes

Developed with the vision to make India safer, FREDDIE shoe range is progressively working to protect from impact, punctures, slips, trips and fall

Mallcom India Limited, India's first integrated manufacturer of head-to-toe Personal Protection Equipment (PPE), has entered a new segment with the introduction of aesthetically designed lifestyle safety shoes - FREDDIE. While the central government's initiatives on worker's safety and health have helped in the better acceptance of PPEs and other safety products, Mallcom India's lifestyle safety shoe range have set up a benchmark for unparalleled quality which is crafted to perform exceptionally well in almost every work environment but in style.

Being a thriving manufacturer with an extended range of exclusive quality PPE products, Mallcom's FREDDIE shoe range is progressively working to protect from impact, punctures, slips, trips and fall. The anti-slip, breathable, puncture and abrasion resistant design with vibrant colours and aesthetics make it a perfect choice for everyday life. Mallcom manufactures 3 million pairs of safety shoes each year across all its manufacturing units put together in Kolkata, Ahmedabad and Haridwar. It is also coming up with another unit in Ghatakpur, Kolkata to ramp up the existing capacity of manufacturing safety shoes. Safety shoes account for one third of the total revenue for Mallcom.

With a motto of providing the best lifestyle safety equipment, Mallcom has been successful in designing the new shoe line FREDDIE in the market. The exclusive design lets everyone enjoy the comfort with cushioned pads, double density PU sole, TPU shock absorber and composite toe cap. Workers from different rough and tough professions like aerospace & aviation, logistics & transportation, warehousing, repair & maintenance, and material handling assembling can use this. Customisation facility with various size and colour options is the USP of this range making every walk of life worthwhile.

Speaking about the new range of lifestyle safety shoes, Giriraj Mall, Executive Director, Mallcom India,

With a motto of providing the best lifestyle safety equipment, Mallcom has been successful in designing the new shoe line FREDDIE in the market.



said, "Mallcom India believes in creating a safer India by adding product range, which would not only provide a safe working environment but also have a style quotient. We want to change the way people look at occupational safety industry in India. It is extremely crucial to adapt to newer technologies and implement it for product innovation without compromising on the utility aspect. Our new range of safety shoes have been tested and certified as per EN and BIS standard."

Mallcom India Limited founded in 1983 is the first generation publicly listed enterprise, under National Stock Exchange (NSE) and Bombay Stock Exchange (BSE) dealing in manufacturing and distribution of personal protective equipment (PPE) for industrial and healthcare safety. Founded by Ajay Mall, Mallcom employees 3,000 workforce and is headquartered in Kolkata, India. Mallcom serves as an original equipment manufacturer (OEM) vendor to the world with customers spread across Europe, USA, South America & Oceania. It also sells under its brand name 'Mallcom' in the Indian sub-continent, Middle East, and South East Asia through its trusted dealer network.

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For more details, please visit www.mallcom.in

“Faclon is a pioneer in taking Industry 4.0 mainstream in India”

The Mumbai-based Faclon Labs is a deep tech IoT (Internet of Things) company started by IIT-Bombay alumni. Faclon aims to become the digital backbone of the manufacturing sector by being a single source for all the digitalization needs of enterprises. In this interview, **Rishi Sharma, CEO & Co-founder, Faclon Labs**, explains importance of modern technologies for increasing India's competitiveness and how Faclon is assisting companies in their Industry 4.0 journey.

Kindly brief us about Faclon Labs?

Founded in 2016, Faclon Labs started as a deep-tech IoT and data management company to address the growing need for Industry 4.0. With this mindset towards improving sustainability and reliability, Faclon is now a leading home-grown IoT and AI (artificial intelligence) company providing IoT platform I/O sense to cater to the wide range of digitization challenges faced by manufacturing, commercial as well as utility segments.

Faclon's expertise lies in data acquisition and data enablement, coupled with generating business insights helping customers increase productivity, reduce operating costs and manage compliances better.

With strong subject matter expertise and ready-to-scale solution offerings, Faclon is a pioneer in taking Industry 4.0 mainstream in India and seven other countries where we have a presence.

What are the major shifts in trends you are seeing in the manufacturing industry?

Due to a boost in adhering to compliances, various government and corporate initiatives, market competition, and tighter budgets (that we are seeing in the post-Covid era), manufacturing industries are trying to figure out ways to operate their facilities in the most streamlined and effective way possible. Significant steps are being taken toward digitalization by industrial plants, facility managers, and OEM manufacturers to diminish



Rishi Sharma (second from left) with the Faclon Labs team

inefficiencies and improve specific production metrics.

India aims to become a manufacturing superpower of the world. How important will be the adoption of modern technologies for increasing India's competitiveness?

Capital flows in the direction of leverage if one really wishes to thrive in a globally competitive landscape. The adoption of technologies such as automation, robotics, AI, and IoT enables cost-competency and production excellence, which are going to be major levers for the growth of the Indian manufacturing industry.

In fact, Faclon Labs is a home-grown deep-tech company that

strives to not only provide world-leading IoT and AI offerings to the Indian market but also take the India stack to the global landscape.

What does Faclon do in terms of digitalization?

Faclon Labs becomes the digital backbone for its customers, enabling them to consolidate all kinds of process, sensor, and other industrial data and provide various analytical, automation, and AI tools to reduce the cost of operations and improve productivity.

In our engagements, we enable plug-n-play data access from any utilities, sensors, and assets across tens-of-thousands of nodes on a real-time basis (I/O Connect). This data forms the foundation of all

algorithmic analytics (I/O Sense), precise automation (I/O Rules), as well as AI/ML interventions for predictive analytics (I/O deep sense). These data driven insights help businesses take smart and forward-looking decisions, which otherwise would be impossible to even conceive.

How can SMEs contribute towards making India a manufacturing superpower?

SMEs are the backbone of any booming economy who are quick

enough to capitalise on the market needs and quickly fill those needs through their offerings. With the growing SME base in India taking up complex challenges, they are the drivers to make India a manufacturing hub.

Falcon Labs is helping various SMEs in taking steps towards significantly improving their unit economics, resulting in increased profitability.

What is the vision of Falcon Labs?

For Faclon Labs, the future looks

quite promising and exciting. As an increasing number of enterprises are starting to realise the value of digitalization, Faclon aims to become the digital backbone of any manufacturing enterprise, by becoming a single source for all the digitalization needs tailored for each enterprise, enabling them to achieve manufacturing excellence, increased productivity and significantly reduced operating costs.

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(Communication provided by the management of the company)

PFERD reaches a major milestone; sells 1 bn thin cut-off wheels

Thin cut-off wheels measuring 1.0 mm thickness were met with scepticism in the market in the late 1990s. However, they are now a crucial part of workshop life across the globe and have revolutionised processes.

To gain an idea of the far-reaching impact thin cut-off wheels have had in the industry, you need only look at the quantities produced since they were launched. These top sellers make up an ever-increasing share of the product range, explained Marco Steinwand, Product Manager for cut-off wheels and grinding discs at PFERD Tools, August Rüggeberg GmbH & Co. KG. "This really became clear to us at the beginning of this year, when we sold our 1 billionth thin cut-off wheel." Given this outstanding achievement, it's hard to believe many users, retailers and manufacturers rejected the new trend of thin cut-off wheels in the market more than 20 years ago. "They said thin wheels would be dangerous and might not last. These tools suddenly made cutting incredibly easy and convenient, so one of our key priorities at the beginning was, of course, to make them safe enough for anyone to use," added Steinwand. PFERD's success in this respect was the key to ensuring the ongoing popularity of the wheels.

"Here at PFERD, our aim from the very beginning was to combine several advantages in these thin wheels. We wanted to make cutting much faster and more convenient than ever before, while also significantly reducing burr formation. But we also had to consider the tool life." Achieving that objective "was a truly exciting project for everyone at the time", added the Product Manager enthusiastically.

"Simply put, there wasn't a thin cut-off wheel available



that could do all that!" It became clear back then that they had to reconcile conflicting objectives, admitted Steinwand. This caused quite an "intensive dialogue" at the company while developing the product, he remembers with a grin. Precisely aligning their development work with users' needs, i.e., detailed analyses of what the workers and their managers wanted, ultimately ensured the wheels' success. "The key factor was that the wheels did exactly what was expected of them – they minimised vibrations, noise, and dust, were easier to handle, and offered the lowest costs per cut. That was the 'new cutting' technique that we wanted to introduce, involving minimal manual effort, an easy way to monitor the cutting process, and a very handy design."

They also managed to increase the performance "by a factor of around 20", explained Marco Steinwand. That was key to significantly improving efficiency and achieving optimal productivity. "Technically speaking, we have now done that a billion times over." Today, PFERD offers one of the most extensive range of thin manual cut-off wheels, including diameters from 105 to 230 mm and widths from 0.8 to 1.9 mm (depending on the diameter). PFERD also offers various performance lines to suit different applications and requirements.

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(Communication provided by the management of the company)

Bohmen Industries is focusing on developing new products

From its humble beginning in 1979, Bohmen Industries today offers a wide variety of position switching devices catering to various industries. Post-Covid, the company is seeing a good demand due to a reduction in competition from the unorganised sector as well as a definite aversion for cheap imported alternatives, reveals **Abhishek Bohra, Partner, Bohmen Industries.**

How has Bohmen Industries grown since its inception?

Bohmen Industries was founded in 1979, as a manufacturer of position switching devices which were primarily being imported then. From its humble origins, today it offers a wide variety of such devices catering to each and every process industry, manufacturing exclusively at their plant at Bhayander, Thane. The team is capable of producing approximately 150,000 devices a year and this capacity is under augmentation.

Are you seeing a pick-up in demand in 2021-22? What is driving the market?

The market has definitely revived post Covid and this is seen in existing customers as well as in new acquisitions. Demand is up due to a reduction in competition from the unorganised sector as well as a definite aversion for cheap imported alternatives which held sway in certain segments.

What were your key learnings from the Covid pandemic? What changes have been brought about in your company and in the industry due to Covid?

The biggest learning for a small SME like us is to ensure continuity of management of affairs especially post the second wave. A number of our associates ran aground due to the unfortunate loss of the founder or proprietors and managers. Having a core team with adequate backup is very critical now and we are already taking steps to ensure



this in the near future.

Which new products & solution have you introduced in the market in the last 2 years? Do you plan to launch new products in the near future?

We have developed coach equipment for the railways which have gone live. We do have a number of products in the development stage which were put

Ease of registration under the new MSME setup has made a lot of us aware of our rights as vendors and at the same time, put the onus on medium & large customers to ensure they follow the rules in the true spirit of the law.

on hold in 2020-21, but should resume this year.

In the last one and half years, the government has announced a number of initiatives like Aatmanirbhar Bharat, PLI scheme, redefinition of MSMEs, etc. Do you think these initiatives will benefit the industry?

Ease of registration under the new MSME setup has made a lot of us aware of our rights as vendors and at the same time, put the onus on medium & large customers to ensure they follow the rules in the true spirit of the law. Financial arm-twisting, which was a bane of many SMEs, is slowly fading out due to this. 'Aatmanirbhar Bharat' slogan is driving the manufacturer's preference for Indian brands and, as I said earlier, is helping avoid unnecessary business practices.

Sustainability and environment awareness are growing in the industry. How is your company gearing up for this trend?

Digital is the new medium for communicating, invoicing, payments, collaborations and developments. We wholly support this trend and are utilising some of these to reduce our environmental footprint. We have stopped printing catalogues, as soft copies are eco-friendly and convenient to distribute, access, modify and so forth. As far as possible, we use digital payment methods to pay our vendors as well as to charge our customers.

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(Communication provided by the management of the company)

Safcon seals offer high security for electric, water and gas prepaid meters

Safcon offers pre-locked security seal designed for protecting meters against tampering and counterfeiting. Its Revguard is a high-security meter seals having unique 8-arm locking mechanism having moulded non-corrosive, non-magnetic stainless-steel wire. The four-arms are pre-locked to prevent pre-tampering the seal before installation. After locking, the seal is having four stages locking and is impossible to open without destroying the security seal. The security seal is customised with hi-rise moulded utility logo, DPM 2D barcode/QR code seal number readable with smart phone or barcode reader, encrypted code and a wide variety of anti-tampering and anti-counterfeiting features.

Each security seal is having highly visible alphanumeric serial numbering for unique identification. Once locked, it provides highest protection level to meters and impossible to open without destruction. The security seal is manufactured from UV stabilised polycarbonate material to withstand high hostile environment. The seal withstand temperature extreme of



148°C. Safcon Tamper Resistant Revguard Meter Security Seal complies with requirements of CEA (Metering Regulations), CE and RoHS. Safcon is ISO 9001:2015 certified by TUV.

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Safcon provides tamper evident security seal for fire extinguishers

Fire extinguisher is something you hope you never have to actually use, but when you do need to use it, you want to be 100% certain that it will work exactly the way it is supposed to work, keeping your family or business safe from fire. Because fire

extinguisher often sits for long periods waiting for a fire emergency, you want to be certain that no one has tampered with it or used it already, rendering it inadequate to your needs when an actual fire strikes. An easy and affordable solution to this problem is to purchase tamper evident seals for fire extinguishers.

Safcon Ball-lok security seal (Part No. BL-26) is especially designed to fix around the safety pin on the fire extinguisher so you can see at a glance that it has not been used. The Security seal is having easy to use pull tight locking mechanism. Safcon security seals are manufactured from virgin plastic materials and are available in yellow colour as standard. Red, orange, green, and blue colour can be supplied on request. The security seal is very effective and inexpensive way to ensure that the fire extinguisher is unused and ready to go in the event of an actual fire. In the event of fire, the security seal is easily removed by hand from the fire extinguisher without the need of any tool.

The fire extinguisher security seals are customised with customers' word logo and/or consecutive serial numbers. The seal is supplied in mats of 10 pieces. The security seal withstand temperature range -20°C to +95°C.

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For details contact, Safcon Seals Pvt Ltd, Kolkata, Tel: +91 33 2229 5486, Mob: +91 98748 55114, Email: sales@safcon.co.in, or visit www.safcon.co.in

NORD offers gears for heavy duty logistics

A 35 per cent increase in centre distance and a 60 per cent reduction in drive weight due to optimal use of installation space: With NORD Drivesystems' new MAXXDRIVE XD series, the drive specialist sets new standards. The new "family member" in the NORD industrial gear unit portfolio is precisely matched to the requirements of lifting equipment. The parallel arrangement of the gear stages and the thus increased centre distance were specially developed for the usual layout of lifting gear drives for cranes, where gear unit, motor and rope drum are arranged in a U-shape. The increased surface area of the XD also ensures an optimum heat dissipation.

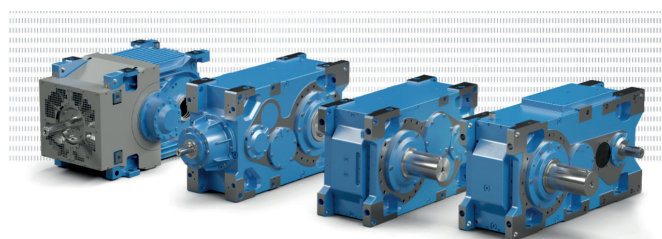
Solutions from a single source

"Thanks to the new MAXXDRIVE XD, we can now provide all drive solutions for heavy duty logistics from a single source," said Jörg Niermann, Head of Marketing at NORD Drivesystems..

All MAXXDRIVE industrial gear units from NORD Drivesystems are characterised by quiet operation and a long service life. With very high output torques of up to 282,000 Nm, they are ideally suitable for demanding applications in lifting equipment, belt conveyors and bucket elevators.

Durable and robust

Precise gear geometries in the MAXXDRIVE industrial gear units ensure excellent load capacity, long service life and low noise. The cuboid UNICASE housing also allows greatest flexibility and enables six installation positions. NORD offers its MAXXDRIVE industrial gear units in a total of eleven sizes and in parallel or right-



From the MAXXDRIVE XT right-angle gear unit (on left) to the MAXXDRIVE XD (on right): NORD offers a wide range of industrial gear units for various applications

angle gear unit versions. The MAXXDRIVE XT series was designed for particularly high powers without special cooling requirements. With powers of up to 7,500 kW, it is recommended for applications in bulk goods conveying.

From conveying to lifting

"For all areas of heavy duty logistics, NORD Drivesystems provides powerful and robust drive solutions – from conveying to lifting, from general goods to bulk materials," said Jörg Niermann emphasises. All MAXXDRIVE industrial gear units use standard components to enable short-term availability. However, they are always configured to be tailor-made for the customer's individual requirements.

"Our experts know the industry-specific requirements of heavy duty logistics exactly, they advise our customers comprehensively and design tailor-made solutions with them, so that they receive the ideal configuration for their application," added Niermann.

IPF

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