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SKILL DEVELOPMENT IN INDUSTRY 4.0 Capacity Utilisation of Gol & CoE



A&D - Interview Atul Govil, CTO & Head (SAP & IT), India Glycols (p. 24)

In association with

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Showing remarkable resiliency!

India has surpassed USA as the world's second most desired manufacturing destination, according to Cushman & Wakefield's 2021 World Manufacturing Danger Index, indicating the growing interest shown by manufacturers in India as a preferred manufacturing hub. The rising deal with India can be attributed to India's working conditions and competitiveness in terms of value. In addition, the country's demonstrated performance in meeting outsourcing requirements has resulted in an annual increase in the ranking. Throughout and after the second wave of COVID-19, Indian manufacturing has also shown remarkable resiliency.

But now, it's time for the Indian manufacturing industry to figure out ways to emerge in the new landscape with confidence and complete readiness and show its prowess. Technology is shaping up to be the only savior in this context. We have had some achievements and success in the past and will continue to do so in future as well. But as a country we are still not able to achieve the scale which other countries like America, China or Japan have been working on for long.

One big setback that the crisis has unleashed is also the one that is proving to be a blessing in disguise. Both large and small players across the globe have realised the importance of diversifying their supplier base instead of tying up their supply to one source country. Indian manufacturers have a chance to convert this crisis into a massive opportunity in this area. As global companies adopt their manufacturing and supply chain strategies to build resilience, India has a unique opportunity to become a global manufacturing hub. Keeping the fingers crossed!

helshar ilthar

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Cover image courtesy: shutterstock

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Alok Bardiya, HEAD – INTERNET OF THINGS (BUSINESS UNIT), TATA COMMUNICATIONS

The Indian manufacturing industry is at a juncture today where the need is to innovate, drive efficiencies, accelerate time-to-market and bring together diverse teams, expertise & knowledge. Amidst this transformation, Internet of Things (IoT) has widely emerged as the technology with the potential to fundamentally alter the manufacturing sector.

Furthermore, with the Government's push to make India a global manufacturing hub, it's imperative that Indian enterprises accelerate their IoT adoption. The manufacturing sector needs to work with the larger ecosystem to commercialise unique prototypes into scalable IoT solutions and leverage new business models to drive competitive & profitable growth. The priority for the sector, at the moment, is to meet growing customer demands while improving business agility & reducing operational complexity to help drive longer term growth.

When it comes to an enterprise operation setting, IoT is capable of delivering connected operations solutions that encompass diverse use cases across employee safety & efficiency, machine & facility management and material & equipment handling.

In an asset-intensive industry, the workplace, by its very nature, involves significant risks. At job sites, workers and employees are prone to various threats. Therefore, safety is an important subject for

"THE PRIORITY FOR THE SECTOR IS TO MEET GROWING CUSTOMER DEMANDS"

any enterprise. Developments in IoT allow for any manufacturing outfit, regardless of size & scope, to connect, monitor and protect employees. Furthermore, in the current scenario, such IoT-powered solutions are being customised to identify suspicious COVID-19 cases while ensuring adherence to social distancing norms through overcrowding alerts & zoning. IoT is able to monitor employee health and safety parameters, including the heart rate, skin temperature and immobility, thus, preventing onsite incidents. What's more, the data IoT generates helps drive insights that enhance productivity across the enterprise.

IoT is also cost-effective to deploy and maintain, while offering unparalleled levels of granularity, when it comes to utility management, incident prevention solutions, monitoring and controlling an environment. From utility metres for electricity, water & gas, temperature & humidity sensors to carbon dioxide & smoke monitors, these solutions contribute to measuring and improving process efficiencies at a facility.



For instance, 24×7 monitoring of room temperature at manufacturing facilities helps in the proactive prevention of equipment overheating and fire mishaps.

Asset management is another area where IoT plays a significant role in ensuring seamless functioning of backend operations at facilities. With minimum manual intervention through remote assistance, asset tracking solutions provide an asset management system that allows enterprises to track their assets, however widely distributed. Additionally, predictive assets monitoring is highly beneficial in eliminating risks as it can pre-empt unforeseen depreciation of machine tools. Bearing a direct business impact, asset tracking can contribute up to 10% in savings for a manufacturing outfit. IoT deployment across the shop floor allows manufacturers to swiftly address the challenges of market volatility while reducing CapEx and OpEx. By taking an asset-centric view of the manufacturing plant across its lifecycle, from pre-FEED to operations to end of life, businesses can better leverage capital investments to generate profitability when the plant begins operating.

IoT provides an end-to-end visibility and helps us reimagine operations. What the Indian manufacturing industry needs is a standard model that will support seamless integration of different IoT solutions and use cases and guarantee interoperability, connectivity & security. □

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ABB expands manufacturing capacity for Low Voltage (LV) motors

ABB recently expanded its Faridabad facility for manufacturing of low voltage motors, which has been at the forefront of promoting sustainable practices and is adopting renewable energy usage and improving energy efficiency across the plant. The new line will develop energy efficient motors up to 55kW for customers operating in different industrial segments such as F&B, water & wastewater, cement, metals and mining, HVAC, textiles, rubber and others. ABB's LV motors are compactly designed to minimise space and total cost of ownership. Offering greater flexibility to meet specific customer requirements, ABB's LV motors help in operating critical processes with minimum downtime. Talking about this expansion, Sanjeev Arora, President, ABB Motion India, said, "This expansion further reinforces our commitment to the 'Make in India' initiative. The new line will not only meet the growing demands of the domestic market, but also help us boost exports to other significant markets like the Middle East and Africa. Our state-of-the-art manufacturing facilities will continue to manufacture world-class motors that are reliable and energy efficient."

Danfoss in India finalises \$3.3 bn acquisition of Eaton's hydraulics business

Danfoss recently acquired Eaton's hydraulics business leading to addition of approximately 10,000 employees worldwide and US\$1.8 billion (around €1.5 billion) in 2020 global sales. Combining the two organisations will double the size of Danfoss Power Solutions, increasing its innovation capacity two-fold. Danfoss will have an even stronger leadership position in the hydraulics market in India, with the addition of Eaton's industrial hydraulics and fluid conveyance expertise. With this merger, the Danfoss Power Solutions on-roll employee headcount crosses 1000 in India. This larger portfolio of products and the strength of the new strong engineering centre in Pune with 500+ engineers will drive the Danfoss innovation growth story in India. Speaking about the acquisition, Kim Fausing, asserted, "This is a great day for Danfoss as we welcome 10,000 new colleagues into the organisation and create a global leader in mobile and industrial hydraulics. We will continue our significant investments to stay on the forefront of technology leadership and provide solutions that improve productivity and reduce emissions to meet the requirements of the future."





Schneider Electric's EcoStruxure™ platform combined with AVEVA's digital transformation solutions

Schneider Electric and AVEVA recently announced that their combined technology offerings are supporting the sustainability initiatives of mining companies in four key pillars – energy efficiency, yield improvement, low greenhouse emission technology adoption and new green processes.

Both companies are providing the tools required by organisations to make informed decisions that will empower people across the mining, minerals and metals value chains to be more strategic in their choices based on sound advice with sustainability in mind. They are assisting operators and managers in these choices leaving these organisations well positioned to tackle some of the challenges associated with adopting sustainable practices, potentially resulting in reduced operating costs and thus providing the rare ability of appeasing all stakeholders.

Speaking on digitalisation in the Indian mining industry, Meenu Singhal, VP – Industry Business, Schneider Electric India, stated, "We work with customers to understand their business and sustainability needs, risks and rewards to deliver a strategy that targets tangible outcomes within a particular regulatory framework. All of it through optimising the technology is already available at mining sites. Our EcoStruxure platform, in conjunction with AVEVA software, makes this possible by bridging operational silos and achieving maximum efficiency for our customers."

Sharing his thoughts, Martin Provencher, Industry Principal, Mining, Metals and Materials, AVEVA, added, "Increasingly virulent cyber attacks and a growing mandate for decarbonised minerals have further emphasised the importance of having high data availability and embracing a secure, cloud-first approach to visualise and contextualise enterprise-wide processes across global operations. The combination of Schneider Electric's energy management solutions, automation systems & services and AVEVA's Digital Mining Transformation solutions enable our customers to transform conventional mining operations into intelligent, resilient and sustainable undertakings."

According to the IDC Technology Spotlight, Schneider Electric's EcoStruxure platform, combined with AVEVA's Digital Mining and Metals Transformation solutions, can provide the operational and organisational insight required to make sustainable operations and improved decisions through the collection and analysis of data. The partner companies aim to decarbonise the mining, minerals and metals value chains through the provision of an industrial IoT platform with technology and software elements supporting the capability for energy management and automation.

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Ohmium launches India's first Green Hydrogen Electrolyser Gigafactory

Ohmium International recently launched India's first Green Hydrogen Electrolyser Gigafactory at Bengaluru through its Indian subsidiary. Supporting India's transition to a clean, safe & secure energy future along with National Hydrogen Mission and Make in India initiatives and dedicating the company to Aatmanirbhar Bharat, Pashupathy Gopalan, Investor, Ohmium, said, "We are firmly aligned to India's vision and believe that we can make immense contribution towards this goal with our cutting-edge technology. By further boosting the production of Green Hydrogen within India, we aim to make the nation an export hub for green fuel." Explaining the products of the company, Arne Ballantine, CEO & Co-founder, Ohmium, expounded, "Our products are



modular, high performance and high value. This ensures that they can be utilised to achieve levelized costs of hydrogen which support the growth of India's economy. Ohmium's technology is leading edge PEM with the bulk of PEM development in India. Ohmium has established a Gigafactory which manufactures Indian-made PEM hydrogen electrolysers. The factory has a capacity of manufacturing approximately ½ GW per year today. But we can quickly expand that to 2 GW per year."



International Federation of Robotics releases paper 'A Mobile Revolution'

International Federation of Robotics (IFR) recently predicted unit sales will grow by 40% per year worldwide as the robot mobility is booming worldwide. How mobility is reshaping robotics and why this is a game-changing revolution has been researched by the IFR and published in the new paper 'A Mobile Revolution'. Talking about Autonomous Mobile Robots (AMR) and the paper, Milton Guerry, President, IFR, said, "Today, AMRs also work in applications where contact with the general public is intended. They provide information to shoppers, deliver room service orders in hotels or support police officers by patrolling city areas. IFR's mobile revolution paper gives an overview of the main use cases for mobile robots and their most significant impacts. Mobile robotics is a dynamic field of development, and we expect exciting advances over the next decade. These advances will take place in both hardware and software. Mobile robots will become lighter and more flexible. AMRs and service robots will be able to navigate in a range of indoor and outdoor environments more easily as advances in sensors and software algorithms mean that navigation and vision become more and more precise."

Manufacturing sector would contribute 25% of the GDP by the end of 2022: Heavy Industries Minister

The Associated Chambers of Commerce and Industry of India (ASSOCHAM) recently organised a virtual conference on Global Value Chains – Backward and Forward integration. The session on 'Smart Manufacturing & Industry 4.0 – Delivering the next generation of manufacturing' was addressed by Dr Mahendra Nath Pandey, Minister, Ministry of Heavy Industries and Public Enterprises, Government of India. Speaking at the session, Pandey stated, "The government's focus on manufacturing through programmes, such as 'Make in India' and policies, such as the 'National Policy for Advanced Manufacturing', Industry 4.0 could play a



key role in boosting the manufacturing sector's share in the country's GDP to 25% by 2022 from the current 17%."

Deciphering the future of the manufacturing industry in the country, Vineet Agarwal, President, ASSOCHAM, pointed, "The focus on manufacturing will help India in leveraging its demographic dividend, as the vast youth population of the country can be engaged in the sector. This mandates a strong skilling focus to enhance employability and reduce the burden on the agricultural industry. However, India would need to strike a balance between emerging technologies and massive labour force."

Moving further, Vinod Pandey, Chairman, ASSOCHAM Manufacturing & Capital Goods Council and Director – Government Affair and External Affairs, BMW India, added, "The acceleration of the fourth industrial revolution - Industry 4.0 or connected factory – however holds the power to steer the industry out of the current crisis. Breakthrough technologies, like Artificial Intelligence (AI), Machine-to-Machine (M2M) Learning, Internet of Things (IoT), sensors and advanced analytics can equip manufacturers with the tools and foresight they need to thrive in the post-COVID-19 world."

Similarly, Kulwin Seehra, Chairman, Punjab State Development Council & Executive Director, GNA Axles, informed, "The government initiatives to popularise digital technology solutions are helping the industry recognise the importance of digital capabilities, such as AI and IoT. Both automation and manual labour can work together. In critical processes where there is a huge risk to human life, a lot of processes can be automated. This would also help in achieving more productivity."





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"Organisations must prioritise sustainability as a frontand-centre imperative"

...mentions **Parminder Singh,** Head of Design & Manufacturing – India & SAARC, Autodesk, in this interview with Juili Eklahare. He points out how generative design enables organisations to create designs that reduce material input & waste, how IoT can help identify how people can use infrastructure in sustainable ways and how the company measures its progress towards sustainability. Excerpts...

For over a decade now, you have been creating institutional collaborations in social impact projects within water & energy segments. Can you tell us in detail about the work you are doing through these collaborations?

Generative design is being adopted profusely in the manufacturing industry. Do you see the industry adopting more of it during the COVID-19 pandemic?

How can an organisation achieve infusing sustainability right at the design stage, while having utmost productivity?

As we rebuild city infrastructure using smart technologies, how do you advise that we analyse its impact on the environment?

How do you measure Autodesk's progress toward sustainability? Do you have milestones? We aim to empower our customers to apply design and make technology to today's most pertinent issues & accelerate industry transformation through cross-sector collaboration & by catalysing innovation between and beyond our industries. Through the Autodesk Carbon Fund, we support projects across the globe. Some of our water projects are Aqua Clara and Boreholes in Uganda and one of our important energy projects include the Kendeda Building for Innovative Sustainable Design.

The pandemic has spurred on break-neck digital adoption, more cloud collaboration and automated systems. Organisations are also facing reduced access to materials and production times. It is in this paradigm that generative design can find its role in the manufacturing value chain. There are three core challenges in the adoption of generative design – skilling, affordability & buy-in from senior management.

Good design can directly influence how efficient an asset will be over its lifetime. Unsustainable assets are also going to cost more over their lifetime. Organisations, therefore, must prioritise sustainability as a front-and-centre imperative, right from the design stage. Generative design enables organisations to create designs that reduce material input and waste, ultimately proving to be more sustainable. These products also perform better and last longer.

The Internet of Things (IoT) can help identify how people can use infrastructure in sustainable ways. This data can also inform the sustainable developments of future infrastructure in response to changing demographic or environmental conditions. IoT-enabled smart infrastructure, inclusive of energy, water, transportation, buildings and governance can prioritise needs, performance, minimise energy use and make life more enjoyable & productive for residents.

We have always been committed to advancing a more sustainable, resilient and equitable world with our technology and within our business. Our efforts are aimed at three primary areas – derived from the United Nations Sustainable Development Goals (UN SDGs) – in which we believe we are best placed to accelerate positive impact at scale –

- Energy & materials: Enabling better energy & materials choices, reducing carbon emissions & waste
- Health & resilience: Accelerating the design and make of products & places that are safer, healthier and more resilient
- Work & prosperity: Advancing equity & access & facilitate the acquisition of in demand skills of future

"Several new needs have appeared for robotic applications"

...says Hrishikesh Kulkarni, COO, Zimmer India – a part of the Zimmer Group – in this interview with Juili Eklahare. He discusses the company's target industry sectors, how there is a big change in the Indian industry & the change in the automation technologies during the pandemic and how the total ecosystem to execute projects essentially with TOC in mind is not available in India. Excerpts...

Which are the target industry sectors for Zimmer? Which industry sectors do you think have major potential for your products?

How do you see automation changing the face of business intelligence currently? What is the level of accuracy and efficiency achieved by your company?

As the COO, what is the biggest challenge faced by a firm in-line with the evolution and building new products to keep up with the current market needs?

Do you think the market requirements have changed during the pandemic? What is your outlook for the market demand in the near future?

How are Zimmer's new GPP/ GPD5000AL grippers perfect for price-conscious customers? In India, we are mainly working with automotive industries and our major applications are in machine tending, handling and assembly. Our major business focus worldwide is towards EV solutions. Plus, we are the major suppliers to auto ancillaries, such as tires, breaks, stearin, glass and many other products. Our several products go in machine tools to enhance the accuracy, capability and longevity. Apart from this, we supply the logistics and medical industry. We have also begun to supply our components to the food & beverage industry due to our food-grade products.

Due to the pandemic, there is a big change in the Indian industry and the automation systems deployed. Nowadays, people are buying from online portals than shops and this has created a huge demand in intralogistics. We are supplying a lot of equipment for intralogistics, for example, cartons, bags, crates, shrink wraps, boxes, pails, etc, handled by robots and moved on AGVs. Besides, our End of Arm Tooling is now equipped with special sensors, cameras and innovative actuators apart from simple grippers. Due to this shift, we are also serving a lot of electric grippers and battery-operated end-effectors.

Though we have innovative and intelligent products, the total ecosystem to execute projects essentially with TOC in mind is not available in India. In India, we are still looking for low capex and are not bothered about high operating cost. If such an ecosystem exists, then our industry will catch up and look for solutions that will bring their total cost down.

The market requirements have definitely changed. After the pandemic, several new needs have appeared for robotic applications, and these will grow. We, being a part of End of Arm Tooling, will get a chance to work in various verticals and we are looking forward to it.

Our 5000 series is the best in its type and when a cost-effective solution was requested, we brought AL series in the market. AL grippers are much more cost-effective than comparable grippers on the market and their standardised mounting options & dimensions make for ideal resistance to even the toughest environmental conditions. The 5000 series, with all of its variants, is our 24/7 solution – unlimited continuous duty with maximum system availability.

"Connected manufacturing brings in complete visibility"

... mentions **Divyesh Shah,** CEO & Founder, LinkEZ Technologies, in his interview with Anvita Pillai. Here, he discusses the idea behind starting LinkEZ, their MATS platform, how it can help in production monitoring during the COVID-19 lockdown period and more. Excerpts...

What was the agenda behind starting Linkez? How does it help connect people and technology?

There has always been a prevalent problem for manufacturers of not knowing 'how a part is being manufactured', raising questions about process, quality and delivery. How does your start-up provide a solution to this problem?

How does connected manufacturing bring in ease of production to both, the manufacturer as well as the end-customer?

With the COVID-19 impacting and there being a reduction in labour and movement, how do you think your product MATS can be helpful in production monitoring?

How do you plan on growing and establishing a strong presence in India in the next five years? Any plans of global expansion? For manufacturing industries, leveraging IT for I4.0 is not second nature and building in house expertise is not scalable. But if deep tech can compliment their operational expertise, then the solution becomes more like a tool for them and helps maximise their full manufacturing potential. That was the idea that gave birth to LinkEZ. Our goal was to make technology simple and easy-to-use, so that people can connect with it and adopt easily.

Interestingly, we have heard the exact statement from many OEMs that we talked to. OEMs prescribe the process and audit through paper trail. This is not efficient if you consider OEMs having thousands of part manufacturers in the supply chain. LinkEZ, with its Al-driven MATS Platform, helps digitalise 4Ms (Man, Machine, Material and Method), enforces the process, monitors quality and provides real-time digital transparency to answer the 'how is it manufactured' question across their supply chain pyramid. MATS platform brings in efficiency in delivering to the plan, to the quality and enables remote audit.

Connected manufacturing brings in complete visibility of people, process and inventory, enabling reduction of costs by allowing accountability, compliance and buffer inventory reduction across the supply chain. Couple it with 100% enforceability that MATS bring in, it consents zero process violations and zero-defect manufacturing. With this, the cost of compliance and quality come down significantly for both, OEMs and vendors enabling a truly cost-optimised supply chain.

Our MATS platform enables one to adhere to COVID-19 SOPs while not compromising with the manufacturing SOPs. It uses guided workflows for quick labour reskilling and digital information exchange at every level, enabling social distancing and the ability to control, observe and enforce remotely. We have 25+ feature rich modules that address all these and many other situations. It's like having a digital supervisor always present across the supply chain.

Presently, we are the digital transformation partners to some of the major manufacturers in India, drawing a strategy for them and implementing MATS across their plants. Our MATS platform enables true 4.0 CoE, be it for small, medium or large enterprises. We are aggressively building our partner network in India and abroad, and have enabled our 5X outreach goal. In the next 5 years, our goal is to help at least 10K+ manufacturers realise their full potential through digital transformation.

The increasing use of **conversational** Al

Haven't we heard a lot of "Okay Google" and "Hello Alexa" at times? Well, interactive conversational Al is now a huge business, being used at the world's largest companies. Industry 4.0 has transformed the manufacturing industry, with cutting-edge tooling and machinery contributing substantial efficiency increases. Here, conversational Al lends a hand to the benefits of technology progression for manufacturers in terms of more than the factory floor and into fundamental business processes. It is generating a buzz by helping manufacturers in purposes where employees usually have to waste a lot of time.

Conversational AI is a sub-category of Artificial Intelligence (AI) that combines various learning technologies, such as Natural Language Processing (NLP), Natural Language Understanding (NLU), predictive intelligence, Machine Learning (ML) and more. A recent report from Markets and Markets said that the global conversational AI market size is expected to grow from \$4.2 billion in 2019 to \$15.7 billion by 2024. With conversational AI assistants, various tasks in manufacturing operations can be streamlined by making available one easy to use conversation. Hence, bringing in noteworthy productivities and enhanced employee and customer experiences.

The adoption of these chatbots has amplified multiplefold in the post-pandemic era, too. With these applications, one can build a strong base of AI-powered operations in manufacturing. Oracle and Future Workplace's annual AI at Juili Eklahare, Features Writer

Work report specified that 64% of employees would trust an AI chatbot more than their manager and 50% have used an AI chatbot instead of going to their manager for advice.

Using an AI-powered manufacturing chatbot, one can eliminate all the transactional frictions by offering an interactive approach. They also help augment maintenance efficiency, automate order management, lead to balanced inventory management and more. With an AI assistant present, customers get payment dues, on-time alerts and updates related to delivery, product availability and so on. This level of personalisation in automation grows the customer experience while helping employees avoid repetitive conversations with customers. An assortment of other challenges also get fixed, such as errors taking place due to manual processes, inquiries coming in a big amount, facing problems in inventory planning, difficulties in managing bulk orders, etc.

With these and other challenges deciphered, one can scale up order processes and achieve a clearer picture of customer demands through real-time data capturing. As a result, orders get processed rapidly, without any suspensions or errors in delivery.

The disruption of AI in manufacturing is certain. And even if conversational AI is still at its emerging stage, it is set to play a dynamic part in the improvement of how humans will network with machines in the happening times to follow. Conversational AI is set to advance and become a technology that will be seen everywhere.

SKILL DEVELOPMENT IN INDUSTRY 4.0 Capacity Utilisation of GoI & CoE

The next industrial revolution is bringing about myriad changes in every industry, creating immense advantages and challenges to implement. Industry 4.0 incorporates a promise of a new industrial revolution – it signifies the ways in which smart, connected technology would become rooted within organisations. The Government of India has taken numerous initiatives to raise awareness about Industry 4.0 among the Indian manufacturing industry through demonstration centres. Plus, the Centre of Excellence (CoE) acts as a primary element for industrial progress and impetus for Industry 4.0 in India. The Cover Story discusses these initiatives and schemes to adopt the best practices of Industry 4.0 and training for talent development, their objectives, Industry 4.0 infrastructure & research projects of CoE & more.



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Gunasekhar Reddy, Manager – Projects, Andhra Pradesh State Skill Development Corporation, Govt of Andhra Pradesh



India, a land of emerging opportunities, has huge resources in the form of manufacturing hubs, innovations and technology transfer to facilitate Industry 4.0. India is a source of manufacturing hub with several advantages such as:

- Home for young labour
- Rich natural repository
- Smooth governance
- Sustainability for responsible development
- Growing digital penetration and technological adaption

The MSME sector contributes 29% to India's GDP and the government plans to take it to 50% in the next five years. India has a vibrant ecosystem in the form of technological infrastructures as Centre of Excellence/ Common Engineering Facility Centre (CEFC) / Demon centre to showcase and train the talent development in the disruptive technologies of Industry 4.0. The Government of India has initiated several centres under different capital good schemes to establish the centre of excellence, thereby promoting technological innovations in deep tech of Industry 4.0, such as cyber-physical systems, edge computing, machine tools, data analytics and many more.

The Government of India has pioneered to initiate national policies to promote Industry 4.0, which are as follows:

- Advanced manufacturing
- Internet of Things (IoT)
- Blockchain
- Cyber-physical systems
- Artificial Intelligence

The national policies have the main objective to promote Industry 4.0 technologies, thereby facilitating talent developments. So, there is a need to develop course content development to align with the national policies of Industry 4.0 and thereby, reskill and upskill young minds. The All India Council for Technical Education, several sector skill councils and premier institutions have successfully framed the curriculum and course syllabus synergised with national policies of Industry 4.0. In addition to the above, several Government of India organisations, such as National Productivity Council, Quality Council of India and industry associations, such as PHD Chamber of Commerce, FICCI, ASSOCHAM & CII have been developing learning content, conducting and promoting the importance of Industry 4.0. The National Program on Technology Enhanced Learning (NPTEL), too, has developed online learning content on several technologies of Industry 4.0. Electronics and ICT academy, an initiative of the Government of India, has been training students through online mode in several domains of Industry 4.0.

Centre of Excellence / Common Engineering Facility Centres supported by GoI

The Department of Heavy Industries (DHI), Government of India, has successfully initiated the Capital Goods scheme called Samarth Udyog Bharat 4.0 to pioneer and adopt the best practices of Industry 4.0. DHI has initiated the pilot schemes to enhance the competitiveness in the Indian capital goods sector through the following pillars of strength:

- 1. Advanced Centre of Excellence.
- 2. Integrated industrial infrastructure facilities.
- 3. Common engineering facility centres.
- 4. Testing and certification centres.
- 5. Technology acquisition fund schemes.

The objectives of the above schemes are outlined below:

- 1. To promote technological innovations in the field of Industry 4.0.
- 2. To achieve cost effectiveness in the product/process development.
- 3. To benefit different stakeholders, including Indian MSMEs.
- 4. To transfer the technology to society for the benefit of mankind.
- 5. To connect talents with cutting-edge infrastructures.
- 6. To strengthen knowledge and skill through experts.
- 7. To connect academia-industry-government on one platform.
- 8. To achieve national gain and accelerate the Indian economy.



Strategies & approach for the utilisation of the centres for talent development

The Government of India has established the Centres of Excellence (CoE) in Industry 4.0. So, there is a demand to have cluster integration with the following centres:

- Samarth Udyog Bharat 4.0 CoE and CEFC
- MSME Technology Development Centres
- Software Technology Parks of India
- CoE for 4th Industrial Revolution by Work Economic Forum
- NASSCOM CoE
- National Productivity Council
- Advanced Manufacturing automation by Ministry of Railways (Integral Coach Factory)

These centres have been playing a pivotal role to train the young minds on disruptive technologies.

Research outcomes of the CEFC

DHI has also established CEFC to facilitate the technological innovations and thereby, transfer the technology to industries through partnership model. The outcomes of these facilitation centres are:

- 1. Technological innovations in Industry 4.0.
- 2. Development of emerging technologies in several domains.
- 3. Transfer of technologies to the industries.
- 4. Facilitate start-ups and entrepreneurship.
- 5. Connect students through educational programs.
- 6. Skill development in cutting-edge technologies.

I4.0 infrastructure & research projects of CoE

CoE in automated manufacturing established as Technical Training Centre by the Ministry of Railways at Integral Coach Factory at Raebarelli has several technological infrastructures, such as Mechatronics (pneumatics, electrohydraulic, Programmable Logic Controllers, sensors & actuators, power electronics), automation (bio-vacuum toilet simulator, LHB coach braking system) and robotics (pick and place robots).

The CoE for the fourth industrial revolution by the World Economic Forum at Mumbai promotes the Artificial Intelligence and Machine Learning, blockchain and distributed ledger technologies, drones and tomorrow's air space, Internet of Things and robotics as well as the smart cities. The CoE established by Software Technology Parks of India has developed cutting-edge infrastructure in different technological Industry 4.0, thereby promoting the culture of entrepreneurship and technological start-ups in India. The NASSCOM Centre of Excellence, which is the initiative of the Government of India, has been in the forefront to promote technological innovations in the field of IoT, Artificial Intelligence, Big Data, data analytics, AR/VR and also tinker with development kits from Texas Instruments, BOSCH, Intel, Qualcom and CISCO. NASSCOM has several success stories with start-ups in different potential applications that include healthcare applications as well.

MSMEs being the vibrant backbone of India, have established technology development centres and tool rooms to promote technological cultures. The centre has been actively developing technologies and delivering training in the field of rapid prototyping, forging, testing and calibration & tool component manufacturing. The Government of India has also successfully modelled smart factory at IISc Bangalore and IIT Delhi to showcase Industry 4.0 technologies and thereby, promote technological innovations and train for talent development.

Industry partners with CoE

The technological innovations at CoE have been successfully transferred to industries with several partners such as:

• CoE at IISc Bangalore TCS, Yaskawa, Faurecia, Toyota Kirloskar Motors (TKM) and Ashok Leyland)



- CoE at IIT Madras (MTAB, Chennai Metco, Interface Design Associates)
- CoE at PSG College of Technology (Effica Systems, PSG Industrial Institute, enArka Instruments & Systems, MAK Controls & systems, Omega Weld Rods Systems, Thirumala Electrodes Co)
- FSM at IIT Delhi (Parametric Technology Corporation, KUKA India, SingEx Exhibitions India, Pepperl+Fuchs FAPL, Adroitec Information Systems, B&R Industrial Automation, Rockwell Automation India, Quality Council of India, Mitsubishi Electric India, Festo India)

Development of Industry 4.0 training modules by CoE

The Centre of Excellence at C4i4 labs, Pune, has been developing e-learning modules to train development and industry leaders in the field of Industry 4.0:

- Digital transformation in manufacturing
- Data science for manufacturing
- Product design for Industry 4.0
- Customer experience for Industry 4.0

Skill development

The Common Engineering Facility at HMT Machine Tools has taken several initiatives in the field of skill development. The centre has been conducting training under the HMT-Shramev Jayate Initiative (HMT-SJI).

1. Technology Acquisition Fund program supported by DHI

The Technology Acquisition Fund programme supported by DHI, Government of India has the following success stories:

- Development of four guided way CNC lathe by HMT MTL
- Development of turn mill centre & integrated high precession C-axis on the main spindle by HMT MTL
- Manufacturing of heavy duty high reliability electrical

specialized power by allied engineering, New Delhi

- Cutting-edge robotic laser cladding technology by Industrial Processor & Metallizers, New Delhi
- Development & commercialisation of titanium casting with ceramic shelling technology by PTC Industries, Lucknow

2. Demo centre by Confederation of Indian Industry

In addition to the above, the Confederation of Indian Industry (CII) has established a demon centre (See Figure above) through partnership industry leaders to accelerate Industry 4.0 in India.

3. Industry 4.0 readiness tools

In order to assess the Indian industry that includes MSMEs, capable to have manufacturing transformation of Industry 4.0, there are several organisations that developed Industry 4.0 readiness tools online:

- 1. National Productivity Council
- 2. FICCI
- 3. C4i4 Labs (supported by DHI)
- 4. Infosys

There is a demand to develop such tools by academic institutions, especially as pilot projects by students and faculty members, in collaboration with the Government of India and industries as well. This will help enhance the talent development of students.

Integrated achieved outcomes & the way forward

The Centre of Excellence acts as the building blocks and epicentre for industrial growth and momentum for Industry 4.0 in the country. It trains researchers and young minds with the existing infrastructure and creates employment opportunities. It promotes start-ups and leapfrogs on the technologies through vocational based education. Plus, it connects the academia-industry- government on one platform. □



IoT mounting in the Indian manufacturing industry

IoT in the Indian manufacturing sector is bound to be nurtured due to several initiatives like 'Make in India', which will ultimately toughen the country's manufacturing expertise. The growing trend of smart industry is a key driver which is expected to drive the growth of the Indian IoT manufacturing market. According to TechSci Research report, the India IoT in manufacturing market is forecasted to grow at a rate of 13.81% to reach \$11573.16 million by FY2027. The article talks about how this report helps manufacturers in the industry and throws light on India's IoT market segmentation.

According to TechSci Research report, "India IoT in manufacturing market by component (solutions, services and platforms), by application area (predictive maintenance, business process optimisation, asset tracking & management, logistics & Supply Chain Management, real-time workforce tracking & management, automation control & management, emergency & incident management, business communication), by vertical (energy & utilities, automotive, food & beverages, aerospace & defence, chemicals & materials, high-tech products, healthcare, others), by region, competition, forecast & opportunities, FY2017-FY2027F, the India IoT in manufacturing market is forecast to grow at a rate of 13.81% to reach \$11573.16 million by FY2027."

The growth in the market can be attributed to the growing demand for analytics to make efficient operational decisions which are expected to drive India's IoT in the manufacturing market. The India IoT in the manufacturing market has been primarily influenced by the massive potential of cloud services in the manufacturing industry. The smart devices connected with cloud platforms can help create the fastest



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data streams through sensors along with producing a bigger amount of data than any other emerging technology, and real-time analysis of this data can help maintain product quality. The rising demand for analytics to maintain the quality and continuity of the manufacturing process is expected to drive the India IoT in the forecast period. The growing adoption of cloud computing services owing to their cost effectiveness, high performance and accessibility will enhance India's IoT and all these factors have resulted in a positive impact on it.

India's IoT market segmentation

India's IoT is segmented by component, application and vertical. In terms of component, the market can be segregated into solutions, services and platforms. Out of these, the solution segment registered a dominant market share in 2020. The solutions component is dominating India's IoT as companies are deploying IoT solutions to improve their manufacturing processes and increase their business outputs. IoT in manufacturing solutions offers multiple benefits, such as reduced operational & infrastructure costs and control over the supply chain. Owing to their ability to provide customised solutions as per the owner's specific needs, they are dominating the component segment of India's IoT.

Based on application area, the market is segmented into predictive maintenance, business process optimisation, asset tracking & management, logistics & Supply Chain Management, real-time workforce tracking & management, automation control & management, emergency & incident management and business communication. Out of these, asset tracking & management dominated the Indian IoT in manufacturing market in 2020 as asset tracking & management facilitate enterprises to monitor the changes occurring in workshops, thus minimising the manufacturing defect and increasing the operational efficiency.

Segmentation based on region

In terms of region, the market is segmented into north, south, east and west. The southern region dominated India's

IoT in the manufacturing market in 2020. Southern cities, such as Bengaluru, Chennai, Hyderabad, etc, have been the key contributors to IoT in the manufacturing industry in India. In addition, emerging cities like Kochi, Thiruvananthapuram, Coimbatore, Visakhapatnam, Mysore and Kozhikode are creating a further pull factor for the southern region.

Leading players in IoT in India

IBM India, Cisco Huawei Systems (India), Telecommunications India, Microsoft Corporation (India), Schneider Electric India, Siemens, Bosch, SAP India, GE Digital, Zebra Technologies India etc, are among the leading players operating in India in IoT in the manufacturing market. Companies operating in the market are using organic strategies, partnerships and collaborations to boost their shares. Significant players are concentrating on accomplishing ideal operational expenses, upgrading the system efficiency, enhancing precision in responses, boosting productivity with high funding in R&D and merging with small players.

According to Karan Chechi, Research Director, TechSci Research, "The growing use of new technologies, such as Artificial Intelligence and data analytics in the manufacturing sector, coupled with supportive government initiatives, is expected to drive IoT in the manufacturing market in India. Moreover, the growth of a sensor-controlled environment that helps the manufacturing industry to track and monitor everything, right from volume to temperature, will contribute to smart industries. Additionally, the accelerated adoption of 5G that will increase internet speed up to 100 gigabits per second is expected to act as a catalyst for IoT in India in the manufacturing market."

Help make sound investment decisions

This report is intended to provide cutting-edge market intelligence and help decision makers make sound investment decisions. Besides, the report also identifies and analyses the emerging trends along with essential drivers, challenges and opportunities present in the Indian IoT manufacturing market. □ *Courtesy: TechSci Research*



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"Digital transformation goes beyond quick fixes"

...says **Atul Govil**, Chief Transformation Officer & Head (SAP & IT), India Glycols, in this interview with Juili Eklahare. India Glycols is a leading company that manufactures green technology based bulk, specialty and performance chemicals. Govil explains the focus of the company's tech initiatives, how educational institutions have to embrace radical, transformative change & what to remember when building an automation or digitalisation strategy. Excerpts...

How has your role as CTO changed from pre-pandemic to post-pandemic?

With technology becoming central to conduct operations, the role of the CIO/CTO has now become more important than ever. COVID-19 was an unexpected situation of a grave magnitude and we had to quickly reassess our operating environment, enable the team with necessary tools and technology for them to navigate the volatile, uncertain times. The biggest focus was to enable secure remote operations, remote transactions to ensure business continuity.

What kind of digital tools are you currently using at India Glycols?

Digital tools are important for us to achieve higher levels of efficiency and help build new business models. These can be categorised into five main buckets (CTAAS): a. Collaboration: Intranet portal with employee self-service apps, office apps, IP telephony, instant messaging, audio and video conferencing apps to facilitate engagement with team members, business partners

enable

remote

working.

- **b. Transactional:** Transactional systems record our company's daily transactions, which are required to manage our day-to-day operations like sales, inventories, accounting, financial, procurement, employee related data points.
- c. Automation: We use RPA for automating mundane, repetitive tasks. For our shop floors, we have deployed Industry 4.0 solutions including IIoT, cloud applications, data analytics, warehouse automation with track and trace features to monitor on a real-time basis the important operational metrics to improve & increase efficiency, find & solve problems faster and ultimately, improve our customers' experiences.
- **d. Analytics with information centralisation:** With analytical tools, we are able to achieve faster speed and certainty of decisions to drive our focus in the right direction. This helps us survive in a tough macro environment.
- e. Security: Information security is critical to protect critical information from any data breach, unauthorised access and to maintain data integrity.

How have you divided automation into the main functional systems for the efficiency of petrochemical production in your factory?

The key levers considered in our automation/digitalisation journey are highlighted in the following aspects:

- Spend optimisation: Raw materials, energy and other utilities are major expense items in our business. We are able to address production bottlenecks, optimise yield and energy consumption, increase throughput with right quality products with desired safety & compliance considerations through efficient conversion processes.
- Inventory visibility & control: Ideally, all businesses seek quickest return on their investments, with lowest inventories. We have also set up a state-of-the-art, smart warehouse with shuttle-based dense racking system which facilitates organised storage of our FGs with FIFO features



Atul Govil is a graduate engineer with post-graduation in marketing & HR. He has a total of 22 years of work experience in different industry verticals and has held several leadership positions. He has also won several prestigious awards and recognitions, including IDC insight award.

with efficient retrieval.

• Workplace productivity (operational efficiencies): To remain competitive and lower costs, efficient processes and high productivity are critical, and in this regard, we got a 360° review by experts on the processes involved in the entire value stream – with a purpose to fine tune the workflows and also narrow down on automation opportunities.

You are a winner of several awards, including IDC insight award. What are some transformative initiatives you took that led you to winning this award?

The core focus of our tech initiatives and transformation projects is to increase agility & ability to scale, using the following levers:

- Syncing with other business leaders on the business priorities and channelling our energies on the same
- Eliminating islands of information with standardisation options
- Setting up a robust core with surround applications
- Identifying and suggesting automation opportunities
- Building a cross-functional team for the prioritised interventions for detailed planning and execution

You have been a visiting faculty for India's leading management institute. How do you see the education scenario changing towards exposing students to the shop floor and practical education?

With other attractive options available, most freshers do not consider the traditional manufacturing sector as their first choice for a job. It is an onus on manufacturing companies to invest in relevant, new digitally-enabled manufacturing tech to be able to attract and retain the digital natives. We should attract and empower the next generation of workers. Colleges, universities and institutions are a very important source of skill supply to organisations. For the skills supply to be in sync with industry demand, educational institutions have to let go of their legacy course material and embrace radical, transformative change to be able to participate in the fourth industrial revolution & remain relevant.

The term digital transformation has different connotations for different enterprises. What is your view of digital transformation? Do you believe that the term 'digital' itself has evolved in the past few years, and if so how?

Digital transformation goes beyond quick fixes. We need to

take a step back and understand that any organisation operating in any vertical is essentially a unit that is run by people and tools/equipment/systems. These tools/equipment/systems will vary from one industry to another and there are always certain evolved organisations in each sector that strategically & holistically leverage the best of the

breed systems/applications by making due investments and prioritising basis expected returns to continually achieve the objectives of the business.

What are some good practices to build an agile and effective automation strategy?

While building an automation or digitalisation strategy, we need to keep the total cost of ownership and the business impact in mind, both tangible and intangible. Rather than getting distracted with the 'shiny object syndrome' or getting immersed in tech hypes, it is pertinent to dig deeper with actual use cases, conduct pilots to get a hold of ground realities. There are always new technologies being talked about in the market. Which ones are ready for commercial grade scale up? Which ones are nascent? Are vendor partners equipped to implement and support the planned initiative? Are key stakeholders receptive to the plan? These are important questions one needs to have answers to in order to deliver on promises. \Box



India preparing for automation

According to a recent research study conducted by Deloitte & commissioned by Autodesk Foundation – The Future of Work is Now: Is APAC Ready? – India ranks fifth in terms of the impact from automation and needs to be more prepared for it. The COVID-19 pandemic has accelerated the use of automation worldwide and we all must be prepared for its next wave. So, how prepared is India? Does the Indian industry have what it takes to implement automation to the fullest and how can it do so? The Viewpoint finds out.



Juili Eklahare Features Writer juili.eklahare@publish-industi

> G Ganapathiraman, Country Manager, India, ARC Advisory Group

"Training programmes are vital to enable the workforce to thrive in the era of automation"

The business world, as we know, has turned topsy-turvy and we are grappling with the changes. The industry is besieged with challenges: ensuring security in a remote work model, data protection, maintaining customer relationships and ensuring agile supply chains. To surmount these challenges, the Indian industry must join the digital bandwagon in a phased manner and automate processes. There is hesitance to migrate from legacy systems and the traditional way of doing things. Unless there is effective change management that percolates across the organisation, India's state of preparedness being low will continue. The management should be convinced about the ROI and the employees should be made aware about how automation improves productivity & efficiency.

Training programmes are vital to enable the workforce to thrive in the era of automation. Besides technical skills, employees need to develop soft skills, such as effective communication, teamwork & collaboration, adaptability and problem solving. Investing in such programmes should be a priority for all stakeholders – industry leaders, academia and the government. Companies can conduct programmes inhouse, ingraining a culture of continuous improvement.

Automation suppliers must also create awareness, educate and showcase successful implementations, justifying capital investments. External and internal support mechanisms are required. External support includes collaborating across geographies, ease of doing business and reliable supply chains. Internal support includes management approval, training etc.

"Automation doesn't mean AI & IoT only. It must start with building indigenous machineries."

In the coming years, user expectations and behaviour will continuously change. Also, there will be a lot of demand variability. This will result in cost competitiveness and manufacturing excellence, which will drive the future businesses. Automation brings all these. The mechanism required will be to standardise the processes which can meet these criteria and the entire exercise can then be automated. Automation requires a lot of capital cost as most of the machines or the parts required for them are imported. To make automation really affordable, we have to start creating the ecosystem in India like motors, sensors, PLCs, computers, etc. Automation doesn't mean AI and IoT only. It must start with building indigenous machineries and then make it smarter. If we keep importing the automation material, the pace will be slow because the capital required will be very high. Corporates must take on several research projects and fund fresh engineers to build it. Every corporation must spend CSR money on such initiatives. Most start-ups are focused on SaaS-based automation as it attracts good investors, and the valuation gets easier. We have such a vast English-speaking, highly educated population that we can supply manpower for the whole world in the field of automation. Skill sets, like PLC programming, simulation, computer programming, coding, robot teaching and cognitive training can be some of the soft skill sets our general English-speaking population can quickly learn to be employable in the world, with one foreign language specific to a country (like Japanese, French, German, Italian etc).

Milind Padole, Managing Director, Affordable Robotic & Automation (ARAPL)



Niju Vijayan, Executive Director, Avanteum Advisors



"Automation levels are relative in nature & should reflect the aspiration of the country"

The current slow pace is attributed to the pandemic induced decline, where sufficient funds offtake is not taking place. The pandemic has no doubt accelerated the pace of automation, but the ebbing of this issue brings the industry back to its regular mode of operations. Moreover, the adverse impact of business loss forces organisations to conserve their resources. There is no silver bullet for the industry to start incorporating automation into their processes. This will happen only if there are incentives. Incentives include competitive environment, export opportunities, tax breaks for higher automation, tax breaks for higher skilled workforce, preferential treatment in government projects etc.

Besides, the digital era of automation calls for workforce that is skilled in the top technologies driving the world e.g. IoT, AI, AR/VR, drones, etc. The skills required are numerous – hardware design, components, software, middleware, system integration, services, regulatory etc. This will also call for specific domain related skills. Given the data intensive nature of future manufacturing, data scientists will be in great demand that can provide the required analytics.

Plus, automation levels are relative in nature and should reflect the size of economy and aspiration of the country. There are multiple reasons for India's preparedness to be low. For example, the fact that India's scale of manufacturing industry is not comparable to developed economies, and thus, the approach is to adopt must-have automation. Or that India is not one of the key supply chain sources for the world, which is threatened by emergence of alternative regions.

"The workforce needs to learn skills that complement the high-end automation requirements"

Sandeep Garg, Head - Manufacturing, Nexcharge



India's preparedness for automation is low majorly because of the rigid belief of organisations that automation comes at a high cost. There is a need for greater flexibility and a balanced approach while adopting automation to keep the cost low. Organisations are now using this approach. They have teams that can design and develop processes in-house to bring automation at lower costs.

The operational issues caused by the unavailability of skilled manpower, high iteration rates, location constraints and variations caused by manual control are further accelerating the adoption of low-cost automation in the industry. To further help adoption, the stakeholders of the manufacturing industry are also raising awareness. This synergy between all stakeholders of the manufacturing industry, coupled with supporting government policies, will help us reap the benefit of economy of scale. To thrive in this era of automation, the workforce needs to learn skills that complement the high-end automation requirements. There is also a need to specialise in fields such as mechatronics, Artificial Intelligence, robotics and data analysis. To cater to the need, our schools and institutions should design modules, host workshops & offer internships and help students learn these new-age skills.

Senthil Kumar Venkatramanujulu, Head - Industrial Automatior Schneider Electric India



"Adopting automation is a process and every company would have to chart its own strategy for it"

India is still in the early stages of transitioning into Industry 4.0 and the response has been encouraging. While the unprecedented challenges paved the way for Indian enterprises to catalyse the integration of automation technologies across sectors, it is important to understand that automation is a new phenomenon and so, it is natural for industry players to set their foot cautiously.

Adopting automation is a process and every company would have to chart its own strategy for it. Some companies are enthusiastically embracing the digital revolution while others might still be figuring it out. According to KellyOCG's 2021 Workforce Agility Report, while 50% of executives say that their organisation is slow to adopt technologies like automation & AI, 49% feel that their company is adopting new talent management technologies. It is imperative to narrow down the gap in digital literacy so that every individual, irrespective of their socio-economic standing, can reap the benefits of the digital world. According to a McKinsey Report, technological skills are set to see huge growth in demand. While not everyone can acquire advanced digital skills, it is crucial for them to develop basic digital skills. The central government's 'Bharat Net Program' that envisions linking all villages through an optical fibre network is a step in the right direction. It would be easier to establish skill development centres in villages across the country. So, companies need to adopt a learning-led approach for achieving sustainable growth.



Ravikiran S Avvaru, IT Head – Asia Pacific, Middle East & Africa, Apollo Tyres

"Automation is a long-term investment"

We need to understand that automation will create new opportunities if the right solution is created and implemented, based on the real pain points workers are facing. One of the fears we have is that automation brings down employment. In fact, automation creates opportunities for us and improves the efficiency & quality of the product and helps us avoid repeated activities. We need to keep in mind that automation is a long-term investment. We also need to focus on high Impact areas where we really need technology in medical services and cybercrime. The first thing our blue collard employees need to develop is computer literacy. And this will help them in acquiring the new skills which are required to ease their regular operations. We need to improve their leadership skills, too, which will help them resolve the conflicts in cross-functions. Many virtual platforms have come about which can simulate the many aspects of automation and India has good capabilities in creating these learning & development modules.

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Automation applications in the automotive industry

The automotive industry is adding more sophisticated robots, looking to 3D Printing and incorporating other advanced technologies. The business, however, is developing on the automation front. Despite the fact that automation is already very well recognised in the automotive industry, OEMs, tier one, two and three suppliers can still profit from continuing

enhancements in this field. Many automotive companies across the world are presently focusing on automation as a weapon for competition on a global market. This article focuses on applications of automation in different areas of the automotive industry.



Rohan A Manikpurkar, Engineer – Controls Engineering, SUEZ Water Technologies & Solutions

Automotive automation technology is constantly advancing. Most repetitive, monotonous and dangerous tasks have been simplified through automation. With advancements in robotic autonomy, Artificial Intelligence (AI) and Machine Learning (ML), some industrial robots now use vision-like sensor technology to help them perform intricate tasks and adapt to a changing environment. Robotic automation in automotive manufacturing will play an integral role in the shift from combustion engines to electric vehicles since robots can be programmed to meet higher demands and perform new roles while meeting production criteria. This will especially make newer vehicles and technology more affordable for the general public sooner. In fact, the auto industry alone accounts for nearly half of all industrial robotics sales in North America.

Collaborative robots (cobots), robotic arms and Internet of Things (IoT), coupled with AI, are already producing a large part

of the automobile chassis, power trains and other components in some companies, saving efforts that can be made by human workers. Now pervading the automotive industry, robots are handling even the most complex manufacturing tasks and completing them several times faster than human workers. Advanced robotics, combined with automation technologies and learning modules, are performing jobs with more precision than ever and increasing industrial productivity. It is barely possible to tabulate an exhaustive list of all the intriguing marvels erupting from the most brilliant, industrious minds in the industry.

The fourth industrial revolution or Industry 4.0 is going to be the next big transformation in the manufacturing industry. Industry 4.0 will be a seamless integration between manufacturing and computerised control systems. It will involve cyber-physical systems that involve sensors throughout the system, from start to finish. All this implementation has not only increased output and reduced downtime but has also significantly increased profits for auto manufacturers. Here are the five most advanced automation technologies used in the automotive industry:

- Machine vision
- Collaborative robots
- Lighting technology
- Artificial Intelligence for driverless/autonomous cars
- Cognitive Computing in IoT connected cars

Machine vision

The need for safer, more reliable and robust automobiles to justify price points is pushing automakers to adopt machine inspection. And Machine Vision (MV) helps them fulfil this need by providing an automated internal machine inspection method.

The automotive industry was one of the earliest industries to have adopted MV to carry out its imaging-based automatic inspection and analysis for automatic inspection, process control and robot guidance. This technology works as the eye of the automotive production process using imaging processes, including conventional imaging, hyperspectral imaging, infrared imaging, line scan imaging, 3D imaging of surfaces and x-ray imaging.

Smart camera or smart sensors with frame grabbers are used along with interfaces, such as Camera Link or CoaXPress (or custom interface) to record or capture images of the surface to be inspected. Digital cameras capable of direct connections to a computer via FireWire, USB or Gigabit Ethernet interfaces are also used by several companies. These cameras capture images of the surface of the automobile component to be inspected (say, the body or fins of an engine). And these images are then analysed and processed by specialised analysis software, which mostly use the principle of Finite Element Analysis in their working. MV helps automakers save money, justify price points and emerge as strong competitors. National Instruments, Cognex, Datalogic, Optotune and ViDi Systems are some of the top most companies whose machine vision systems are preferred by large carmakers.

Collaborative robots

A cobot uses Machine Learning to pause all its operations when a human worker enters its space. Cobots actually help human technicians by handling a large part of the job. When a certain job requires multiple functions to be done at once, the cobot will allow the labourer to work on it and later shut down once the latter's job is done. However, not all cobots are made equally. Some are designed to stop while others are not. As per ISO 10218, there are four types of cobots based on functionalities – safety monitored stop, hand guiding, speed & separation monitoring and power & force limiting robots.

Universal Robots, Rethink Robotics, KUKA, ABB Yumi, F&P Robotics and Fanuc are some of the large companies that design, produce and supply cobots. KUKA and Universal Robots are currently being supplied to automotive companies, such as Tesla, to build cars, car-building robots and also assembly lines. Using cobots in such settings can put carmakers light years ahead in the race for speed and productivity in manufacturing.

Lighting technology

Advancements in automotive lighting technology have ramped up in recent years. Many new models of cars are adding adaptive lighting technology that will auto-adjust to lighting conditions, without blinding other drivers on the road. This new tech has reduced the incidence of night-time accidents by lighting



more areas of the road ahead and to the sides. 5-chip LED lights also boast 'around the corner' lighting while laser headlight technology can let one see up to 600 metres ahead of oneself on the road, doubling the distance of regular LED headlamps. 5-chip adaptive LED tech illuminates objects on the edge of the road as well as approaching vehicles. The key players in the automotive lighting market are Continental AG, Valeo S A, Ichikoh, Robert Bosch GmbH, Koito Manufacturing and Stanley Electric.

Artificial Intelligence for driverless/autonomous cars

Artificial Intelligence system is defined as, "any system that perceives its environment and takes actions that maximise its chance of success at some goal." And this is true for the onresearch driverless or autonomous or self-driving cars that are using various levels of AI. Circling back to Elon Musk, Tesla has developed its own driverless car hardware called Autopilot that is currently being used on all Tesla models. And ironically, Musk, as per reports, wants Level 5 automation in all Tesla models.

Artificial Intelligence in cars works by first creating and storing an internal map of the surroundings (street, locality or region) using smart sensors, such as radar, sonar and/or laser. It then processes these inputs, plots the most plausible trajectory and sends instructions to the vehicle's actuators which control acceleration, braking and steering. Coded driving protocols, obstacle avoidance algorithms, predictive modelling and smart object discrimination (i.e., knowing the difference between a bicycle and a motorcycle) help the car follow traffic rules and navigate past obstacles. AI software in the car is connected to all the sensors and collects input from Google Street View and video cameras inside the car. The AI simulates human perceptual and decision-making processes using deep learning and controls actions in driver control systems, such as steering and brakes.

Major players, such as NVIDIA and Bosch are playing a major role in developing and improving deep learning or Machine Learning to improve AI.

Cognitive Computing in IoT connected cars

Some companies, such as IBM (Watson AI) and BMW are combining Cognitive Computing (CC) and IoT to invent autonomous cars that communicate with each other while recognising & linking driving patterns to the emotional response of their human drivers during all possible scenarios (such as to applying brakes a moment before collision to avoid accidents).

These would prove to be way more advanced than driverless cars if the technology is successfully tested and replicated. An example of IoT platform is Thing Worx, on which automakers can develop a cloud-based service for connecting to remote OBDII devices and vehicles, manage the vehicle diagnostic & driving behaviour data, integrate the data with enterprise systems and develop new innovative connected vehicle applications.

Ushering in a new renaissance

The main challenge of vehicle manufacturing industries is to make the balance between order-winning criterion of cost, time and availability of product, without compromising the quality.

Here, we have discussed about the application of advanced automation in different areas of vehicle manufacturing industries. These top five automation technologies used in the automotive industry among others are ushering in a new renaissance with robotics and Artificial Intelligence at its heart. \Box





IT-OT Integration

Enables seamless, smooth connection from upper level IT systems to OT systems on single network for Smart Manufacturing



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Open technology provides freedom of choice for end users, OEMs and device vendors



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Highest productivity Industry4.0 solution combines gigabit Ethernet with TSN



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A wealth of intelligent features reduce time to market and downtime while increasing productivity







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How is Artificial Intelligence revolutionising the manufacturing industry?

AI is a critical component of Industry 4.0, as it enables flexible & adaptable systems, automates manufacturing & business processes and helps in making intelligent decisions. However, specific human characteristics that are specifically required for decision-making are absent from AI systems. This article discusses how human-centric AI extends the boundaries of

previously limited AI solutions to bridge the gap between machines and humans by developing machine intelligence to understand human languages, emotions and behaviour.



Govindan Soundararajan, Head - Artificial Intelligence & Software, Continental Automotive India

Artificial Intelligence (AI) has become a technological reality for businesses and organisations across the globe. AI can boost process efficiency, minimise human errors and workload, and extract insights from Big Data, making it one of the most widely discussed technologies today. In India, various sectors are adopting AI technologies and taking innovative steps in their applications. India is one of the world's fastest-growing economies and has a considerable stake in the AI revolution. According to Accenture's latest AI research paper, AI is predicted to boost India's yearly growth rate by 1.3 percentage points by 2035.

The Indian manufacturing sector has started adopting Industry 4.0 practices, where AI can play a critical role. The pace of adoption is only expected to rise as varied sectors begin to digitise and automate the processes in the post-COVID-19 world.

AI in the manufacturing industry

AI-based solutions are projected to have a significant impact on the manufacturing industry. As per industry research, the



global AI in the manufacturing market size was \$840 million in 2019. It is expected to reach \$4,798 million by the end of 2026, with a CAGR of 28.1% during the forecast period 2021-2026.

As mentioned earlier, the adoption of Industry 4.0 practices is a key reason driving this growth. AI is a critical component of Industry 4.0, as it enables flexible & adaptable systems, automates manufacturing & business processes and helps in making intelligent decisions. Manufacturing organisations can immensely benefit from using AI in engineering, R&D, supply chain management, production, maintenance and in-plant logistics & storage. AI technologies have significantly advanced in the past decade on several factors. It is more democratised than ever before, is much easier to understand & implement and it provides better & consistent results, thanks to the improved computing nodes, availability of trained & skilled resources and improved AI ecosystem. All these have contributed to the rise in AI adoption in Indian manufacturing industries.

The technology can also enhance quality inspection and accuracy. For example, AI algorithms can significantly improve the facial recognition of quality inspectors, thus, ensuring the correct human inspector is auditing the quality of the products. Humanoid robots, enabled by AI/ML algorithms can take over the inspection of the products and will deliver a high quality & consistent throughput.

Application of AI in cobots

Another use of AI is in cobots – collaborative robots that can work alongside humans and take care of repetitive tasks. They need AI/ML to evaluate data to create a vision for themselves and not hinder humans while collaborating. Further, AI/ML helps cobots work better in a collaborative environment continuously.

Much like cobots, AI/ML plays a crucial role in the working of Automated Guided Vehicles (AGVs) in the indoor environment, such as manufacturing factories or huge warehouses. AGVs help carry heavy loads on the shop floor. Through AI/ML, they observe the surroundings, process the captured data and move seamlessly without creating any obstacles to the humans & other equipment. Today's manufacturing plants collect massive quantities of data, aided by connected devices and smart sensors. However, AI technologies are required to make sense of this data to generate meaningful information on the plant operations, the health of the equipment and other business insights. For example, AI helps detect issues with machines in advance before it breaks down, thereby saving the downtime cost. This is predictive maintenance and is one of the fastest-growing applications of AI in the manufacturing industry.

By using AI in analytics, companies can quickly figure out the gaps and improve their processes. Areas of supply chain management, production, in-plant logistics and storage, etc, can hugely benefit from AI-powered analytics. Chatbots are another standard tool where AI is used. They can resolve dayto-day problems on the shop floor and become an interactive way to access resources when needed. Apart from these, manufacturing companies are also using AI in their engineering and development. For instance, to develop simulations and test cases for specific functions.

However, some critical questions that arise are, is AI completely reliable? How much automation can AI do? Can AI understand certain scenarios and take appropriate decisions as humans do? And many more such questions that need understanding.



Human-centric AI integrates AI's analytical capability with humans' creative problemsolving and expertise, thus successfully bringing the best of both worlds together

The potential of human-centric AI across industries

As demonstrated by the use-cases mentioned above, AI is all about moving from programming and more towards Machine Learning (ML). AI technologies are trained to learn various processes and patterns of a specific function and decide how to proceed to the following stages through Machine Learning. The quality of AI programs is directly proportional to the amount of data that it is trained on. To provide accurate results, AI programs need a very large amount of data to learn than humans.

However, AI can create a slew of problems. AI programs are designed to assess and overcome a specific set of loss functions, but this has unintended consequences for other loss functions. AI also has a range of unforeseen effects in terms of ethics, biases and privacy, all of which necessitate close analysis and goal-directed action. If the initial dataset fed to the system is biased in any manner, the machine will learn to generate biased outputs.

Taking a slightly non-manufacturing example, if only men were selected for manufacturing roles earlier, AI is bound to choose more male CVs in the new positions too. It might not understand that earlier selection was due to a lack of female candidates and not gender preference.

Human-centric AI is a new concept being explored to counter these side-effects of AI. In simple terms, humancentred AI refers to systems that improve over time because of human input. It applies to manufacturing and almost every other industry where AI plays a crucial role in day-to-day operations. It extends the boundaries of previously limited Artificial Intelligence solutions to bridge the gap between machines and humans by developing machine intelligence to understand human languages, emotions and behaviour and focuses on algorithms within a more comprehensive, humanbased system, learning through human input & collaboration. It refers to systems that improve over time due to human input, while also offering a positive human-robot interaction.

Human-centric AI has enormous potential across industries, including automotive and manufacturing. In 2020, India joined the Global Partnership on Artificial Intelligence (GPAI) as a founding member to support responsible and human-centric development and use of Artificial Intelligence.

Human-centric AI is the future of Artificial Intelligence

To get optimal results, many procedures rely on more than just simple data. A good AI solution must be able to comprehend human desires. Specific human characteristics that are typically required for decision-making are absent from AI systems. For instance, it lacks empathy and a basic understanding of social & cultural issues. It may be missing the context required for optimum results. With consumerfacing AI systems, this becomes even more challenging.

Humans tend to make mistakes. However, AI systems can also make mistakes if it doesn't have all the knowledge it needs to make good decisions. In the manufacturing industry, an AI system's dependability and efficiency may be harmed by the lack of human-centric design.

Human-centric AI integrates AI's analytical capability with humans' creative problem-solving and expertise, thus successfully bringing the best of both worlds together. To avoid feedback loops and erroneous outcomes, consumerfacing AI systems must take a human-centric approach. Human-centric AI also improves industrial business.

To summarise, human-centric AI is essential for smart manufacturing as it increases reliability, improves decisionmaking and output efficiency. □



AR/VR – The new collaborative tool for automation

From their capacity to decrease operator errors to enable remote assistance, Augmented Reality and Virtual Reality technologies (AR/VR) are experiencing a growth in interest during the pandemic. AR/VR also has sundry uses in automation. Where AR/VR have

the prospective to essentially transform the way we work and collaborate, this impact is likely to be seen significantly in automation. The article explores the various AR/VR use cases being exploited by automation solution providers to accelerate project execution & secure reliability for their automation solutions before they are implemented on the shop floor and also during shop floor implementation.

In the last decade, technology has been changing the face of manufacturing and it will certainly play an even greater role in the post COVID-19 world. While business and liquidity challenges that the automation industry is currently facing in these turbulent times are well-known, there are operational issues which need focused attention.

Productivity and efficiency are the key factors of optimal

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Rajiv Salkar, Strategic Consultant & India Head, iQ3Connect Inc



Sandeep Dawkhar, Growth Consultant, iQ3Connect Inc

operations. While robotics, Internet of Things (IoT) and Artificial Intelligence (AI) have been in the forefront of technologies adopted for manufacturing automation in the last couple of years, Augmented Reality (AR) & Virtual Reality (VR) are now fast creating their own spaces in the last few years as a big support function to these trio of technologies.

The pandemic has already created a new way of remote



working, and this is bound to remain as the new normal even after the pandemic is over. Collaboration beyond the flat screen is the new buzzword for implementing automation projects using AR/VR technologies. AR/VR technologies have been used in media and marketing during the last decade but now find active usage as an affective aid for planning & executing automation projects, including robotic automation.

AR/VR has been in use for a long time. However, there is still not widespread or enterprise-wide use of these technologies. Recent breakthroughs in these technologies have opened new avenues to scale-up their use across an enterprise, and moreover, the adoption of these technologies by even low and medium scale automation solution providers. We talk about some AR/ VR use cases being exploited by automation solution providers.

Collaborative engineering & design

Design reviews with remote design centres or customers have been regular applications for AR/VR technologies over the last decade. However, their use was limited due to a considerable amount of effort to make the models VRenabled. Though there were tools which helped in automating this process, it still required special skilled project teams to make the models VR-enabled. The other major constraint was difficulty in remote collaboration with immersive data. This required initial planning & set up to ensure that the collaboration experience was smooth.

The recent improvement in AR/VR technologies enables users to have instant collaboration, like a Zoom or Teams meeting. The presenter can initiate a meeting and just send the link over email to the other participants. There is no need for any software, data or app for the remote user. The remote user just needs a browser. The user clicks on the link and joins the presenter in an immersive collaborative way. Moreover, the models can also be automatically converted into VR-enabled models.

This ease-of-use technology has opened many opportunities for automation solution providers to use AR/VR technologies for engineering collaboration with both customers & suppliers before any component is actually manufactured. One of the common applications can be assembly check for interference, clearance etc. for a robot path. Earlier it was achieved through simulation, which does not necessarily instil confidence in the customer's mind. Now, AR/VR offers an immersive experience, wherein the automation solution provider and the customer or the supplier can go around the designed solution in a virtual space and review the design, annotate if necessary and provide a feedback which is easier to understand & implement for the designer. AR/VR tools these days offer a full stack collaboration platform for reviewing the automation solution before it sees the light of day.

Product/solution training

Ensuring productivity of installation & commissioning engineers implementing the automation solution at a customer site is a constant area of concern for the senior management. Product & solution training is one of the many ways of ensuring that the engineers have all the relevant knowledge to undertake the tasks on the shop floor or at the customer site. Traditional methods have been presentations or videos; however, these methods of instructions do not involve the participants. AR/ VR have been found to greatly enhance training productivity. Their use for product & solution training had been limited due to the shortcomings mentioned earlier. A product, for example, a robot, can have many variants. So, creating training modules for every product can be very costly.

The advent of newer web-based AR/VR technologies is easy to use and does not require any special skilled workforce to create the training modules. The subject matter experts can



easily create modules using their standard machines in a matter of days if not hours. This has drastically reduced the total cost of ownership of these projects and thus, thousands of engineers can be easily trained using these technologies. Imagine the saving potential due to the reduction of prototypes, special videos, training rooms & other infrastructure. AR/VR now enables even remote training; for example, an instructor sitting thousands of kilometres away can train a classroom of robot programmers using an immersive training space, reducing training cost drastically.

Remote support

Remote support using AR/VR has been on the rise recently. Many automation solution providers have either initiated pilot projects for remote support for maintenance engineers or are in the process of implementation. Travel restrictions due to the pandemic have accelerated the adoption of these technologies. However, these implementations are restricted to large solution providers due to the cost of AR headset equipment and the cost of building applications. Currently, some solution providers are using mobile-based video and messaging applications for remote support.

The newer technologies, however, support hybrid use. It is not necessary to have all the users wearing headsets. Some of the users can view/interact in a browser on their laptop or tablet. This can help small and medium automation solution providers to quickly adopt these technologies for remote support. The shortage of expert support engineers is a common problem with all these organisations. Hybrid AR/VR technologies can circumvent this dilemma by having expert engineers guide the automation engineer at the customer site through remote immersive collaboration. The expert engineer can not only explain through video but also demonstrate the instructions by animating with a model in a 3D workspace.

Automation for legacy processes

AR/VR have significant applications in industries undertaking process upgradation – automating legacy processes. Automating existing processes or a plant retrofit for brown field projects is an interesting use case. Most of these plants have old drawings which are not updated for years. Digital representation of the plants can be easily brought into a VR environment and super imposed with 3D models of automation equipment, like robots and other ancillary equipment. Virtually seeing the plant to scale can help resolve many fouling issues, thereby reducing the commissioning time of the equipment leading to major savings. It is observed that most of the projects bleed in the installation & commissioning phase and doing a virtual check of the automation equipment working helps ensure that the equipment works first time right after completing the plant retrofit.

In step with AR/VR

Though there are several proven use cases for AR/VR usage as an affective aid for automation solution providers, there has been hesitancy in adopting these technologies till now, since earlier we needed experts to manage the AR/VR pipeline, the access to the AR/VR space was clunky for users & deployment expensive for business. The device-specific apps & ecosystem also limited adoption. Hopefully, with the advent of a one-click CAD-agnostic conversion & optimisation and a light footprint collaboration in a web browser, automation solution providers will be more amenable to use these technologies as a mandatory tool to secure their solution before planning for the physical hardware. AR/VR also helps in giving immense confidence to customers of the automation solution that their investments are secure & solution reliability is assured. \Box



The changing industrial communication

In the manufacturing industry, as technology turns all the more integrated, so does the importance of cables. Demands are already shifting in terms of cabling & connection technology and data rates are going up. In this backdrop, Publish Industry India, along with Lapp GmbH, organised a webinar on 'Industrial communication – Enabling technology for smart factories'. The webinar discussed how industrial Ethernet is replacing fieldbuses more & more, and being the standard in

factories today and how physical network components like cables & connectors are coming more in focus with the introduction of industrial Ethernet.



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At the core of smart factory is the merging of physical and digital worlds, alongside the emergence of a vast and rapidly expanding network of smart machines – in which every digital device has the potential to serve as a point for interconnection and informational exchange. All of these are made possible largely by hard-wired cable connections that are capable of transmitting zillions of bytes of data.

This offers enormous opportunities – but also huge challenges – for the industrial and manufacturing sectors. When it comes to cabling and connection technology, demands are already changing, data rates are climbing, and network cables aren't just connecting machinery but are laid with intelligent sensors: millions and millions of them. In this context, Publish Industry India, along with Lapp GmbH, recently organised a webinar on 'Industrial Communication – Enabling technology for smart factories' that discussed the need of availability of data for smart factories & Industry 4.0, how Industrial Communication (IC) technologies have changed during the past decades and how, today, IC needs to integrate IT and OT networks.

Communication is key

The webinar started with a technology presentation on 'Industrial communication – Enabling technology for smart factories', by Ralf Moebus, Head - Product Management, Industrial Communication, Lapp GmbH. Moebus gave an insight into trends in industrial communication and what it means for LAPP and the users of such technologies. He threw light on LAPP's eight brands – control cables, Ethernet systems, fieldbus systems, fibre optics, connectors, cable glands, cable marking and cable protection.

Diving deeper into the global trends of Internet of Things, he said, "IoT has many names – smart factory, Industry 4.0, the fourth industrial revolution, etc. But these all have something in common and that's communication. Without communication, a factory will not be smart, we won't get the data out of the factory that we need to analyse and process. So, communication is key for everything."

OPC/UA enabling technology for seamless communication

Throwing light on the Indian market, Moebus informed that the share of industrial IoT is \$4.95 bn in India and manufacturing has a share of 18% from that total market of IoT. He also spoke about the four major trends in industrial communication, which include seamless communication, zero downtime, security & IIoT. He further explained the benefits of Industrial Ethernet, from increased network size to benefit from IT innovations. Going on, he asserted how OPC/UA is an enabling technology for seamless communication. Moebus cited that OPC/UA has rapidly grown in the past years and also threw light on its new developments, like PubSub. Plus, he divulged its advantages, like high level of security and it being supported by many industrial device manufacturers.

He further spoke about the launching of a new technology – Time Sensitive Network (TSN) – which is a really standardised, real-time protocol. "TSN offers functions for quality of service, for instance bandwidth reservation," he put across and went on, "It also offers synchronisation between different network devices, very low latency times & seamless redundancy."

Security - Important for productivity

Moving on to security, Moebus further added how security is an important factor to ensure productivity & how seamless communication needs secure structures. Speaking about solutions for the factory, he said, "Industrial NAT Firewall is one great solution to integrate easier security concept on the plant level or machine level. Plus, it is very easy to set up. We also recommend using Managed Industrial Ethernet Switches because they allow for structuring the network."

He went on to speak about a new upcoming technology – Single Pair Ethernet. "This is what we call downsizing, which means it is now possible with a new physical layer to install industrial Ethernet with only two cores for up to one gigabit data rate," Moebus mentioned. Another upcoming solution he talked about was Single Pair Ethernet. The typical applications for Single Pair Ethernet consist of being used for connecting two sensors, for a PLC communication in the cabinet, etc. Moebus also highlighted the first products LAPP is offering for Single Pair Ethernet and its solution for predictive maintenance – ETHERLINE[®] GUARD. He eventually threw light on solutions for industrial communication from LAPP.

Digital maturity

Up next, Nitin Kalothia, Advisor, Kaizen Hansei LLP & Partner, Patona Advisory, gave a presentation on 'Enabling technology for smart factory' where he talked about some of the digital themes – what are the evolving digital themes, how it is really impacting manufacturing & how manufacturing companies are leveraging that and more. He explained that the digital maturity moves from disconnected factory to integration to automating processes to how to become more intelligent as an organisation to autonomous factory. "In each of these stages, the accuracy of data is very important," Kalothia mentioned.

He also highlighted different digital themes, from digital safety to digital worker. He further informed why automation & integration become very relevant. The webinar informed the audience plainly about how the reliability of data is very important, how seamless communication needs secure structures and threw light on the IoT market in India. □

Data security for import & export

B&R Industrial Automation recently added new security functions to its process control system, APROL. This addition allows users to protect



Secured import & export of engineering data

their projects from cyber the threats in best way. possible А new function enables automatic encryption of engineering data, guaranteeing the highest level of security during import and export. In larger projects, tasks are often split up between team members scattered

around the world. To guarantee the securest possible exchange of engineering data, all configuration data must be protected by encryption. The new APROL function, 'Data security for import and export', allows data to be encrypted with minimal effort. After commissioning, the entire project is handed over to the responsible archivist in a tamper-resistant manner. Subsequent manipulation without a password is impossible. Users benefit from a high level of data security and save a lot of time since manual encryption & decryption is no longer necessary.

> **B&R Industrial Automation | Pune** Email: office.in@br-automation.com | Tel: +91-20-4147 8999

HMI operator workstation

PepperI+Fuchs recently presented the new modular VisuNet FLX HMI operator workstation, which is part of a comprehensive range of operation and monitoring systems for ATEX/IECEx Zone 2/22 and Division 2 (global



VisuNet FLX HMI operator workstation

certifications pending) and non-hazardous areas. This product suite provides a range of solutions that allow the automation specialist to offer total flexibility in the field. The new platform is tailored to the needs of the petrochemical, chemical and pharmaceutical industries.

The devices in the new VisuNet FLX series can be ordered in three basic configurations, depending on the user specification.

- 1. HMI system: Complete HMI system (various display options in Full HD) combined with a thin-client, PC or direct monitor unit, including stainless steel housing in a hygienic design. Suitable for stand-alone installation, such as on a pedestal or support arm.
- 2. Panel PC: Display (various display sizes in Full HD) combined with a thin-client, PC or direct monitor unit for panel mounting.
- 3. Box PC: Stand-alone PC or thin client for direct installation in a switch cabinet.

Pepperl+Fuchs | Gurugram Email: fa-info@in.pepperl-fuchs.com | Tel: +91-9650 530 027

Axis compensation module with new linear guide & new installation sizes

Zimmer Group recently announced the introduction of an updated version of its XYR1000 axis compensation module se-ries. Having

developed the axis compensation modules of the new XYR1000-B series, the company now has another version that currently has the highest power density on the market and provides an important extension to its range of robot accessories. In addition to the use of new linear guides, the most important innovation of the XYR1000-B version primarily include the greatly im-proved technical properties of the axis compensation module compared to its predecessor. For example, moving the linear guide further out and having an overall longer guide length results in a considerably more stable



XYR1000-B series

structure. This enables a much higher force & torque absorption and re-sults in the new axis compensation module version being able to withstand higher shock loads. Moreover, enlarging the cylinder diameter allowed the holding forces for both the centered and eccentric holding functions to be significantly increased by an average of 35%.

Practical selection guide for the handling weight Now there is a new practical selection guide for defining the maximum

> handling weight. The han-dling weight is used to enable a rough estimate of which size works for the respective application. In the past, there was only one numerical value for each standard application, but now there are separate diagrams for which even the lever arm and acceleration at the robot (or gantry) are in-cluded in the calculation.

New installation sizes & accessories

The previous -1063 to -1160 installation sizes are joined by a total of three more design sizes. The -1040 and -1050 sizes are intended more for small handling

weights, while the -1200 size is more suitable for the heavy-duty range. A two-point sensor is available as an accessory for piston position sensing. In addition, the accessory has been optimised for production, resulting in cost savings in production that have been passed on directly to the customer.

Silica analyser

Mettler-Toledo recently announced the launch of its 2850Si silica analyser, which is designed to maximise uptime and achieve superior performance for both silica and phosphate monitoring.

Wreaking havoc on product quality, equipment efficiency and maintenance planning, silica monitoring is vital for the measurement and control of contamination in pure and ultrapure waters used in industries, such as power generation and microelectronics.

Phosphate treatment, often deployed within power plant drum-type boilers, plays two important roles maintaining proper alkalinity and controlling scale build-up for effective blowdown and protection against corrosion.

With its innovative measurement technique, a single analyser does twice the monitoring with combined silica and phosphate analysis for power plant chemistry,

significantly reducing overall reagent consumption and operating costs.

The 2850Si's compact size, driven by the need for 75% less reagent volume compared to typical silica analysers, allows additional measurements to be installed – optimising valuable water panel space.

Monitoring of reagent usage and tube/filter status with the company's Intelligent Sensor Management (ISM®) technology enable proactive inventory

and service planning. Maintenance can be further simplified using service facilities to ensure optimal performance throughout the life of the analyser.

To ensure ease of operation, the built-in M800 Transmitter, with its

intuitive touchscreen user interface, meets individual plant display needs from initial configuration and training to full operation and troubleshooting.

Unprecedented challenges in the power and microelectronics industries require breakthrough technology for analytics that offer more value to users. With the 2850Si silica analyser, plant personnel can save space, get more measurements and lower the budget for maintenance and consumables.

The quality of water is a critical factor when it comes to production within the power and microelectronics industries. The importance of monitoring the right

chemicals at the right time and under budget to meet increasingly aggressive targets cannot be understated. The silica analyser exceeds today's standards with multi-stream sampling, lower reagent consumption, predictive diagnostics and a phosphate measurement, all within a compact design adding operational flexibility while saving personnel resources and valuable panel space for water analytics.

> Mettler-Toledo India | Mumbai E-mail: sales.mtin@mt.com | Tel: +91-22-4291 0111

Motor starters

Schneider Electric recently announced the release of new generation of TeSys Giga series motor starters. The series has been reimagined with the

latest smart digital innovations to deliver a simpler, more sustainable, safe & secure customer experience for panel builders, consulting engineers, system integrators, facility managers and Original Equipment Manufacturers (OEMs), further building on proven reliability and high electrical durability. It is designed to serve the needs of the process machinery, water & wastewater, metals, minerals & mining as well as various manufacturing and processing industries. It reduces engineering time and complexity, whilst improving machine reliability and driving down maintenance costs, reducing downtime through a number of unique benefits and features as below –

- Modular design: The set-up enables easy replacement of spare parts, improving the reliability and robustness by up to 90%, with up to 50% faster integration and commissioning time
- Compact footprint: Compact design with 40% size reduction to enable optimal cabinet installation space
- Self-diagnosis: Predictive maintenance can be achieved through contact wear diagnostic and coil over/under voltage detection. A unique calculation method provides a more precise status, significantly

reducing the downtime and optimising site operation with tips wear level indicator, coil under/over voltage indicator, internal fault indicator

and contactor open & close status indicator. This feature significantly maximises resilience and uptime for an efficient site operation

- Full-scale protection: Initial settings guarantee a safe customer journey when it comes to overload relay protection, including overload protection, ground fault protection and phase imbalance protection to guarantee a safer customer journey
- QR codes: Delivers technical documents, technical video guides and counterfeit safeguards which improve customer experience
- Highly reliable and ready for harsh environments: Improved auxiliary contacts (17V,1mA,10-8) enable better reliability in harsh environments and conform to high density PLC input applications

Products from the TeSys Giga line will integrate next-gen technologies into rendering consistency in performance, optimal cost-efficiency and heightened security. TeSys Giga will let one build complete motor control solution. It will offer protection and control of motors and aide in one's digital transformation journey.



TeSys Giga series

motor starters

Highlights – Oct-Nov 2021



» FOOD & BEVERAGE PROCESSING

The food & beverage industry makes up about 10% of the agricultural GDP and 12% of the manufacturing GDP. The industry is going through a considerable number of changes and is also witnessing a change in advanced technology adoption. The forthcoming edition will highlight the technological changes in the F&B sector towards sustainable manufacturing, with automation being the key.



» SENSORS & ENCODERS

Sensors & encoders detect changes in a magnetic field of a rotating disc and translate information into a digital format. Earlier, sensors & encoders strictly supported position and speed feedback, but today, it can create digital signals that can integrate the future for many industries. The next issue will divulge into the future of sensors & encoders and how it can alleviate the challenges manufacturers face



» ROBOTICS & HANDLING

Robotics has found its way in many different areas of manufacturing and the usage of industry robots is bound to grow by over 175% in the next nine years. The upcoming issue will focus on how robotics is unleashing its full potential in segments of manufacturing, handling and how it can bring more variability to production.



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