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November 2023

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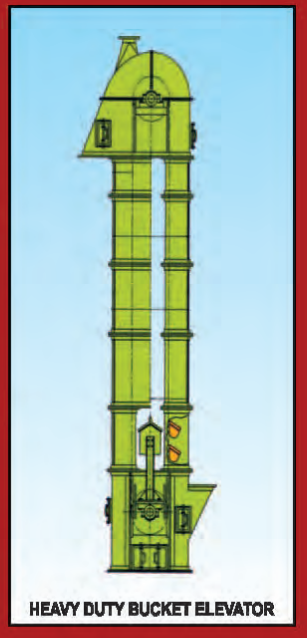
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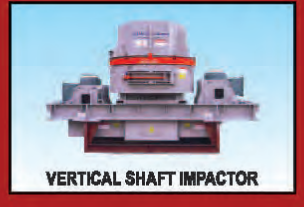
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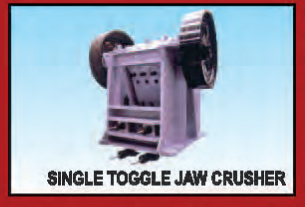
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EDITOR'S NOTE

Automation: Check for benefits beyond RoI

Ceat, owned by the RPG Group, became the first tyre brand globally to win the Deming Grand Prize (considered to be the highest award in the area of total quality management) in 2023. The company's spokesperson (speaking exclusively to IPF), attributed adoption of robotic automation as one of the reasons for achieving this award. Technology intervention has helped the company to not only raise the quality bar, but also increase productivity by enhancing Ceat's management systems, relations with vendors & suppliers, and waste elimination.

While the concept of advanced automation is gaining traction in India, the adoption pace needs to pick up for making a bigger impact on the manufacturing productivity. And for this, companies need to look beyond simple RoI calculations based on labour saving to include quality and long-term efficiency improvements.

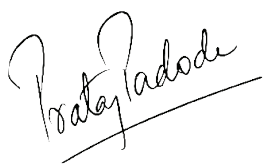
For example, automation facilitates supply chain efficiency, offering customers visibility from order placement to delivery. It also tackles challenges such as the scarcity of skilled labour, especially in remote areas, through robotic solutions, ensuring consistent quality. However, automation should be tailored to each business' unique requirements. For example, in project-based businesses, accurately capturing and delivering the customer's requirements without distortion is crucial. Automation, in this context, involves efficiently scheduling production to minimise waiting time and setup costs. In contrast, for industries dealing with high-precision materials (like aerospace) meticulous data tracking is vital by maintaining records of raw material batches, processing details, operators, machines, and parameters. Therefore, businesses must carefully select automation strategies that align with their core priorities and customer requirements.

The strategic adoption of digitalization and automation has become indispensable for companies seeking to excel in their sustainability endeavors. By leveraging state-of-the-art technologies such as energy management systems, building management systems, IoT devices, and data analytics, organisations can not only enhance their operational efficiency and competitive edge but also make substantial strides in minimising their environmental footprint.

Energy efficiency is at the heart of sustainability. Organisations can adopt a comprehensive approach to energy management by embracing digitalization and automation. Similarly, by streamlining manufacturing processes and day-to-day operations through technologies like automation, sensors, and predictive maintenance, companies can optimise resource usage and minimise industrial waste.

With the country emerging as a major sourcing centre for global firms, experts believe manufacturers in India will accelerate their automation/ digital journey due to productivity, quality, and compliance requirements. India, the world's fifth largest economy as measured by manufacturing output, now ranks tenth worldwide for number of annual robot installations, which is very positive indicator. The government's Production Linked Incentive (PLI) scheme, which is currently set to run until 2025, is also helping to increase incorporation of modern manufacturing tools in industries like automotive, metal, pharmaceuticals, and food processing as the scheme subsidises companies that create production capacity in the country.

Thus, automation will enable manufacturers to optimise and make their processes more efficient while increasing their competitive-edge in the global market.



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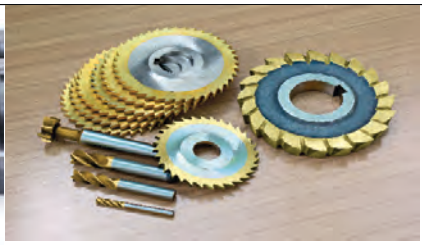

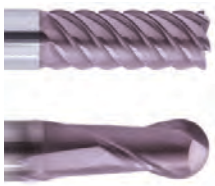

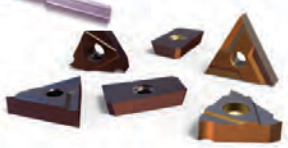

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Dividends of Digital Manufacturing

Shopfloors are undergoing a significant transformation to cope with the requirements of globalisation, shorter product life cycles, changes in market and demand, and rapid technology advancements. Companies are transitioning from dedicated manufacturing systems to flexible and reconfigurable systems to reduce the lead time between different products.

With the country emerging as a major sourcing centre for global firms, manufacturers in India have accelerated their automation/digital journey due to productivity, quality, and compliance requirements. India, the world's fifth largest economy as measured by manufacturing output, now ranks tenth worldwide for number of annual robot installations, which is very positive indicator. Automation is enabling manufacturers to optimise and make their processes more efficient while increasing production, adapt to changes, and adopt sustainable practices.

The government's Production Linked Incentive (PLI) scheme, which is currently set to run until 2025, is also helping to increase incorporation of modern manufacturing tools in industries like automotive, metal, pharmaceuticals, and food processing as the scheme subsidises companies that create production capacity in the country.

Digitalization of shopfloors and related operations will be a linchpin in India's pursuit of a $1 trillion manufacturing economy. Digital manufacturing - including predictive maintenance to reduce downtime and repair costs, data analytics for leaner supply chains, and AI for proactive quality control - not only empowers sustainable production processes but also introduces unprecedented flexibility for customisation based on customer demands. In this "Cover Story" section, industry experts elaborate on transformative strategies to embrace digital solutions for realising India's goal to become a global manufacturing powerhouse. IPF

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“Automation should be tailored to businesses’ unique needs”

Understanding the customer’s specific needs is paramount in any industry and, based on customer demands, each manufacturing unit has unique priorities. Therefore, **Zurvan Marolia,** Sr VP & Head - Manufacturing Council, Godrej & Boyce Manufacturing Co Ltd, says, businesses must carefully select automation strategies that align with their core priorities and customer requirements. In this interview with Rakesh Rao, Zurvan Marolia eloquently explains steps to be taken by companies to maximise their return on investments (RoIs) while adopting automation.

How is the manufacturing industry evolving due to advancements in technologies such as automation, robotics, cobots, AI, etc?

Understanding the need for automation is crucial; it's not just a trend but a strategic decision. Choosing the right automation is essential, given the multitude of options available. There are three main reasons why businesses opt for automation.

First, it enhances consistency, repeatability, and reduces fatigue, ensuring uniformity in processes. Second, it provides predictability and traceability, enabling better control and monitoring. Lastly, automation aids in cost optimisation, making operations more competitive by streamlining processes and reducing lead times.

Customer-centricity is vital in any business endeavour. The Covid-19 pandemic accelerated automation efforts due to social distancing requirements, prompting a re-evaluation of processes. Automation addressed customer demands for quick deliveries and competitive pricing. It eliminated unnecessary costs, improved quality consistency, reduced rejections, and minimised buffer stock requirements.

Moreover, automation facilitated supply chain efficiency, offering customers visibility from order placement to delivery, particularly for institutional clients. Automation also tackled challenges such as the scarcity of skilled labour, especially in remote areas, through robotic solutions, ensuring consistent quality.

However, it's crucial to note that automation should be tailored to each business' unique requirements. A one-size-fits-all approach doesn't work; an appropriate, scalable operation is a key to successful automation implementation.

Automation addressed customer demands for quick deliveries and competitive pricing. It eliminated unnecessary costs, improved quality consistency, reduced rejections, and minimised buffer stock requirements.

How is Godrej & Boyce utilising digital manufacturing tools, particularly, to develop a robust supplier ecosystem?

Several years before the widespread adoption of Industry 4.0, we initiated a movement called 'Beyond Sourcing' approximately 14 years ago. This approach involved collaborating with our suppliers beyond mere transactions, focusing on their development. We implemented a cluster approach, receiving guidance from CII, and formed groups of non-competing suppliers. These groups underwent a series of steps; establishing basic processes and systems, followed by product management encompassing quality, maintenance, productivity, and safety. The third step focused on green and sustainable practices, resulting in a significant reduction in energy consumption. The final phase involved certification for business excellence at the SME level, with participants achieving platinum, gold, or silver status.

This initiative led to the creation of a cohesive supplier group with streamlined systems. We can now use advanced shipping notes with QR codes, simplifying material processing. Quality-precertified items are directly stocked, while non-precertified ones undergo inspection before acceptance or return.

Maintaining an updated inventory is crucial, and this approach has helped us achieve that. Continuous supplier development remains pivotal. Regular evaluations, facilitated by our “Beyond Sourcing” rating

system, ensure on-going progress. Suppliers are incentivised based on their rating level, with benefits and business share allocated accordingly. This system has enabled us to create a comprehensive and efficient ecosystem.

How can small SMEs harness the benefits of automation without facing excessive upfront expenses?

The role of OEMs is pivotal in this context. We provide necessary guidance and assistance. We offer training in such technologies, enabling SMEs to operate autonomously. We encourage them to hire technical experts whom we then educate, forming part of our evaluation process. Simultaneously, we exhibit our own automation endeavours, not for replication, but to spark creative ideas. During these interactions, we showcase the effectiveness of these technologies. SMEs have adopted these methods in managing their raw materials, considering their position within a broader supply chain. This approach forms a comprehensive network, underscoring the interconnectedness of all stakeholders involved.

What steps would you recommend for a company aiming to embrace automation with a customer-centric approach?

Understanding your customer's specific needs is paramount in any industry or market. In project-based businesses, accurately capturing and delivering the customer's requirements without distortion is crucial. Automation, in this context, involves efficiently scheduling production to minimise waiting time and setup costs. For instance, in a project business, optimising processes around minimising colour changes in the paint shop proved effective, streamlining the entire production flow.

In contrast, industries dealing with high-precision materials like aerospace prioritise meticulous data tracking. Maintaining records of raw material batches, processing details, operators, machines, and parameters used are vital. This data ensures achieving micron-level precision and facilitates thorough inspection.

Each manufacturing unit has unique priorities based on customer demands. Automation solutions must align with these specific needs. Investing in non-priority areas can lead to delayed returns, especially considering global market uncertainties and unforeseen challenges. Therefore, businesses must carefully select automation strategies that align with their core priorities and customer requirements.

What types of new technologies would a company be interested in to address external challenges to some extent?

Firstly, it's essential to identify potential risks and develop a mitigation strategy. When it comes to supply chains, building robustness is the key. Instead of relying on a single country, diversification across regions and exploring domestic sources can help mitigate risks. Preparedness is crucial, especially for unforeseen events like pandemics. This involves analysing the probability and severity of each risk and creating mitigation plans in advance.

While it's impossible to prepare for every scenario, understanding likely risks and devising mitigation plans, including exploring alternatives, is important.

Currently, global events such as wars impact various industries, like petrochemicals, affecting products such as oil, chemicals, paints, and foam used in refrigerators and furniture. While it's impossible to prepare for every scenario, understanding likely risks and devising mitigation plans, including exploring alternatives, is important.

What are your thoughts on the evolving technologies in digital manufacturing? Do you anticipate any specific technologies gaining traction in India over the next few years?

The manufacturing landscape is rapidly shifting towards highly automated facilities, often referred to as 'Lighthouse Factories'. In these advanced setups, interconnected systems make decisions based on algorithms and possess self-correction and self-diagnosis capabilities. Although this concept may seem extreme, it's inevitable that our technology will move in this direction, even if the transition takes longer than we anticipate.

Another intriguing development is post-production product monitoring. For instance, our material handling team utilises a fleet management system. After products are deployed, this system informs customers about maintenance needs, such as low oil levels, to prevent breakdowns. Moreover, this data is analysed to improve future product designs.

Consider the emergence of smart furniture. Soon, we might have chairs equipped with sensors that vibrate to remind users to stand up periodically, addressing health concerns related to prolonged sitting. Currently, devices like the Apple Watch perform similar functions, but the integration of such features into furniture can come. These innovations will become more prevalent as electronic components become more affordable.

The key to this transformation lies in enhanced visibility and smarter products. Anticipating consumer needs and delivering timely solutions will become the norm. This approach will significantly reduce development and production timelines, making processes more efficient and competitive.

(With inputs from Divya Shetty) IPF

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“Digitalisation, electrification, and automation must go hand in hand”

...this is ABB’s vision, says **Subrata Karmakar,** President - Robotics and Discrete Automation, ABB India, in this interview with Rakesh Rao. ABB follows a 5-step process of Enable, Integrate, Model, Analyse and Deliver leading to technology adoption, he adds.

With the advent of AI, ML, IoT, 3D printing, cobots, digital twins, cloud, etc, how has the dynamics in manufacturing changed with respect to usage of technologies – i.e. hardware as well as software - in recent years?

The manufacturing segment has been consistently gaining the spotlight owing to its support towards revitalising the economy. The segment is constantly evolving with integration of fully automated, connected and digitally optimised factories, keeping up with the demand for new and innovative product methods. The industrial revolution 4.0 has witnessed the rise of core computing technologies like AI, ML, Big Data, Cloud Computing, Cyber Security along with other physical technologies like automation and robotics, IoT, CPS, AM. Since smart manufacturing systems are an enabler of fully integrated and collaborative manufacturing systems, these technologies ensure agility, flexibility in smart manufacturing. This results in meeting the ever-evolving needs in smart factories to meet the customer needs and keep up with the supply on a real time basis.

Additionally, with sustainability and eco-consciousness being on the rise, more companies are embedding sustainability goals into everything they do, also resulting in innovative business models. Unprecedented supply chain disruptions encourage the industry to move faster and become more resilient than ever before – to stay ahead of the curve. The growing infrastructure and road developments, also lead factories into a new era of connectivity. Problems can be solved as soon as they arise, ensuring safety, optimising production levels, and reducing costs. Software-defined solutions enable fast changeovers to meet the consumer requirements as well as workforce and supply chain dynamics.

Being a global company, how do you see the current status of the Indian manufacturing sector?

Today, India has become the world’s fifth largest economy as measured by manufacturing output. India also ranks tenth worldwide for number of annual Robot installations, which is very positive indicator. Manufacturers in India have accelerated their digital maturity due to current productivity, quality, and compliance. Automation is enabling manufacturers to optimise and make their processes more efficient while increasing production, adapt to changes, and adopt sustainable practices. There is a clear need for automation as demonstrated by the various manufacturers who have invested in making the shift to more automated operations.

The Indian manufacturing sector is also expected to benefit from the government's initiatives to boost competitiveness and attractiveness for investors. The Production Linked Incentive (PLI) scheme, for example, which is currently set to run until 2025, subsidises companies that create production capacity in India in robot customer industries like automotive, metal, pharmaceuticals, and food processing. It is showing the growth of the adoption of robotics and automation within the industries.

With companies (i.e. your customers) in India looking to opt for smart and digital manufacturing solutions, how is your company supporting them in this?

At ABB, we have always been focused on giving utmost importance to technology. Smart industries hold a huge potential if approached with a comprehensive and value-driven strategy. The key aspects of building smart industries are trust and collaboration, therefore, it is crucial to deploy the right technologies to tackle the challenges with precision. We have a demonstrated history of guiding businesses to identify and leverage their distinctive data points in their ecosystem. Our purpose is to maximise those data to garner concrete outcome. We follow a 5-step process of Enable, Integrate, Model, Analyse and Deliver. Additionally, to help companies navigate the complex landscape and pursue programs that delivers on value.

ABB has also chosen five solution areas - sustainability, asset performance (AI/ML), process performance, operational excellence and a connected workforce - because together they can be used to provide demonstratable evidence that digital transformation strategies are working. ABB´s vision is that automation, digitalisation and electrification must go hand in hand for real digital transformation and deliver on the values of sustainable and efficient operations.

What are key hurdles faced by companies when they adopt (or plan to adopt) automation/ digitalisation? How can they mitigate these hurdles?

When adopting automation and digitalisation, manufacturing companies frequently face challenges, such as high implementation costs, employee resistance, integration difficulties, data security worries, talent gaps maintenance issues, undesired ROI, and regulatory compliance.

Companies should start with pilot projects, invest in thorough employee training, carefully choose appropriate technology, plan for seamless system integration, prioritise cybersecurity, implement predictive maintenance strategies, continuously improve operations through data analytics, ensure compliance expertise, manage change successfully, and consistently measure ROI to lessen these difficulties and make the transition easier. By following these guidelines, industrial companies may better manage the challenges of automation and digitalisation, increase efficiency, and maintain their competitiveness in the market.

High upfront cost is a big put-off for companies. Are there low-cost entry routes into digitalisation? How is ABB supporting the needs of SMEs?

By investing in cloud-based software, open-source options, mobile apps, and software-as-a-service (SaaS), Small and Medium Enterprises (SMEs) can embrace digital solutions affordably. SMEs can embrace digitalisation without incurring significant upfront expenditures by starting small, concentrating on high-ROI areas, and gradually growing digital activities. For example, ABB's RobotStudio® programming tool enables users to create, simulate and test a complete robot installation in a virtual 3D environment without having to disturb their actual production line. This means that new product lines can be installed faster and ramped up to full speed without surprises during commissioning – a critical competency for manufacturers with today's mass customisation and shorter product life cycles.

What are the emerging trends in the manufacturing sector with respect to digital manufacturing?

In the upcoming time, we will increasingly see smart factories and manufacturing plants leverage the power of AI, automation and robotics, IoT, cloud computing, cobots and digital twins along with sustainable manufacturing to drive more efficient operations and ultimately improve business outcomes. For example, predictive maintenance, which refers to the use of sensor data and artificial intelligence to identify any failure patterns within the machinery and components, has started to become the norm. This helps to detect and solve issues in real time to avoid lengthy maintenance issues and downtime. Another rising trend within manufacturing is the use of robots, to help enhance the work of humans. Such robotics can work with humans to help with the more labor intensive and dangerous tasks within production. Collaborative robots, known as cobots have also become more popular as they are specially designed to work alongside humans.

In its 130-year history, ABB has been constantly reinventing the wheel to aid industries in various industrial revolutions. As businesses prepare for the increased usage of automation and advanced AI applications within manufacturing, ABB India is innovating for industrial AI, leveraging capable IIoT startups, sharpening digital skills and the future of Industrial Control Systems in the age of AI.

At the heart of our cutting-edge solutions is ABB Ability™, which combines ABB's deep domain expertise with connectivity and software innovation to empower real-time, data-driven decisions for safer and smarter operations that maximise resource efficiency and contribute to a low-carbon future. Our broad portfolio of digital offerings – from sensors to cloud – helps energy, infrastructure and transport organisations to automate, optimise and future-proof their businesses to achieve new heights in performance and drive sustainable progress.

What kinds of opportunities are you looking to tap as digital manufacturing grow in India?

We are in the midst of a transformational decade. The world is evolving at a rapid pace, and robotics automation is critical for all clients in all industries to keep up. While the goal of automation has always been to increase production and quality, increased flexibility and simplicity of use have become a strategic imperative. Consumers now demand items that are suited to their specific needs, they also want these faster than ever before. As a result, the factories of the future must be able to respond far more dynamically to the ever-changing consumer demands, altering demand, and current trends. On the one hand, for factories, this means that inflexible automation must give way to flexible production, which is characterised by flexibility and enabled by simplification, collaboration, and digitisation, all of which ABB is able to provide.

IPF

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"Country is reinventing India Centric Automation, which is more frugal"

Wipro PARI, a user as well as provider of digital/automated solutions in the industry, is one of the largest global automation companies. In this interview with Rakesh Rao, **Sundararaman G,** Co-CEO, Wipro PARI, Wipro Infrastructure Engineering talks about Industry 4.0 ecosystem, low-cost routes to automation, and emerging trends in the automation and digital manufacturing.

With the advent of automation, robots/cobots, AI, ML, IoT, data analytics, cloud, etc, what changes are you witnessing in the Indian manufacturing sector in recent years?

We see significant changes in the Indian manufacturing sector, specially post covid. We see a greater appreciation for remote monitoring, feedback, control of production processes. We see that efforts are being made to reduce the number of human touches in material handling through better automation. Unlike China, where we compare the number of robots being retailed per year as a measure of automation penetration, we in India, seem to be reinventing "India Centric Automation" in our own way, which is more frugal and at the same time serving the purpose of improving productivity and quality.

What steps is Wipro PARI taking to develop the Industry 4.0 ecosystem in India?

Wipro Pari's Industry 4.0 offering is through Linecraft AI's software product suite that provides artificial intelligence-enabled Industrial IoT solutions. It begins with hassle-free data collection from PLCs, runs proprietary algorithms to process the data, and creates meaningful, user-friendly reports and charts. It allows manufacturers to gain insights into key performance indicators (KPIs) of their lines, and also sends personalised recommendations to optimise their production lines. This software has standard modules like:

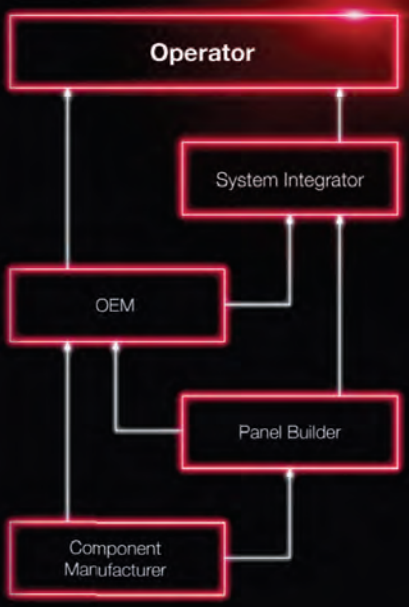
- Part Trace: IIoT-driven traceability solution that can help manufacturers meet compliance requirements by tracking and visualising each part through the production line, track the number of reworks and times the part entered the line and view process parameters at each station, visualise the flow of a part through the production line leveraging Gantt charts and tables, track retries, and abnormal cycles which are usually not reported in quality reports, time in line, view actual parts produced, segregated as parts OK, NOT OK, and Reworks, track genealogy/child parts during recall for a part variant serial number.
- Monitor: which helps to track and visualise OEE (Overall Equipment Efficiency) of each station or production line through tabular reports and charts, gain insights into the efficiency of machines through heat maps and graphs.
- Analyse: Identify anomalies, study trends to find when the line is deviating from normal behaviour, drill down to study and compare different station cycles, analyse the time that a machine is unavailable for production along with the reasons for downtime.
- Optimise: Actionable recommendations to improve overall performance, increase the throughput of your key stations, by optimising their cycles and waiting times, discover stability, availability, and infrastructural opportunities for bottlenecks.

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

The first step in digitisation is to connect the machine to the world of internet. Today we have affordable data gathering devices even for legacy machines. The low-cost but effective entry route for SMEs is to keep the entire digitisation requirement simple and purposeful. If the machine is connected, the entire team in SME can monitor the productivity through simple mobile apps and only engage in detailed investigations when required. Sometimes, standard IoT offerings from many

EPLAN

efficient engineering.



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of the proprietary players will warrant them to invest heavily in the beginning. There will be so many sensors, digital/analog ports gathering hundreds of data at very short time intervals with heavy analytics. This could lead to overdose of IoT for SMEs and the real purpose of productivity monitoring and improvement gets lost. So the essential requirement for SMEs is to ensure machines are connected with just the requisite data / information getting gathered, simple mobile app based analytics to understand the productivity measures and intervene with larger tools and investment only when the ROI is justified or the problem is insurmountable.

What are the emerging trends in the automation and digital manufacturing space?

Apart from IoT, 5G, AI, ML etc, I will point to four key emerging trends in automation and digitisation in the manufacturing space as below:

- Edge computing – this is like bringing self-driving cars inside the factories – all real time analytics with very little latency and time loss for decision making.
- Digital twins – The virtual machine mimicking the physical machine helping to take real time controls on large manufacturing and assembly lines.
- AR/VR technologies – While AR overlays the digital information onto the real world, VR creates a completely immersive virtual environment.
- Generative AI – This can create new contents as texts, sound, images, videos based on learning patterns from existing data and help shop floor intelligence to reach newer heights.

What kinds of new opportunities are you looking to tap as digital manufacturing grows in India?

The acronym that comes to my mind is 3E's that will propel our digital manufacturing in this and next decade and thereby achieving our trillion-dollar manufacturing economy:

- Electric Vehicle: India is home to the world's largest 2-wheeler and 3 wheeler market, we are poised for this major transformation. All requirements of digitisation "Cradle to Grave" track, trace, monitor, improve, optimise will get deployed in this segmental growth. With a staggering projected CAGR of over 90%, we will be witnessing a revolution in our digital manufacturing footprint.
- Ecommerce: The rapidity with which our billion consumers are embracing online stores, consumption of day-to-day livelihood items, is propelling unimaginable level of digitisation from Factory to End-consumer. On –line retail growth and consumer demands for faster delivery, forces industry to develop automated and digitised logistics infrastructure in the network across all stakeholders from factories , Distribution Centre's (DC), Transportation , Fulfilment Centre's (FC), Micro Fulfilment Centre's (MFC) and the last mile delivery.
- Electronics Manufacturing: With China+1 strategy, we are seeing huge manufacturing investments happening from semiconductors, battery cells, smart phones, and all consumer electronics goods. Already we have witnessed the mobile phone production going from 60 Mn in 2015 to 300 Mn in 2022, now we are poised to take this to 1 billion level over the next 5 years. This segment will witness a major investment in precision engineering automation along with world class digitisation technologies penetrating the high-speed fault free manufacturing lines.

How important will digital manufacturing be for India to become a $1 trillion manufacturing economy?

India in the last three decades of growth skipped the manufacturing sector and focused more on the services sector to propel its GDP. But now with all the advantages of demographic dividend, government impetus through various PLI schemes, its software prowess, we are looking at this and next decade as digital manufacturing era generating significant employment opportunities. IPF

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NEWS SNIPPET

Wipro PARI buys majority stake in Ferretto Automation

Wipro PARI, the industrial automation business of Wipro Enterprises Pvt Ltd, has acquired majority stake in Ferretto Automation & Services, a subsidiary of Ferretto Group based in Italy. Ferretto Automation & Services is the Ferretto Group's division that specialises in the design and manufacture of automated storage systems. Ferretto Group company is a leading player in warehouse automation solutions across the world. Ferretto Automation manufactures a full range of intralogistics automation solutions for all storage (Automated Storage and Retrieval Systems), handling and distribution needs, on a turnkey basis. The scope covers design, engineering manufacturing and installation of the automation solution on a turnkey basis along with a warehouse management system (WMS) software & post-commissioning service with completely inhouse manufacturing and assembly of all critical systems. IPF

"Operational technology is getting more & more connected to IT"

Digitalization is driving the manufacturing towards higher quality, safety and consistency, based on real time information being collected and processed at IT end. Digital manufacturing is offering us huge opportunity, states **Bipin Jirge,** Managing Director, ifm electronic India Pvt Ltd. In this interview, Bipin Jirge explains the importance of automation in gaining competitive-edge in the industry.

How is ifm electronic serving the industry's requirement?

A wholly-owned subsidiary of ifm electronic gmbh, ifm electronic India has been serving the domestic market for last more than 28 years – with offices across the country. We offer automation solutions for various industry verticals like automotive, machine tool, steel, cement, food, packaging, construction machines, water, port equipment, etc. We offer hardware as well as software solutions for Industry 4.0 implementation.

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

We offer automation solutions which are implemented on the plants & machines which results into cutting long term costs, predict breakdown, real time maintenance, increase OEE etc for our customers.

What kinds of new features (hardware or software) are you adding for offering innovative products/solutions?

We are pioneers of sensors and solutions with built in digitalization technologies like IO-Link where customers get end to end sensor data as well as diagnostic data in the digital format from the sensors to IOT servers. This is an innovative concept being adapted by many customers in India, having derived concrete advantages for digitalization as well as reduction in wiring costs.

What kinds of changes are you seeing in the manufacturing sector due to new technologies?

The change we see in the manufacturing is very much in the direction that OT (operational technology – that is machine controls) are getting more and more connected to IT (information technology – that is IOT servers) giving data to company ERP systems directly from the machines in Real time. This enables companies to take decisions in real time.

How important is adoption of digital/automated solutions for companies in India, which is a major sourcing hub for engineering goods?

It is very important for engineering manufacturing companies to go digital, as their customers across the world are now demanding real time data from their supply chain partners. This data could be regarding quality parameters, details regarding work in progress, as well as final delivery schedules.

"Digital Manufacturing" is a buzzword across the industries. What kinds of business opportunities it presents to your company?

Digital manufacturing is offering us as well as across the automation suppliers' huge opportunities as digitalization is driving the manufacturing towards higher quality, safety and consistency in manufacturing world, based on real time information being collected and processed at IT end. All this information chain demands more feedback devices (sensors) as well communication systems across the machines/ plant equipment (communication systems) connected to IoT servers / ERP systems concurrently (IoT hardware and software). These offer huge business opportunities for companies offering these solutions.

What are your growth plans?

We are one of the most innovative automation companies across the world and we offer every year new automation solutions (be these in the field of sensing solutions for quality, condition based maintenance as well as track and trace systems) which are being absorbed by manufacturing industry across the world. The new products which are launched across the world are mostly launched concurrently also in India.

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Shopfloors are becoming more agile, efficient, and competitive

Shopfloors are undergoing a significant transformation to cope with the requirements of globalisation, shorter product life cycles, changes in market, demand, and rapid technology advancements. In this interview with Rakesh Rao, **Shubhankar Chatterji,** Chief Supply Chain Officer, and **Manish K Jha,** Director - Engine Business, Operations and Supply Chain, of Cummins India, highlight how automation and digital solutions are elevating efficiency and productivity in the manufacturing industry.

Shubhankar Chatterji

Manish K Jha

How is the dynamics of the manufacturing sector changing with the arrival of automation, robots/cobots, AI, ML, IoT, data analytics, digital twins, etc?

Shubhankar Chatterji: The adoption of automation, robots, collaborative robots (cobots), Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT), data analytics, and digital twins has brought a transformative wave in manufacturing. Cummins India serves as a shining example of how these innovations have redefined our manufacturing prowess.

Automation has brought a profound shift, substantially elevating efficiency and productivity by substituting human labor for repetitive tasks. This transition has resulted in consistent quality, higher output, and reduced labor costs. Ubiquitous automation at Cummins India has not only increased operational efficiency but has also improved product quality and enhanced delivery performance. This shift harmonizes perfectly with our core values of Diversity and Inclusion, rendering most of our manufacturing lines gender-neutral.

Robots and cobots have assumed a central role in the metamorphosis of manufacturing operations, emerging as indispensable partners for human workers. Cummins India has recently implemented versatile cobots to handle repetitive and hazardous tasks, resulting in remarkable improvements in shop floor safety and overall operational efficiency. Additionally, our ongoing deployment of Intelligent Mobile Robots (IMRs) is poised to enhance autonomy in material delivery on the shop floor.

Beyond automation, AI and ML algorithms process copious data to uncover patterns and trends, enabling predictive maintenance, quality improvement, demand forecasting, and streamlined processes. Simultaneously, IoT captures and analyzes data in real time, ensuring seamless operations and early identification of quality issues and potential failures. At Cummins India, we leverage ML to analyze data from IoT, proactively detecting machine health, quality, and operational concerns. Further, our expedited IoT deployment ensures real-time monitoring of facilities, machinery, and product traceability, collectively strengthening our processes and resource optimisation, to amplify productivity and efficiency.

Digital twins, which replicate physical systems digitally, have facilitated simulations, bottleneck identification, workflow optimisation, and overall efficiency enhancement. Cummins India's journey into extensive automation, Manufacturing Execution System (MES), advanced data analytics, and predictive maintenance platforms underlines our commitment to managing complexity at the lowest possible cost while ensuring product quality. We are also investing in upskilling our workforce to effectively operate and maintain these advanced technologies, which is crucial for seamless integration into our manufacturing and supply chain processes.

What kinds of transformation have you been seeing on the shopfloor – i.e., hardware as well as software - in recent years?

Manish Jha: Shopfloors are undergoing a significant transformation to cope with the requirements of globalisation, shorter product life cycles, changes in market, demand, and rapid technology advancements. We are witnessing manufacturing companies transitioning from dedicated manufacturing systems to flexible and reconfigurable systems to reduce the lead time between different products. The goal is to connect humans and machines (smart systems) to achieve flawless flexibility and agility at the lowest possible cost. This involves the adoption of both hardware and software technologies including integration of IoT devices, RFID systems, and smart sensors on machinery that allow real-time data collection; along with sophisticated Manufacturing Execution Systems (MES) and Enterprise Resource Planning (ERP) software enabling seamless communication, data acquisition and analysis across the manufacturing process. With these integrations, shopfloors are becoming more agile, responsive, efficient, and competitive in domestic as well as global markets.

Can digitalization and automation help companies to achieve their sustainability goals faster and more efficiently?

Shubhankar Chatterji: The strategic adoption of digitalization and automation has become indispensable for companies seeking to excel in their sustainability endeavors. By leveraging state-of-the-art technologies such as Energy Management Systems, Building Management Systems, IoT devices, and data analytics, organizations can not only enhance their operational efficiency and competitive edge but also make substantial strides in minimizing their environmental footprint.

Energy efficiency is at the heart of sustainability. By embracing digitalization and automation, organizations can adopt a comprehensive approach to energy management. Real-time monitoring and control of energy consumption become feasible through intelligent sensors, IoT devices, and data analytics, facilitating resource optimisation. Resource optimisation is another crucial aspect of sustainable practices. Automation in supply chain management can significantly enhance resource management by increasing fuel efficiency, reducing waste, and improving logistics. Companies that leverage automation in their operations can make more informed decisions to optimise their use of resources, thus contributing to their sustainability goals. A pivotal facet of the sustainability journey is waste reduction. By streamlining manufacturing processes and day-to-day operations through technologies like automation, sensors, and predictive maintenance, companies can optimise resource use and minimise industrial waste.

Resource optimisation is crucial aspect of sustainable practices. Automation in supply chain management can significantly enhance resource management by increasing fuel efficiency, reducing waste, and improving logistics.

With a legacy spanning over six decades in India and guided by a global PLANET 2050 environmental sustainability strategy, Cummins exemplifies the power of digitalization and automation in sustainability. In line with our sustainability goals, we are actively working to centralize data collection on energy consumption, greenhouse gas emissions, and water usage, instilling a data-driven ethos. This enables us to meticulously monitor pivotal sustainability metrics and set annual goals, ensuring continuous progress toward our environmental objectives. We have also wholeheartedly embraced supply chain automation processes to amplify fuel efficiency and optimise resource management, reaffirming our commitment to becoming a resilient sustainability partner within the ecosystem.

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

Manish Jha: Economies of scale play a key role in this case. With the widespread adoption and the pace of digitalization across the country, several technologies like GPS, camera tracking systems, RFIDs, etc. are available at reasonable costs today. This can enable entry-level players to invest and adopt automated and digital solutions. Further, the scalability of these solutions by the technology providers is going to be a game-changer. There are several low-cost entry routes into digitalization and automation, particularly designed to help small and medium enterprises (SMEs) adopt advanced technologies without a prohibitive upfront investment. There is ample open-source automation software and hardware available. Effective strategies and approaches can make the transition to digitalization and automation more affordable for SMEs. A suggested approach is to analyze existing processes to identify inefficiencies. Often, optimising processes without major investments in new technology can significantly enhance productivity and cut costs. Here are a few recommendations:

- 'Start Small' begins by automating specific processes that yield high-efficiency gains or have

The integration of IoT into manufacturing processes is facilitating smarter decision-making, while the increasing prevalence of digital twins, used for simulations, testing, and predictive analysis, is of particular significance.

a direct impact on product quality.

- Deploy cobots, which are designed to work alongside humans. These are easy to program, and generally have a lower upfront cost compared to traditional industrial robots.
- Explore local and national programs that provide financial assistance for technology adoption. Collaborate with universities, research institutions, and institutes like CII to access expertise and resources, often at reduced costs or through government-funded initiatives.

Through focused efforts in the area of adopting effective strategies and exploring available resources, SMEs can find cost-effective ways to embrace digitalization and automation, improving their competitiveness and long-term sustainability in the market. Investing in training and upskilling existing employees is also crucial. A knowledgeable workforce can optimise existing technologies better, ensuring that the SME is making the most out of its current resources.

What are the emerging trends in the manufacturing sector with respect to technologies and digital manufacturing?

Shubhankar Chatterji: Within the evolving manufacturing sector, shaped by a dynamic business landscape, several pivotal trends are emerging. Notably, AI and ML algorithms find increasing application in predictive maintenance, quality control, demand forecasting, supply chain optimisation, and process automation. Furthermore, there is a growing reliance on IoT devices and sensors for real-time data collection from machinery and equipment, aiding predictive maintenance, process optimisation, and remote monitoring. The integration of IoT into manufacturing processes is facilitating smarter decision-making, while the increasing prevalence of digital twins, used for simulations, testing, and predictive analysis, is of particular significance. Edge computing is employed to minimize latency and enable real-time data analysis. Augmented Reality (AR) and Virtual Reality (VR) technologies are leveraged to enhance training, maintenance, and assembly process design. The integration of blockchain technology enhances supply chain transparency, traceability, and product authenticity, while additive manufacturing (3D printing) is embraced for rapid prototyping and customisation. These trends collectively drive efficiency, innovation, and competitiveness in manufacturing, offering companies the chance to excel in this evolving landscape.

With companies (i.e., your customers) looking to make their facilities Industry 4.0 compliant, how is your company supporting them in their efforts?

Manish Jha: As our customers enthusiastically embrace Industry 4.0 and connected factory initiatives, we have endeavored to support this transition and upgrade our systems, and processes to meet their

By leveraging state-of-the-art technologies such as energy management systems, building management systems, IoT devices, and data analytics, organisations can not only enhance their operational efficiency and competitive edge but also make substantial strides in minimising their environmental footprint.

requirements. As a provider of automotive engines, we have incorporated telematics to offer connectivity and predictive maintenance, empowering end-users to minimize costs and reduce breakdowns. We have aligned our daily scheduling with our customers' operational sequences, driving us to elevate our manufacturing quality standards. This shift has significantly curtailed in-house defects and inventory levels throughout our supply chain. Extensive automation in demand management has further refined our order commitments, considerably reducing inventory across the supply chain, and streamlining throughput timelines. This ensures timely availability of finished goods in the market, prompting our transition from a "Make to Stock" approach to "Assemble to Order" or "Make to Order," while maintaining the same lead time for order commitments. This shift has also resulted in reduced cycle time for product development and introduction.

Why adoption of digital manufacturing will be crucial for India to become a $1 trillion manufacturing economy?

Shubhankar Chatterji: As we witness the Indian economy growing, it will be considerably driven by the growth of the manufacturing sector. The digitalization of Indian shopfloors and related operations will be a linchpin in India's pursuit of a $1 trillion manufacturing economy. Digital manufacturing technologies, including predictive maintenance to reduce downtime and repair costs, data analytics for leaner supply chains, and advanced AI for proactive quality control, not only empower environmentally sustainable production processes but also introduce unprecedented flexibility for customization based on customer demands. This digital transformation acts as a catalyst for innovation, fostering experimentation with new products and services, supported by state-of-the-art technologies like 3D printing and rapid prototyping. By enabling efficient, high-quality production processes, digital manufacturing elevates the competitiveness of Indian products in the global arena. However, the success of this digital transformation hinges on a skilled workforce. Industry 4.0-focused training programs and educational initiatives empower the workforce, making them more productive contributors to the economy.

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"Digital manufacturing enhances operational efficiency"

As the government aims to India a $ 1 trillion manufacturing economy, digital manufacturing is emerging as a key enabler in this trajectory. Digital manufacturing enhances operational efficiency, facilitates innovation, and bolsters adaptability to evolving market demands, opines **Ranjit Patil,** Head CoE – Manufacturing Operations Management, Tata Technologies. In this interview with Rakesh Rao, Ranjit Patil elaborates on transformations taking place in the Indian manufacturing sector due to the integration of advanced technologies.

How is Indian manufacturing sector transforming with the arrival of advanced automation, AI, ML, IoT, data analytics, cloud, etc?

The landscape of the Indian manufacturing sector has undergone significant transformations in recent years with the integration of advanced technologies. Automation has streamlined production processes, enhanced efficiency and reduced manual intervention. Artificial Intelligence (AI) and Machine Learning (ML) have played instrumental roles in predictive maintenance, quality control, and process optimization, contributing to improved overall operational performance.

The adoption of Internet of Things (IoT) devices has facilitated real-time monitoring and data collection, enabling better decision-making and heightened visibility across the production chain. Data analytics has emerged as a key driver, offering actionable insights for informed decision-making and continuous process improvement. Additionally, the integration of cloud technologies has revolutionized data storage, accessibility, and collaboration, fostering a more agile and interconnected manufacturing ecosystem. These technological advancements collectively signify a paradigm shift in the Indian manufacturing sector, positioning it at the forefront of innovation and efficiency on the global stage.

How is Tata Technologies supporting the manufacturing industry's journey towards digital manufacturing?

Tata Technologies is a driving force in the manufacturing industry's transition to digital manufacturing. At our dedicated lab, we have established a state-of-the-art setup emulating a modern factory, employing advanced technologies like cloud computing, augmented reality/virtual reality (AR/VR), data science, and the Internet of Things (IoT). As parts move along the conveyor belt, they undergo real-time machine inspections for dimensions, shape, defects, colour, and overall condition. This tech-integrated environment allows us to automate quality control during production. This not only enhances the efficiency of our production processes but also serves as a showcase of our commitment to embracing Industry 4.0 technologies.

Moreover, our commitment extends beyond our lab initiatives. We actively collaborate with industry peers, research institutions, and technology providers to create a dynamic network for knowledge exchange and innovation. By investing significantly in skill development programs, we ensure that our workforce is well-equipped to navigate the challenges and opportunities presented by the digital transformation. This strategic approach, coupled with our advocacy for a supportive regulatory environment, positions us at the forefront of contributing to the industry's profound digital evolution in India.

What are the emerging trends in the automation and digital manufacturing space?

In automation and digital manufacturing, trends include a shift to edge computing for real-time decision-making, the integration of 5G for enhanced connectivity, and increased use of AI and ML for predictive maintenance. Digital twins are gaining ground for simulation and optimization, while collaborative robots (Cobots) work alongside humans to boost efficiency. Blockchain secures supply chains, and AR/VR technologies enhance training. Sustainability is a key focus, along with advancements in 3D printing, cybersecurity measures, and resilient supply chains.

Human-machine collaboration is evolving, and the industry is adapting to an ever-changing regulatory landscape.

What kinds of new opportunities are you looking to tap as digital manufacturing grows in India?

As we witness the evolution of digital manufacturing, our strategic focus centers on exploring opportunities within smart manufacturing. Emphasizing simplicity and cutting-edge advancements, our primary thrust involves harnessing the potential of the Internet of Things (IoT) to gather real-time data. This initiative aims to optimise processes, predict maintenance requirements, and enable data-driven decision-making for enhanced operational efficiency.

Additionally, we are enthusiastic about the integration of collaborative robots (Cobots), as valuable contributors to our factory floor. Operating seamlessly alongside our human workforce, these collaborative technologies enhance safety and efficiency. Furthermore, Unified Network Systems (UNS) play a pivotal role in our vision, ensuring seamless communication among all devices. By prioritising these opportunities, we are not merely adapting to technological trends but proactively shaping the trajectory of manufacturing in India, positioning ourselves at the forefront of innovation and efficiency.

How important will digital manufacturing be for India to become a $1 trillion manufacturing economy?

Digital manufacturing holds pivotal significance in India's quest to achieve a $1 trillion manufacturing economy. Currently, manufacturing contributes approximately 16 per cent to the overall economic output. To attain the $1 trillion milestone, a strategic imperative involves elevating this contribution substantially, aiming for a target of around 25 per cent.

Digital manufacturing emerges as a critical enabler in this trajectory. It enhances operational efficiency, facilitates innovation, and bolsters adaptability to evolving market demands. This technological shift is not just advantageous; it's imperative for propelling India's manufacturing sector into a higher echelon of productivity, job creation, and global competitiveness. Embracing digital manufacturing is, therefore, not merely an option; it is a transformative strategy essential for realising India's ambitions in the manufacturing domain. IPF

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NEWS SNIPPET

Andreas Maier Workholding offers Zero Point Clamping System

Andreas Maier Workholding Technology Pvt Ltd offers a wide range of clamping solutions including Zero Point Clamping System. The highly precise clamping modules with high draw-in, locking and holding forces ensure perfect clamping in the widest range of applications. It effortlessly changes workpieces/fixtures on CNC machines, reduces setup times to a fraction, and improve the overall workflow. Providing a highly reliable and repeatable clamping solution, it eliminates the need for manual adjustments and tedious setup procedures. When it comes to machining, precision is everything. Whether you're producing intricate components or large-scale parts/fixtures, this system ensures that tolerances are met with the utmost precision. One of the standout features of the AMF Zero Point Clamping System is its compatibility with a wide range of machine tools and workholding setups. Whether one has a 3-axis or 5-axis CNC machine, horizontal or vertical machining centers, this system seamlessly integrates into your existing setup.

Zero Point Clamping System is engineered with robust safety mechanisms. It ensures that workpieces are securely clamped during machining operations, minimizing the risk of accidents. Investing in the AMF Zero Point Clamping System is not just an upgrade; it's a strategic investment for the future. The substantial time savings, improved precision, and enhanced production capacity quickly translate into a significant return on investment.

Andreas Maier Workholding Technology Pvt Ltd is the subsidiary of AMF-Germany. Being at the forefront of the clamping industry over 100 years, AMF offers an extensive range of clamping products and solutions tailored to meet the diverse needs of modern manufacturing processes. AMF take pride in offering high-quality products that deliver precision, reliability, and durability, enabling the users to achieve superior results in production and maximise the operational efficiency by reduction of set-up times. IPF

For details, contact Andreas Maier Workholding Technology, Bengaluru, on Tel: +91 80 2323 8444; Email: amfindia@amf.de, or visit www.amf.de

"Automation also enables firms to employ sustainable practices"

Digital manufacturing has the potential to drive growth, enhance competitiveness, foster innovation, and create a sustainable and future-ready manufacturing ecosystem in the country. In this interview with Rakesh Rao, **Sameer Gandhi,** Managing Director, OMRON Automation, India, explains how advanced technologies are enabling a shift towards smart manufacturing and Industry 4.0 practices.

How are advanced technologies like robots/cobots, AI, ML, IoT, data analytics, cloud, etc, changing the manufacturing landscape in India?

The Indian manufacturing sector has been experiencing significant changes in recent years due to the advent of automation, artificial intelligence (AI), machine learning (ML), Internet of Things (IoT), data analytics, and cloud technologies. These advancements are shaping the industry and enabling a shift towards smart manufacturing and Industry 4.0 practices.

Some of the changes happening in the Indian manufacturing sector are:

Use of robotics: Automation has gained traction in Indian manufacturing, leading to improved productivity, efficiency, and quality. Robots are being used for repetitive tasks, while robotic arms and automated assembly lines are streamlining production processes.

Data analytics based decision-making: With the availability of vast amounts of data, Indian manufacturers are leveraging data analytics tools and techniques to gain insights and make data-driven decisions. Advanced analytics helps in identifying patterns, optimising processes, and improving overall operational performance.

Skilling and workforce transformation: The changing manufacturing landscape requires a skilled workforce to handle advanced technologies. Companies are investing in upskilling and reskilling programs to equip employees with the necessary skills to work with automation, AI, and other emerging technologies.

Improved product development: Advanced technologies have accelerated the product development process. Virtual prototyping, simulation, and digital twin technologies enable manufacturers to design and test products virtually, reducing time-to-market and development costs.

Predictive maintenance: IoT-enabled sensors and AI-powered analytics are being used to enable predictive maintenance for critical machines in real time. Thereby improving efficiency, reducing costs, and minimising disruptions.

Sustainability and energy efficiency: Manufacturers are increasingly focusing on sustainability and energy efficiency. IoT sensors and data analytics help monitor energy consumption, identify areas for optimisation, and reduce the environmental impact of manufacturing processes.

These changes indicate a shift towards a more connected, intelligent, and efficient manufacturing ecosystem in India, fostering competitiveness and growth in the sector.

How is your company supporting the manufacturing industry's journey towards digital manufacturing?

To cater to this need and growth opportunity, OMRON with its wide portfolio of automation solutions based on its "i-automation" concept is committed to help the manufacturing industry meet this challenge. The concept stands for "innovative-automation" which is OMRON's global manufacturing innovation direction based on three "i's"- "integrated", "intelligent" and "interactive" embodying three goals: "Digital engineering transformation", "Autonomation beyond human abilities," and "Advanced collaboration between people and machines" respectively.

Empowered with this, we strive to enable the makers with the right and customised automation solutions to increase productivity & quality, achieve more energy efficiency and also upskill the workforce with our training & education services so that they are able to make the most out of the new automation technologies. While our condition monitoring solutions and robotics portfolio come handy for achieving energy efficiency and productivity respectively, our i-BELT manufacturing site data utilization service streamlines the integrated

management of diverse data, to bring about further improvement on productivity and quality at manufacturing floors. This also impacts attainment of carbon neutrality- one of the prime imperatives for manufacturing businesses as explained above.

What steps is Omron taking to develop the Industry 4.0 ecosystem in India?

We believe in creating advanced collaboration between people and machines that allows people to maximise their potential.

OMRON aims to develop a new manufacturing ecosystem that allows people to maximise their potential and experience more growth and motivation by making superior harmonies between people and machines. For example, leaving the heavy labour and simple repetitive work to robots, machines support human proficiency & allow them to be more creative to pursue higher and better objectives.

What are key hurdles faced by companies while adopting automation/digitalization? Any tips to make adoption hassle-free?

One of the major challenges is its adoption by the micro, small and medium enterprises (MSMEs). They have a dire need for better levels for flexibility, quality and consistency, amidst challenges like limited scope of extension or modification of the shop floor space, shortage of skilled manpower, and meagre capital infusion capabilities.

Another hurdle for adoption of right automation solutions, especially in India, is the availability of a partner ecosystem. Many requirements are unique and need to be run like a small project. These require some mechanical additions or modifications on the customers' existing setup. While larger organisations may be able to run some of these projects on their own, MSMEs usually do not have the required skill set to execute such projects. This is where the role of system integrators (SIs) comes into the picture. They marry the robot/cobot with the required mechanical design and implement it at customer locations. While India has many such SIs, we require a substantial increase in their number. Although, given the availability of technological skill-sets and an entrepreneurial mindset, it is only a matter of time before this ecosystem develops rapidly.

Also, India is more known for its prowess in assembly manufacturing. It means a large number of components in the value chain are imported and not really manufactured here. And now, post COVID, the makers are looking out for ways to increase in-house manufacturing through automation rather than outsource it to other countries to minimise the global supply chain risks in the future. This rise in domestic value addition has to come from the MSMEs for which they have to adopt greater measures of technology and digitization.

What are the emerging trends in the automation and digital manufacturing space?

Some of the most promising and emerging technologies in the Indian automation and manufacturing space are data visualisation, robotics and machine vision inspection. While large amounts of data are available on the shopfloor – especially in automation systems – traditionally not much has been done to visualise and make this data actionable. To achieve this, it requires not just software to visualise, but also a complete integrated architecture to gather the data and push it to the cloud layer in real time. Such an architecture may include IO links and smart sensors, connected with PLCs that can push data directly to the ERP layer.

While the concept of robotics has become popular in the Indian manufacturing, however, the adoption pace needs to be much faster for it to make a bigger impact on Indian manufacturing productivity. We need to look beyond simple RoI calculations based on labour saving to also include quality and long-term efficiency improvements. Unlike robotics, machine vision is much more widely adopted in the Indian manufacturing sector, but more advantage can be derived especially from PC based GigE cameras besides the traditional smart cameras and linking the data to PLCs to achieve traceability across the entire supply chain.

What kinds of new opportunities are you looking to tap as digital manufacturing grows in India?

Industrial automation technologies that help in making companies take data-driven predictive maintenance decisions and also become more sustainable are some of the opportunities. Both are achievable by deploying the right automation applications that help in optimising production processes, reducing waste and emissions, and improving energy efficiency.

OMRON's i- BELT technology enables digital transformation of the plant which supports businesses to gain valuable data-driven insights into their operations, such as identifying bottlenecks, optimising workflows, and improving overall efficiency. By streamlining operations and eliminating inefficiencies, technology helps organisations make better use of their resources and reduce waste. This technology also focuses on energy efficiency by monitoring power consumption and providing insights into optimising overall plant system configuration. By fine-tuning these parameters, the technology helps minimise energy waste. This leads to reduced energy consumption, lower operational costs, a smaller environmental footprint, proactive maintenance, and ensuring compliance with environmental standards.

Additionally, automation has the capabilities to enable companies to implement sustainable practices such as utilising renewable energy sources and further reducing their carbon footprint.

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“SMEs should leverage technology like cobots to propel their business”

An industry pioneer since 30 years, **Anuj Bihani,** Director of Alstrut India Pvt Ltd, has been a catalyst for many companies in introducing numerous technologies to them. Alstrut is focused on providing automation solution to various industries in manufacturing sector. In a partnership with Denmark-based Universal Robot, the company has leveraged the robotics and automation for the SMEs and other manufacturers in India. In this interview with Ayushi Khandelwal, he shares insights on the importance of digital manufacturing for the country.

Kindly brief us about your company. How is your company serving the industry in its journey towards “digital manufacturing”?

Alstrut, headquartered in Chennai, is an Indian company specialising in automation and material handling solutions for various manufacturing sectors. Our expertise spans diverse verticals, including automobiles, auto components, electrical, electronics, FMCG, food, and pharmaceuticals. We offer comprehensive turnkey automation solutions and have established a successful seven-year partnership with Denmark-based Universal Robots, a leading collaborative robot manufacturer. In India, we have emerged as a prominent collaborative robot provider.

Our primary objective is to assist Indian manufacturers in effectively implementing automation solutions and collaborative robotic technologies. We strive to simplify the deployment process, making it more accessible and seamless. By doing so, we aim to contribute significantly to the growth of the Indian manufacturing industry.

How has the manufacturing sector evolved over the years with respect to digital manufacturing?

Over the years, there has been a huge transition happened in the automation sector. I vividly recall the early days of my journey, where our efforts involved meeting customers and explaining basic concepts such as sensors. Selling even these fundamental products used to be time-consuming. However, as time passed, we observed a rapid adoption of technology among customers. Advanced technologies like vision systems, vision centers, and laser marking emerged, and we are currently in the process of integrating them with collaborative robots. Initially, every new technology faced some skepticism. However, as people became more familiar with these advancements, their apprehensions started to fade away. We have played a pioneering role in introducing numerous technologies to India.

How do you see the current status of the Indian manufacturing sector?

Digital manufacturing encompasses technologies like IoT, AI, and automation, among others. These innovations are more widely embraced in developed nations such as the United States, Germany, and Japan, owing to their well-established manufacturing infrastructure. In India, there have been significant initiatives like "Make in India" aimed at promoting digital manufacturing. There are quite a few companies in automobile, oil and gas, pharmaceutical etc, which have taken the leap on Industry 4.0 and digital manufacturing, enabling them to compete effectively in the global market.

With India emerging as a major sourcing hub for engineering goods, how important will it be for Indian companies to adopt digital/ automated solutions for manufacturing?

I think it is going to be extremely important, and companies are realising this. They are making strides towards this way to be able to compete at the global level. The adoption of digital manufacturing is imperative for enhancing efficiency, reducing costs, and improving product quality. Companies today need to stay agile and adapt to evolving trends. In the current landscape, the focus has shifted beyond traditional metrics such as efficiency, productivity, and cost reduction. Post-Covid, new parameters such as sustainability, resilience, and adaptability to uncertain situations have gained prominence. For instance, companies that previously relied heavily on a labour force are now investing in automation to ensure

continuous operation, even in the absence of human workers. This transformation is reshaping the business landscape, emphasising the importance of digital manufacturing for analytics and flexibility, enabling businesses to navigate these changes effectively.

There a blurring line between hardware and software in the engineering space because of the automation? How would you comment on it?

I think there are two perspectives on this. One is from the vendors's perspective who acquires these technologies for their respective companies, and the second from the users' perspective. From the user's point of view, there is a continuous need for them to have a comprehensive understanding of products across the entire spectrum, encompassing both hardware and software. It is crucial for users to witness how these two elements that how the hardware and software handshake together and can give them the desired results. But from vendors point of view, we can classify them on different kinds of companies.
Some may be substantial multinational corporations that have a presence in both hardware and software domains. Meanwhile, there are likely smaller companies that remain predominantly hardware-focused. They have got a play in both areas and there is space for both types of vendors to co-exist, probably collaborating with each other to be able to add value for customers. It is not possible for the hardware part of automation to be completely eliminated.

Are there low-cost entry routes into digitalisation for SMEs and MSMEs?

I think low cost and high costs are just a matter of perception for each person. What matters more, in my opinion, is the willingness to explore and embrace the world of robotics and automation while taking a crucial step forward to understand and experience this realm. The concept of low or high costs becomes irrelevant as long as individuals can reap returns on their investments. However, one can never ascertain these returns without actively participating in the field.
The real question to ponder is whether one is ready for this technological revolution today or if the need will arise in the future, say, after three years. In my estimation, the demand for such technologies will become ubiquitous in the next few years. Moreover, in the ongoing debate between larger corporations with substantial capital and smaller enterprises, I would say that being small has got a very different kind of advantages. A large company has bureaucratic hurdles often hinder the seamless deployment of technology on the required scale. Conversely, small and medium-sized enterprises (SMEs) have the advantage of a more streamlined decision-making process. The owners of these businesses play a pivotal role in making decisions, without the complexities of extensive management layers. The driving forces behind automation differ for SMEs, and I believe they should leverage user-friendly technologies like collaborative robots to propel their businesses forward.

How is your company supporting SMEs' needs?

Collaborative robotics, although a relatively new technology, has been in India for 6-7 years. It is designed for easy adoption by SMEs, and we have a proven track record in this regard. We are the gold distributor of Universal Robots in India and have distributed over 300-350 cobots in the past six years. Interestingly, a large portion of these cobots has been deployed in small and medium-sized enterprises (SMEs) rather than large companies. The reason behind this trend lies in the challenges faced by larger companies, especially those dealing with extensive ERP systems. Implementing such technologies demands substantial infrastructure and time investment. Companies have to consider factors like server setup, infrastructure requirements, payment for technicians and software engineers for necessary modifications. This complexity often deters companies from taking the leap into advanced technologies. SMEs, however, tend to opt for smaller, manageable solutions where risks are lower even if they face failures. On a very similar note, collaborative robots are user-friendly, akin to smartphones. They are intuitive and easy to program, allowing users to adapt quickly without extensive technical knowledge. This simplicity enables businesses to swiftly redeploy the cobots for various applications without external assistance.

We actively support our customers by providing comprehensive training sessions. Through our training setup, we ensure that our customers gain confidence in handling the technology independently. We also offer demonstrations to familiarise them with the concept and its applications. These efforts contribute to preparing businesses for embracing collaborative robotics technology effectively.

What are your future growth plans?

Definitely we are looking at growing but, growth for me is not just about the revenue but also about making a difference. We are constantly trying to see how can we take our technology to manufacturing companies and help them improve their processes. Two years back, we set up a separate entity named Impaqt Robotics which is a product company mainly focusing on providing our customers a support in integrating robots with their operations. I take a lot of pride in the company and the way we are working on accelerating the deployment of robots. It is a one-of-its-kind in India and we also won the Red Dot Design Award and Red Dot Innovative Product Award in 2023 for our in-house designed and manufactured products, pneumagiQ PQ180 and pneumagiQ PQ90 respectively.

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"Unmanned manufacturing operation is reality now"

Established in 1984, Avcon Systems Pvt Ltd is one of the oldest material handling solution providers in the country. To meet the growing requirements of its customers, the company is expanding its production capacity by 100 per cent. In this interview, **Aniket Sawarkar,** CEO, Avcon Systems Pvt Ltd, highlights the importance of adopting the right material handling equipment (MHE) for improving efficiency and productivity.

How is Avcon Systems serving the manufacturing industry's requirements?

Avcon is providing material handling solutions to practically all industry verticals for more than 40 years. We handhold our customers for selecting correct material handling equipment with storage system to maximise operational output in intra-logistic applications.

How are you helping your customers to improve their productivity and efficiency, and maintain their competitiveness?

Every customer has unique process designed suitable to their product and production targets we understand the same and offer customised solutions for improvement resulting in increased efficiency.

What kinds of new features (hardware or software) are you adding for offering innovative products/solutions? Any recent example, you would like to share with us?

We believe in continuous improvement in our products with improved features being evaluated every month taking customer feedback and all levels. Recently, we have migrated to improved AC motor technology for our drives which is developed locally to reduce import dependency and improved serviceability.

What kinds of changes are you seeing in the manufacturing sector due to new technologies (hardware as well as software/digitalisation)?

Unmanned manufacturing operation, which was a theoretical concept few years ago, is well executed reality now. Safety is considered highest priority in every organisation currently with reduction in human efforts and deskilling for standardisation in process is observed in every manufacturing sector.

With India emerging as a major sourcing hub for engineering goods, how important will it be for Indian companies to adopt digital/automated solutions for manufacturing?

We have to accept the concept of automation and up-gradation of technology to emerge top source for engineering goods. With tight time lines for manufacturing, it is need of an hour to migrate from manual process to digital/automated process to maintain standardisation and records for duplication of same process in future.

"Digital Manufacturing" is a buzzword across the industries. What kinds of business opportunities it presents to your company?

There is a huge scope in Indian industry for digital manufacturing to meet ever growing consumption of products by the domestic market itself. Digital manufacturing provides clear roadmap for capacity and optimisation of resources by reducing wastage of funds as well as resources for production. MHE (material handling industry) will become one of biggest industries in coming era to meet global requirement of manufacturing and storage for raw material as well as finished goods.

How do you intend to take your growth plans forward?

In couple of months, we will be relocating to a bigger manufacturing location with production capacity increased by 100 per cent of existing capacity. We are in constant up-gradation of new product offerings and will soon come up with a customised solution offering software for enhanced customer experience in selection of equipment.

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“Our PVD coatings are eco-friendly, comply with standards”

Surface Modification Technologies deliver surface enhancement solutions using Physical Vapor Deposition (PVD) coating processes customised to individual requirements. In this interview **Dr Umesh Mhatre,** Managing Director, Surface Modification Technologies Pvt Ltd tells more about the PVD coating and its significance in increase the lifespan of components and tools.

Kindly brief us about Surface Modification Technologies (SMT). How is SMT serving the industry?

Surface Modification Technologies Pvt Ltd (SMTPL) involved in the services of range of techniques and processes used to alter the surface properties of materials while leaving their bulk properties unchanged. Our expertise in Physical Vapor Deposition Technologies (PVD) lead to improvements in various material properties, including surface hardness, lubricity, adhesion, electrical conductivity and resistance to wear, corrosion, and environmental factors. This in turn, can result in longer-lasting, higher-performing and more cost-effective materials and components. These technologies play a crucial role in various industries and serve a multitude of purposes.

SMTPL serving the industry by offering a wide range of coating solutions that enhance the performance, durability and functionality of various materials and components. These coatings have applications in multiple sectors, from aerospace and automotive to biomedical, electronics, wearables, contributing to improved product quality, reduce maintenance cost and enhanced environmental sustainability.

To maintain competitiveness every company (including your customers) is aiming to improve productivity and efficiency. How are you helping your customers to achieve this objective?

PVD (Physical Vapor Deposition) coatings are known to play a significant role in helping users to improve productivity and efficiency in various industries around the world. SMT’s PVD coating services are also playing the same important role in Indian market. Our coatings significantly increase the lifespan of components and tools by improving their resistance to wear, corrosion, and other forms of degradation. This reduces the need for frequent replacements and maintenance, saving both time and resources for the customer. Furthermore, by increasing the efficiency and effectiveness of these tools and components, customers can reduce production times and costs while achieving better results. Our PVD coatings are environmentally friendly and comply with regulatory standards. This not only demonstrates a commitment to sustainability but can also lead to cost savings through reduced compliance-related expenses. Apart from PVD coating services, we provide 24x7 technical support and expertise to our customers, helping them choose the right coatings and optimise their application processes for maximum efficiency.

These advantages translate into cost savings, decreased downtime, and a competitive advantage in the market, all of which are critical for any company seeking to remain competitive in today's business landscape.

What kind of changes are you seeing in the surface engineering space due to new technologies (hardware as well as software/ digitalisation)?

New technologies have significantly transformed the surface engineering space, allowing for more precise, durable, and environmentally friendly coatings. These changes have a broad impact on multiple industries including manufacturing, automotive, aerospace, electronics, and more offering enhanced performance, reduced maintenance costs, and innovative applications. The use of nanomaterials in surface engineering has opened up new possibilities for creating coatings with exceptional properties. Nanocoating can enhance surface hardness, wear resistance, and provide unique functionalities, like superhydrophobic or self-cleaning surfaces. Smart coatings that can respond to external stimuli, such as temperature, humidity, or light, are being developed. These coatings have applications in sensors, smart textiles, and self-regulating surfaces.

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

Physical Vapor Deposition (PVD) coatings have a wide range of potential markets due to their process flexibility and ability to structure tailor-made coating architectures to enhance the properties of various materials. Automotive, aerospace and defence, medical devices, cutting tools, electronics, energy and renewable energy, optics, tooling and mould industry, packaging industry, decorative and architectural applications are some of the key markets for PVD coatings.

Several new trends were shaping the field of Physical Vapor Deposition (PVD) technology. As with any industry, it is a continuous process. Several noteworthy developments are already in play with noticeable impacts in various industries. For example, the use of nanomaterials in PVD coatings to create ultrathin and high-performance coatings with exceptional properties has shown great potential in biomedical sector. Such coatings can very effectively produce coatings that offer specific functionalities like anti-microbial, self-healing, and anti-fouling properties for various Bio-medical applications. Moreover, combining PVD with other coating techniques like CVD (Chemical Vapor Deposition) to create advanced hybrid coatings with enhanced properties is being very effectively practiced. Despite their rapid advancement, PVD technologies have not lost sight of the importance of the environment. They are increasingly focusing on eco-friendly and low-VOC coatings to address environmental concerns. Improving the speed and efficiency of PVD processes for mass production of these coatings is also being focused. Along with this, development of new materials, such as superalloys and composite coatings, for high-performance and specialised applications is also a part of new trends in PVD market. Advancements in deposition techniques, including dual-magnetron sputtering, high-power impulse magnetron sputtering (HIPIMS), and arc evaporation, offering improved coating quality and properties is rapidly growing.

With India emerging as a major sourcing hub for engineering goods, how important will it be for Indian companies to adopt the latest manufacturing technologies?

Do Indian industries have another option? I don't think so. Today, India's combination of cost-competitiveness, a skilled workforce, a favourable regulatory environment, and its strategic location has made it an increasingly attractive sourcing hub for Western companies across a wide range of industries. This trend is likely to continue as India continues to develop its business ecosystem and enhance its position in the global marketplace. However, this cannot be an option unless global quality standards are maintained. Therefore, in the context of India emerging as a major sourcing hub for engineering goods, adoption of the latest manufacturing technologies is not only important but also essential for Indian companies aspiring to become major sourcing hubs for engineering goods. It enables them to meet global quality and efficiency expectations at an affordable cost, attracting international customers and expanding their global presence.

What steps are you taking to make your products/solutions "smart", "intelligent", etc? Any recent example, you would like to share with us?

We are taking several steps as a PVD coating company to make our products (PVD coatings) and solutions "smart" or "intelligent." First and foremost, we intend to completely automate our coating processes. Such automation plays a pivotal role on our shop floor by enhancing efficiency, quality, standardisation, and safety. It is a transformative force in modern manufacturing, enabling us to stay competitive, reduce operational costs, and adapt to changing market conditions. Being a service industry, our response to our customer is the most prime factor. Automation allows for rapid adjustments in production based on changes in demand or market trends. This agility is essential for us to stay competitive and responsive to customer needs. We are investing in advances high-resolution imaging, microscopy, and characterisation techniques for coatings, ensuring quality control and in-depth analysis of coatings at the micro and nanoscale. We are also in the process of implementing Enterprise Resource Planning (ERP) systems that play a significant role in our operations. ERP will help us centralising and automating our processes, improve visibility, enhance customer relationships, and ensure regulatory compliance, ultimately contributing to increased productivity and profitability.

What are your future growth plans?

As we advance with cutting-edge PVD technologies, we are focusing on well-balanced and strategically designed growth path, considering both short-term and long-term objectives. Our plans are guided by a clear vision and mission of the company and regularly reviewed and adjusted based on market dynamics and emerging opportunities. We intend to increase our market presence, increase profitability, and remain competitive in the long term. We are investing in additional PVD coating equipment and facilities to meet increased demand. Geographic expansions are planned, particularly in the north, east, and west of India.

Our New business Development cell is continuously engaged in exploring new markets or industries where PVD coatings can be applied. Strategic alliances are currently under discussion with global technology leaders. IPF

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"India is in process of transitioning towards adopting automation"

Test and measurement (T&M) equipment form an integral part of various industrial sectors as these devices are used throughout different stages of a product's life cycle. WIKA, a leading global player in pressure and temperature measurement segment, offer a diverse range of IoT-enabled smart instruments and sensors. In this interview with Rakesh Rao, **Ankit Jain,** IT Head, WIKA India, explains how these AI-integrated solutions contribute to creating a 'smart' manufacturing ecosystem.

Which IT/automation tools (like AI, ML, IoT, data analytics, cloud, robots/cobots, etc) have witnessed increased usage in the manufacturing facilities in India in the last few years?

India has experienced a huge surge in the adoption and integration of various IT and automation tools within manufacturing facilities. In particular, artificial intelligence (AI) has witnessed extensive adoption in the manufacturing sector. According to the market research company Statista, the AI market in India is currently valued at $ 4.11 billion and is expected to grow at a CAGR of 19.99 per cent to reach a market size of $14.72 billion by 2030.

AI technologies including predictive maintenance, quality control, supply chain optimisation and production planning, have been embraced by the industry to enhance efficiency and decision-making. Furthermore, data analytics has played a crucial role in extracting valuable insights from manufacturing databases, optimising operations, enabling predictive maintenance, and improving product quality.

Predictive maintenance helps anticipate machinery breakdowns, reducing unplanned downtime and enhancing productivity, while quality control mechanisms have significantly improved accuracy and efficiency in identifying defects, leading to higher-quality end products.

All this has not just revolutionised the Indian manufacturing industry but has also paved the way for future technologies like autonomous systems and smart factories to harness the potential of AI technologies in India.

How are you leveraging digital manufacturing tools to improve productivity and efficiency at your facilities?

Test and measurement equipment form an integral part of various industrial sectors. These devices are used throughout different stages of a product's life cycle. WIKA has leveraged these advanced sensors by offering a diverse range of IoT-enabled smart instruments and sensors. These instruments are seamlessly integrated with radio units, facilitating connectivity between WIKA and third-party measuring instruments through standard interfaces. These AI-integrated solutions also contribute to creating a 'smart' manufacturing ecosystem in the era of smart machines.

Furthermore, our devices are completely connected to manufacturing machines to monitor their availability, planned vs actual production and quality. Monitoring other critical parameters of the machine facilitates predictive maintenance and enhances overall equipment efficiency (OEE). Today, WIKA's IoT-enabled sensors are playing a vital role in achieving 85 per cent OEE, with an aim to reach 90 per cent.

What are the key hurdles faced by companies when they are planning to adopt automation/ digitalization?

India is still in the process of transitioning towards adopting automation. While many companies have adopted an enthusiastic approach to adopting these technologies, several others are still taking measured strides. These companies often encounter hurdles in the areas of:

- **Employee buy-in/resistance to change**: One significant challenge is gaining employee support or countering their resistance to change. At times, resistance arises due to employees accustomed to traditional methods, being overwhelmed by new technologies and the fear of job displacement.
- **Lack of time, budget and trained resources**: For the implementation of automation and

digitalization, companies require adequate time, financial resources and a strong pool of trained personnel. However, many companies struggle with limited budgets, tight schedules and a shortage of skilled individuals to manage and implement these technologies effectively bringing more roadblocks and unsatisfactory results post-implementation.

- **Alignment with the vision of the organisation**: Changing business dynamics calls for revisions in the organisational modus operandi. Instead of making automation and digitalization a mechanical move, they should be made to align with the organisation's broader vision and objectives. Lack of alignment can lead to incoherent efforts, wasted resources and an ineffective implementation strategy.

To facilitate a smoother adoption process and a hassle-free transformation, companies should focus on continuous communication with the employees and top management explaining the advantages of digital transformation. Investing in training and awareness programs can alleviate concerns and prepare them for the transition. The companies can also initiate the transition with smaller-scale pilot projects to demonstrate the benefits of automation, allowing employees to experience the positive impact firsthand. This can then be gradually scaled up for a complete transition. Companies need to strategically address these challenges and navigate the organisation toward seamless integration.

What steps are you taking to make your products/solutions "smart", "intelligent", etc? Any recent example, you would like to share with us?

Most industries are moving towards incorporating smart electronics into their operations. WIKA has always been future-ready with IoT-enabled instrumentation products and solutions that align with the industry trend. The global instrumentation giant has a road map in place to manufacture IoT-enabled automated solutions throughout the value chain, covering pressure, temperature, level, flow and force solutions. They set a standard of excellence in every operation. To align our products globally and make them 'smart' and 'intelligent', WIKA has a robust and centralised Research & Development Centre in Klingenberg, Germany. The centre vehemently works to incorporate the company's dynamism and innovation potential in every product WIKA offers. Our smart instrumentation solutions are further customized are tailored to meet the unique requirements of various industries.

How is the automation and digital manufacturing space changing?

Several transformative trends are shaping the automation and digital manufacturing industry, revolutionising the way businesses operate. Some of these trends include:

- **Artificial Intelligence**: AI is at the forefront of digital transformation, enabling machines to learn from data, adapt to new inputs and make decisions autonomously for tasks that traditionally required human intelligence. It has also enhanced predictive maintenance, process optimisation and quality control in every operation.
- **Advanced Robotics**: Many companies are incorporating advanced robotics in their operations. These sophisticated, agile and collaborative robots can handle complex tasks with precision, improving efficiency, productivity and safety in manufacturing processes.
- **Industrial Internet of Things**: IIoT interconnects devices and sensors, facilitating real-time data collection and analysis. This connectivity optimises production, reduces downtime and enhances overall operational efficiency.
- **Edge & Cloud Computing**: Edge computing processes data locally on devices, minimizes latency and enhances real-time decision-making. Cloud computing, on the other hand, provides extensive storage and computational power for data analysis and long-term insights.
- **Cybersecurity**: Increased digitalization and interconnected devices make robust cybersecurity essential to protect sensitive data and systems from cyber threats, ultimately maintaining the integrity and confidentiality of operations.
- **Digitalization and Industry 4.0/5.0**: As industries are moving from Industry 4.0 to 5.0, the digital technologies of AI, IoT and data analytics are further enhanced for optimised manufacturing processes, supply chain management and customer engagement through data-driven insights and automation.
- **3D Printing**: 3D printing, or additive manufacturing, is an area that is gaining prominence for rapid prototyping, customization and cost-effective production. It allows intricate designs and reduces waste by using only the necessary materials.
- **Sustainable Manufacturing**: Most manufacturers are putting an additional focus on eco-friendly practices, energy efficiency, waste reduction and circular economy principles to reduce their environmental impact and contribute to a greener future. Automated and smart solutions are playing a pivotal role in enhancing these criteria.

All these trends are collectively driving the transformation of the automation and digital manufacturing landscape, offering increased efficiency, sustainability and innovation to the industry.

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Delta banks on growth of 5G applications and energy solutions

With strong research capabilities, a sound future path to be followed and over 60 per cent market share in power solutions for the telecom sector, Delta India aspires to become the most prominent energy management company in the Indian telecom space, writes E Jayashree Kurup.

When India launched 5G telecom services in October 2022, there wasn't much of a splash in the marketplace. However, for those providing power services to the telecom sector, it suddenly opened up a whole new area of growth. In fact, telecom operators like Reliance and Airtel, and power solutions suppliers such as Delta Electronics India Pvt Ltd, have been in overdrive to prepare for the upcoming changes.

"We are fully prepared to deploy 5G rapidly in the country," explained **Rajesh Kaushal, Vice President at Delta Electronics India**. But since the 2022 launch of 5G, "In the last year alone, approximately 315,000 base transceiver stations (BTS) have been installed in the country. About 100,000 new telecom sites have emerged, approximately 50,000 small cell sites have been established, and tens of thousands of kilometers of fiber have been deployed in the country. Numerous H data centers, telecom, and data centers have sprung up to cater to the data needs of these telecom networks. Around 300,000 sites would have been upgraded to handle the additional 5G load," he added. With a 60 percent market share in telecom power electronics, he knows what he's talking about.

The addition of 5G BTSs has been made to the existing infrastructure, thanks to the site-sharing concept. One tower can host multiple operators and multiple BTSs. "The load on our equipment, or the switch mode power supply (SMPS) on our power or commercial equipment, has increased." Kaushal sees this as a significant opportunity in the marketplace and believes that with the advent of 5G, everyone in the infrastructure or equipment space has opportunities for growth.

Within the next five to six months, the reach required for 5G will certainly be achieved. Reliance has largely achieved it, and in the next 3-6 months, Airtel is expected to achieve significant reach nationwide. By March 2024, Kaushal believes that these two operators would have achieved nationwide 5G coverage. But reach is just the first step. This must lead to another wave of growth, which will come through the addition of capacity to these networks.

One of the major reasons for this, according to Kaushal, is that "in our country, we don't yet have the 5G applications for which the system was designed. Even today, the majority of subscribers on the 5G network primarily use it for voice and data. However, the real applications of 5G are those that can't be accommodated by 4G. Very data-intensive applications - like gaming, autonomous cars, remote surgery, industry 4.0, or IoT applications allowing various devices to communicate with each other in the industrial environment - need to reach critical mass. This would enable every machine to become a radiating point for applications. These applications are emerging, and developers in the ecosystem are still evolving. We expect that in the next two to three years, all these applications will eventually emerge, and once they do, 5G will find its true worth." With the need will come capacity enhancement as well.

This entire segment is serviced through data center telecom products and solutions. Today, the total installed base in this segment is estimated to be in the range of 250-300 Megawatts, a significant presence in this industry. Another part of this business is the UPS group, which caters to various backup applications in areas such as industry, manufacturing, transportation, BFSI, and IT. The India unit takes care of the SAARC region, which includes India, Bangladesh, Nepal, and Sri Lanka.

The ICT unit currently generates revenue of approximately $200 million within Delta and anticipates about 10 percent double-digit growth year-over-year in this business. The primary growth is driven by telecom power, followed by data center solutions.

Telecom power is closely associated with investments in new technologies. "We are leading this growth, especially in the infrastructure provider segment because

"All major power and operator companies depend on us to support their infrastructure growth. We have gained market share in the past year and a half to two years because of this opportunity."

Rajesh Kaushal, VP, Delta Electronics India

we have about 60 percent market share in telecom," says Kaushal. "All major power and operator companies depend on us to support their infrastructure growth. We have gained market share in the past year and a half to two years because of this opportunity." The telecom power space is not very crowded, with only four or five active players.

Today, companies are trying to attract customers based on their presence and reach, but there are few real applications behind this. Once real applications become a business case in the marketplace, there will be another wave of expansion where more towers will be needed. Data centers will require more sites to handle the load of low-latency applications. Data must be shared quickly, so computing and storage must be located very close to the application. For example, in a hospital where a remote surgery application is taking place, data management would need to be extremely close to the application. "Besides data centers near the applications, they also need towers to ensure continuous transmission," explains Kaushal. He anticipates penetration of fiber and data centers, as well as the densification of telecom networks, to be important steps toward achieving optimal 5G applications.

Research & development

Preparing for this growth requires meticulous research. "Delta, as a corporation, places a strong emphasis on innovation and R&D. Almost 7 percent of revenue is invested back into R&D. India is one of the R&D hubs, located in Bangalore, catering to low power R&D and Megawatt Power. In India, we support domestic and global businesses for their R&D needs. We have approximately 400 R&D engineers from elite institutions like IITs, IIsc, and premier NITs. Most of them hold Masters or PhDs. The plan is to have around 2,000 R&D engineers in the next two to three years, and we have already developed the infrastructure. We have a corporate office and R&D center in Bangalore, which was recently inaugurated," adds Kaushal.

India R&D specialises in telecom power, data center solutions, EV charging solutions, industrial automation, and software and firmware to support power electronics applications. Low power R&D focuses on quality control products on a megawatt scale for railways and industrial applications. High power R&D concentrates on renewable solutions such as solar inverters, high-capacity EV charging infrastructure, energy storage, and power conversion solutions.

Future prospects

Delta's direction is clear as a company. Kaushal elaborates, "We are focusing heavily on data centers. We are taking the right steps to become a data center leader in the coming years. We will certainly lead the telecom space as that is our most important business. The third area where we are growing rapidly is industrial automation. We have various solutions for energy management and automation. In the next 2-3 years, we will be a strong force in the EV charging infrastructure space. We have a significant presence in this area, as we are the world's number one company in power electronics. And from that foundation, we can build on EV charging infrastructure, becoming one of the prominent players in the industry. We will be a major partner in the industry for storage solutions like lithium-ion batteries, which will be a game-changing solution for us as all the solutions we are focusing on are dependent on power storage as well."

With a goal to become one of the most prominent companies in the energy management space, Delta is in a growth phase. Its offerings are not industry-specific, and it operates in multiple industry verticals. Today, multiple business groups in the organization cater to these verticals. The aim is to have a complete portfolio of solutions to help Delta emerge as a prominent energy management company.

E Jayashree Kurup is Director at Wordmeister Editorial Services and Senior Editor of ASAPP Media IPF

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Continental strengthens expertise in mobile robotics

The company acquires KINEXON's special division for the on-board operating system "Brain" for autonomous control of transport robots in intralogistics.

Continental has acquired KINEXON's specialist division for on-board operating systems for the intelligent control of autonomous mobile robots (AMR), thereby strengthening its own position in the strategic growth field of mobile robotics. The core of the acquisition is the "Brain" on-board operating system developed for the precise and networked control of autonomous mobile transport robots, including the IP rights to this market-leading and proven solution. In addition, the division's highly qualified development team is moving from KINEXON to Continental. Through this acquisition, Continental is expanding its own depth of value creation, extending its robotics expertise in software and hardware, and thus strengthening its own range of customer solutions for mobile robots. This will enable the company to further accelerate the introduction of new functionalities and the expansion of its product portfolio within robotics for intralogistics. Both companies have agreed not to disclose the purchase price or further details of the transaction.

"With this acquisition, we are enlarging our global development team and strengthening our system expertise in mobile robotics. We can offer robust mobile robot solutions that are proven in operations since years. A one-stop shop for our customers. This step underlines our growth path for Continental Mobile Robots for a wide range of end markets," said Pierre Pomper, head of Continental Mobile Robots.

The successful partnership between KINEXON and Continental will continue after the acquisition of the on-board operating system "Brain" for autonomous driving robots. In the robotics sector, KINEXON will focus in the future on the fast-growing area of centralized control for autonomous driving robots and further expand its software for fleet management. Continental offers its customers this intelligent fleet management software as an option for controlling the AMRs. "To meet the trend as well as the increasing demand of our customers, we want to focus 100 percent on our solution in the field of fleet management. The sale of AMR's special division of on-board operating system for mobile robots 'Brain' helps us in this endeavor. We are proud to have developed a leading solution with 'Brain' and the team behind it. With this transaction, we are giving both a new home at Continental with promising prospects," said Dr Alexander Hüttenbrink, co-founder and co-CEO of KINEXON.

Continental now offers customers a first-class total solution for intralogistics from its own source that has been proven in operational use.

Continental offers its customers this intelligent fleet management software as an option for controlling the AMRs

Continental has announced its entry into the intralogistics AMR market in 2021. Building on its experience in the automotive sector, the technology company has developed its own industrial solution that simplifies logistical workflows. After an internal test phase at Continental production sites worldwide, the AMRs are available for external market entry with improved and new functions as well as handling of new use cases. A major advantage here is the simple implementation and smooth operation in warehouse and production.

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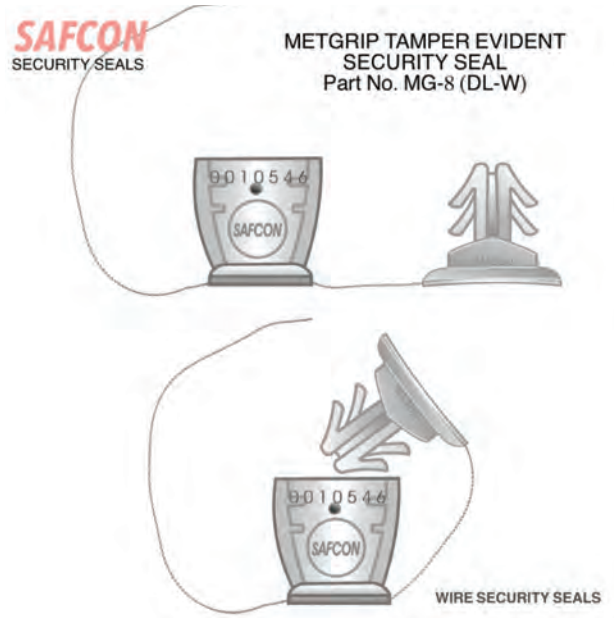
Right security seals used smartly can improve the cargo security

Seals are tamper-indicating devices used to detect and report unauthorised entry says Rajesh Kumar Banka while explaining the significance of seals in the industry.



Tamper Evident Transparent Wire Security Seals

The alarming increase in illegal, criminal and dishonest activities throughout the world means that more stringent and positive action is needed to protect the environment in which we live. This has led to the introduction of many "high-tech" products and systems, invariably expensive and often the target for sophisticated interference. Fortunately there are some practical forms of security, which are very simple, easy-to-use and offer an extremely cost effective form of protection. Safety requirements for transport and warehousing of goods have been continuously increasing over the last few years. Security Seals are the first step towards more safety.

Security seals play a vital role in national and international safeguards. Security seals, also known as tamper-indicating devices, are meant to leave unambiguous, non-erasable evidence of unauthorised access. Our experience and technical knowledge at Safcon has led to the development of a unique new range of most reliable security seals which offer a precise solution to many security and protection related problems. By combining the benefits of special materials and security features, together with a clear understanding of a customer's requirements, Safcon Security seal technology is unsurpassed.

The Safcon new range of security seals is simple-to-use, low cost and offers appropriate seals for every application. For example, our double lock container seal has been developed to provide highest security containers, trucks to substitute to ordinary bolt container seal. The double lock container seal is specifically designed for trucks, containers, vehicle doors, involved in transportation of raw materials and finished goods. It's carefully researched design double locking with anti-spin feature to prevent tampering. It includes a serial number and security ID on each of the two parts of the seal, which allows for the immediate identification of tampering. The most rugged and barrier metal Bolt container seals are impossible to remove without the aid of special 24" bolt cutter.

Another new from Safcon is cable seal, an inexpensive, weather resistant, high-security seal that requires no tools for installation. It is supplied with a break off screw to secure the cable seal. Standard seals are engraved with ID codes and sequential numbers to customer's own requirements. Cable Seals are available in, red, green, black, blue, silver and gold, with variable lengths of cable as per customers' specific requirements. Cable Seal is ideal for protecting food, chemicals, pharmaceuticals, petroleum, and wastes in transit, in plant and tank-truck valves. Cable Seals are flexible and can be used anywhere/everywhere.

Other effective locking devices included in the new range of seals are Ball-lok. Minitite, Padlock, Pull tight, Hasp-lok, fixed length, Anchor wire security seals, which are most reliable and very cost-effective to protect product packaging and industrial security.

The benefit of low-tech sealing

An International customer's remark was interesting and useful which I would like to share with you. "All the seal manufacturers are pretty good at coming up with snazzy devices, but many aren't appropriate to our needs. We don't need something that's labour intensive, because our labour's very expensive. We don't want all kinds of electronic doodads. It's like you needed to go around the corner in your car, and someone offered you a satellite guidance system. They're great device, I marvel at the technology, but we wouldn't use them."

Security personnel are a good investment. It's very important to have a person dedicated to security. Some of the largest companies don't have this. But even in a downsized security department that consists of "one guy with 15 jobs instead someone solely dedicated to security," it is still worthwhile to keep your eyes open.

Pull tite security seals for jumbo, cash, courier bags

When you pass one of your trucks, on occasions check to see what's on it. Remember that 80 percent of all cargo theft is employee-related; they're stealing it themselves or giving out the information to thieves. What's the pay-off for paying attention to the little stuff? So much theft could be prevented by following real simple procedures. Just follow the procedures and you'll eliminate half the crime.

Security Seals

1. Kept in secure place?
2. Adequate control and issuance? Is logbook maintained?
3. Check rail ramps - seals checked?
   Other ... Are broken seals disposed of properly?

Sealing systems and procedures for shippers and transportation companies

Seals are tamper-indicating devices used to detect and report unauthorised entry. They provide deterrent against, an indication of, tampering, pilferage and unauthorised entry. Once locked in position, seals cannot be removed except by destructive means and broken seals cannot be re-assembled or re-used. Unlike intrusion or burglar alarms, seals report unauthorised entry after the fact. They must be inspected to determine if unauthorised access has taken place. A seal does not need to physically resist entry and the purpose of a seal is to reveal evidence of entry. Customised Seals with serial numbering and company logo/name must be used to enhance security level.

An efficient security system not only requires well trained and trustworthy staff but also a highly reliable seal, manufactured by companies who are at the forefront in the fight against cargo tampering and who understand the continually evolving and ever more ingenious methods used by thieves to steal cargo. This calls for continuous cooperation and partnership between the end users and the manufacturers of security seals in order to achieve the desired result, that is, the total integrity of cargo in transit. The effectiveness of seals is strongly dependent on the proper protocols for using them. These protocols are the official and unofficial procedures used for seal procurement, storage, record keeping, installation, inspection, removal, disposal, reporting, interpreting findings, and training. With a good protocol, a modest seal can provide excellent security. On the other hand, a sophisticated seal used poorly may be worse than useless if naively trusted.

Our several years of experience in security seal business have led us to formulate some generic suggestions for optimizing the security and reliability of security seals. The following report is designed to educate a seal user in developing the correct systems and procedures in order to stop pilferage and theft.

Ordering and storage

Ordering: One person should only be responsible for buying the protective seals. All seal orders should originate from the head office or a pre-determined ordering location. The seal manufacturers should be instructed to ship the seals to a specific person's attention of either the head office or another designated location. In addition to consecutive numbering, the company name or initials should be embossed onto each seal to make it absolutely unique. Each terminal or transfer facility should be coded by number and/or color.

Storage: All seals and security devices should be kept in a controlled area in order to prevent unauthorised people from obtaining them for illegal use.

Outbound recording: Maintain one logbook for outbound seal recording and a separate log book for inbound seal recording. If the driver is not part of the shippers' organization, the goods inventory count and the seal application should be made in the presence of the shippers' representative. The driver will note on the bill of loading or on the shipping order the seal number and colour applied of the shippers' dock.

Application: In order to maintain control over your sealing system, all seals must be properly applied and checked by a security person. Select a proper seal based on destination, value and susceptibility to theft. A high security seal may be required. The following procedures for application should be used:

- Seal the side as well as the rear doors.
- Run the seal strap through the hasp, once. Seals wrapped through the hasp more than once become illegible.
- In order to ensure a positive seal, pull the seal strap and twist the section of the seal that was inserted into the locking mechanism.

Broken seals: Should it be necessary to break a seal before its arrival of the final destination, the following information should be recorded, especially at highway weigh stations:

- The name of the person breaking the seal.
- The reason for breaking the seal.
- The time and date the seal was broken.
- The serial number of the broken seal.
- The serial number of the replacement seal.
- The names of witnesses to the breaking of the seal.

The broken seal report must be filled with the terminal manager and/or the security officer of the

High security cable seals and tamper resistant security seals for tankers

outbound terminal, regardless of how far the driver is from the point of origin.

SEAL removal and inbound recording: In order to ensure the integrity of a seal before its removal, a physical check must be made. The following procedures for seal removal are recommended:

- Only authorised security personnel should remove seals.
- Enter in the in-bound seal log, the name, serial number and all coding information appearing on the seal. Be sure to verify that it is the original seal from the manifests.
- Compare the name, serial number and all coding information appearing on the seal with the corresponding shipping papers.
- Prior to removing the seal, ensure that it has not been shortened or falsely sealed. Check for strange marks and tampering.
- Security seals that are inspected visually should be examined with an identical seal held right alongside.Humans do not accurately remember details of exact color, size, surface texture, and patterns, but they are very proficient at visual side-by-side comparisons.
- Pull and twist the seal to the left and right to ensure that the seal head has not been violated.
- Any discrepancy should be reported to the person(s) assigned to accept such statements, as well as recorded in the in-bound seal log.
- All shipments received with a violated seal must be reported as noted in the previous section and re-sealed if additional transportation is required.
- Any evidence of theft should be reported to the security department and investigation begun, regardless of the hour.

Supplementary procedures: The following steps may be taken to reinforce the seal control program and discourage the would-be pilferers:

- Ensure that the fastening devices and hinges securing the door and the locking handles cannot be removed without violating the seal.
- Use color-coded seals to differentiate commodities, terminals, warehouses, plants, in-bound or out-bound shipments, and time periods.
- Use different colored seals for trailers returning with empty loads in order to prevent drivers from privately utilizing trailers on return trips and from transporting cargo without authority.
- Periodically change the seal colors to prevent usage of unauthorized old seals.
- Companies shipping a trailer load of merchandise within a local area making 2 to 7 stops may secure the trailer with a different colored seal after each stop.

High security seal locks: Conventional metal seals or plastic seals are not always effective. The development of heavy duty, self-locking and serially numbered cable seals or heavy metal Bolt Container Seal locks arose to provide physical security as well as seal integrity. The use of high security cable seal locks/heavy metal Bolt Container Seal are recommended for the following areas:

- High security shipments.
- Air, Water and ground transportation and intermodal shipments.
- International shipments.
- Shipping or storing in high crime areas or parked vehicles.

Either heavy-duty cable or bolt cutters are required to remove high security seal locks.

- The use of the cutting tools should be carefully controlled.
- Drivers should not be allowed to carry bolt cutters except for special occasions.

Security seals should be viewed as only one part of an overall security or verification program. In conclusion, it is advisable in the interest of the shippers and the transporters that a system should be immediately adopted for use of appropriate type and variety of the tamper evident and barrier security seals in warehouses and transportation of any cargo irrespective of value in all road transport, courier, train, ship, airfreight, truck, trailer, tractor, wagon cargos to combat with and to substantially reduce cargo theft, pilferage and adulteration. In choosing a seal, it is important to bear in mind that unit cost is not always the most decisive economic factor associated with using a seal, nor is cost necessarily well correlated with the level of security a seal can provide. It is important to choose the right seal with the reliable seal manufacturers.

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About the author:

Rajesh Kumar Banka is Managing Director of Safcon Seals Pvt Ltd, Calcutta and has two decade's experience in security seal business. Safcon is pioneer and leading manufacturers and exporters of High Performance Tamper indicating and Barrier Security Seals. He can be reached at rajesh@safcon.co.in.

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Role and impact of a technology company in modern world

Bangalore-based, VBR Technologies is a technology company playing a providing innovative and cutting-edge solutions to simplify and empower businesses across various sectors.

In the ever-evolving landscape of today's world with fast-paced life and digital-driven world, technology companies play a pivotal role in influencing the society and shaping the destiny of many people by driving innovation and transforming industries. These companies are the architects of digital era impacting the society significantly through innovation and research, economic growth, digital transformation, and connectivity and communication.

- Innovation and research: They constantly push the boundaries of what is possible by developing new technologies, software, and hardware. From artificial intelligence and machine learning to block chain and quantum computing, these companies drive the innovation that powers our future.
- Economic growth: Being economic powerhouses, they generate significant revenue and create jobs in various sectors, driving economic growth. As they grow and expand, they contribute to local and national economies, attracting talent and investments from around the world.
- Digital transformation: They enable the digital transformation of various industries. Sectors like healthcare, finance, transportation, and education have undergone significant changes due to technology companies. They facilitate efficiency, transparency, and accessibility in these sectors.
- Connectivity and communication: Through their products and services, technology companies foster global connectivity and communication. Social media, smartphones, and internet services connect people worldwide, transcending geographical boundaries and fostering collaboration.

Technology companies disrupt traditional industries by challenging conventional business models. The consequences lead to improved services with lower cost. These companies create jobs not only within their organisations, but also in related sectors, attracting talents from various fields. There are also challenges and dilemmas in the form of issues related to data privacy, artificial intelligence ethics and algorithm bias. Some tech giants wield significant global influence and can shape public discourse, influence political decisions, and affect international relations. However, responsibility and accountability will address these concerns eventually. As technology continues to evolve, the role of technology companies in our lives will only become more pronounced, making it crucial to monitor and assess their impact on society.

In this very context, VBR Technologies Private Limited (VBR Tech), a technology solutions company, has been at the forefront of providing innovative and cutting-edge solutions to simplify and empower businesses across various sectors.

Based out of Bangalore, VBR Technologies is driven by a passion to excel in the area of its competence to innovate and simplify factory automation. The company fosters a culture of innovation, to think outside the box

and develop Simple solutions to address real-world challenges.

Value added business ethos and client-centric work philosophy helps to understand the core customer requirements and deliver tailor-made solutions that meet and exceed expectations. VBR Tech operates with integrity and transparency in all its dealings, fostering trust with clients, partners, and employees. Continuous learning and skill development is a key requirement for business sustenance and continuity and this forms the key basis to stay abreast of the latest technological advancements.

Partnering with two specialist key industry players, Pro-face-A HMI Specialist and Control Techniques-A Drive Specialist, VBR Technologies specialises in crafting custom solutions to address specific Industry needs. VBR Technologies is proud to be associated with and caters to a diverse range of industry verticals, including, but not limited to automobile, food and beverages, MMM, textile, pharma, packaging, etc, and has foot prints not only across the length and breadth of the country, but also across the globe.

Founded in 1972, Pro-face is a part of the global automation giant Schneider Electric and is a pioneer in the field of intuitive HMI technology. It has been at the forefront of innovation, delivering top-notch touch based products from its wide product basket including Graphic HMIs, Control HMIs and Industrial PCs, that seamlessly bridge the gap between humans and machines with user-friendly, reliable, and efficient solutions. Multiple key features in terms of advanced graphics and visualisation to comprehend complex data, multi-touch technology, robust and durable design, remote connectivity empower businesses as industries progress and automation expands its footprint. Pro-face remains a trusted partner in revolutionising human-machine interaction.

Founded in 1973, Control Techniques is a part of Nidec Corporation and specialises in AC, DC and Servo Drives. These drives are used to control the speed and torque of electric motors, allowing for energy savings and precise control in various industrial and commercial applications. The drives support various communication protocols such as Modbus, Profibus, Ethernet, Profinet, Ethercat and more, facilitating easy integration into industrial automation systems. On-board PLC Functionality, Built-in EMI Filter, Multi-Protocol Connectivity, Menu driver easy parameterisation and five year product warranty are the key USPs of the products that instill unshakeable confidence in the customers on these rugged and reliable products.

Technology companies disrupt traditional industries by challenging conventional business models. The consequences lead to improved services with lower cost. These companies create jobs not only within their organisations, but also in related sectors, attracting talents from various fields. VBR Technologies, a technology solutions company, has been at the forefront of providing cutting-edge solutions to simplify and empower businesses across various sectors.

VBR Technologies has emerged as a reliable and innovative technology partner for businesses seeking digital transformation and cutting-edge solutions. The commitment to excellence, customer-centric approach, and dedication to staying at the forefront of technology have positioned them as a trailblazer in the tech industry. With a firmly placed footstep, and as technology continues to evolve, VBR Technologies remains committed to undoubtedly play a pivotal role in helping to shaping the future of businesses and industries through its pioneering innovations. IPF

For details contact VBR Technologies Private Limited, Tel: 91-87 22222 500, email: info@vbrtech.com

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New robot with igus linear guide taps beer in seconds

Festival season is in full swing. To keep the queues at the beer to reasonable lengths, One Two Beer GmbH has developed an automatic beer tap. Its core is a mobile tap head that moves to the bottom of the cup, which it fills in five seconds without foam-over - built with a lubrication-free, hygienic, durable lead screw from the igus dryspin series.

Festival season in Germany. Your favourite band is playing, a gentle breeze is blowing, the mood is great. All you need now is a cold beer. So off you go to the beer tent. However, a nasty surprise awaits you there: the queue is so long that you miss three songs. One Two Beer GmbH from Vienna would like to spare concert-goers this annoyance. Therefore, it has developed an automatic beer tap. Two plastic cups are placed side by side - much like a coffee machine. At the touch of a button, dispensing heads move to the bottom of each cup. The beer flows. Tapping from the bottom eliminates foam-over. The beer is tapped in just five seconds, so concert-goers don't have to wait long. Beer vendors enjoy machine support in times of labour shortages.

They wanted no lubrication

As simple and elegant as the beer robot may appear, building it was a technical challenge. "For tapping in a matter of seconds, one necessary item was a fast linear guide with as little friction as possible," says Tamás Kozma, Chief Information Officer at One Two Beer GmbH. The system needed to work to within a tenth of a millimetre. It needed to be as compact as possible to allow quick transport. And it had to be insensitive to the harsh festival environment, which includes dust, high temperatures and condensation. "Since our machine works in the food sector, a 100 per cent lubrication-free application with FDA conformity was also crucial for us." After a long search, the company's engineers finally came across igus, where they found a system that meets these requirements: a complete linear guide unit consisting of a compact dryspin-series lead screw and lead screw nut and a suitable stepper motor.

High-performance plastic and stainless steel allow hygienic, trouble-free dry operation

This is how the linear guide works: the tap is mounted on a flange lead screw nut from the dryspin JFRM series. When the NEMA 23 lead screw stepper motor rotates the lead screw, the tap moves up or down. The system is fairly simple. However, there are some special features: the lead screw nut is made of FDA-compliant high-performance plastic, a self-lubricating material that allows for low-friction dry operation. The advantage is obvious: unlike lubricated versions made of metal, the polymer nut will not become a dirt magnet due to lubricating grease. It is easy to clean with water or high pressure. The linear guide is hygienic, and its mechanical system works flawlessly. The pairing of plastic and stainless steel also prevents corrosion. As there is no need for relubrication, there is also no necessity for any maintenance.

Lead screw achieves an efficiency of 82 per cent

However, resistance to corrosion and dirt are not all that result in a long linear guide service life. igus has also enlarged the nut's thread edges by a factor of 1.3 for dryspin technology. The lead screw's thread pitch is also broader. Enlarged thread flanks mean more high-performance plastic for power transmission and thus more material that is tribologically optimised (that is, optimised for friction and wear). "This asymmetry has enabled us to extend service life to about 30 per cent longer than that of symmetrical trapezoidal threads", says Hendricks, Head of dryspin Lead Screw Drive Business Unit at igus. We have also flattened the flank angles of the lead screw nut and lead screw. "This gives us an efficiency of 82 per cent, which is above average."

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Schunk showcases linear direct axes with SLD series

SCHUNK is introducing a new generation of linear direct axes with the SLD series. The dynamic, heavy-duty axes with electric linear direct drive ensure short cycle times and more productivity in high-speed assembly and handling processes for the electronics manufacturing, e-mobility or life science sectors.

The SLD series was developed as a dynamic all-rounder that can meet the requirements for higher basic load ratings and a longer service life. At the same time, SCHUNK the automation expert is expanding its portfolio of linear direct axes with this series, and due to its modular design also enables an attractive price/performance ratio. For a wide range of applications, two sizes are currently available that have four different motor sizes each and that provide driving forces up to a maximum of 2,4 kN and load ratings of up to 106 kN. Additional versions will follow. The electric drive and the path measuring system are already integrated in the compact axis, enabling agile, space-saving motion sequences. Accelerations of the direct drive up to 100 m/s² and speeds of 5 m/s ensure high dynamics and short cycle times. At the same time, the drive ensures an accuracy of ±0.01 mm for the user. Its elements operate without mechanical play, which eliminates wear parts and keeps maintenance costs to a minimum. In addition, the drive can be designed in any length without compromising performance. The linear direct axes of the SLD series are UL-certified as standard. This is the prerequisite for rapid access to the US market and other markets.

Options potentiate the range of applications

As a crucial component of the SLD axes, the profile rail guide enables the compact design and the absorption of high loads. Strokes of up to 6,000 mm can be achieved. On top of preventing the penetration of dirt and dust inside the axis, the use of a cover also makes applications in areas with coarse, sharp-edged or hot foreign bodies possible. This even paves the path for use in harsh environments. The cover also prevents grease from leaking with overhead assemblies.

SCHUNK offers the series with a wide selection of options, including a holding brake that prevents gravity-loaded axes from dropping or falling unintentionally. This ensures safety in the applications. Mounted under the slide and pneumatically actuated, the brake reliably engages in the event of a power failure. In addition, the linear direct axes use a modular encoder system with the proven interfaces Hiperface/ HiperfaceDSL, DRIVE-CLiQ, Sin/Cos and SSI. All encoders are also available in SIL2/PLd. Customized measuring systems can also be integrated on request.

The series SLD offers a whole range of options when it comes to mounting, installation, and combinations. This means that the linear direct axes can be easily combined using an adapter plate, fastened by clamps and used in a variety of applications. Due to its high dynamics, load rating and long service life, the axis is ideal for industries ranging from electronics and electrical engineering, food and packaging, life science and assembly automation, and on to photovoltaic and automotive engineering. In e-mobility, for example, the handling of prismatic cells can be implemented just as efficiently as in hairpin applications with high demands on flexibility, dynamics and precision. For easy configuration and design of its electric linear axes, SCHUNK is expanding its digital services and plans to launch a practical configurator this year.

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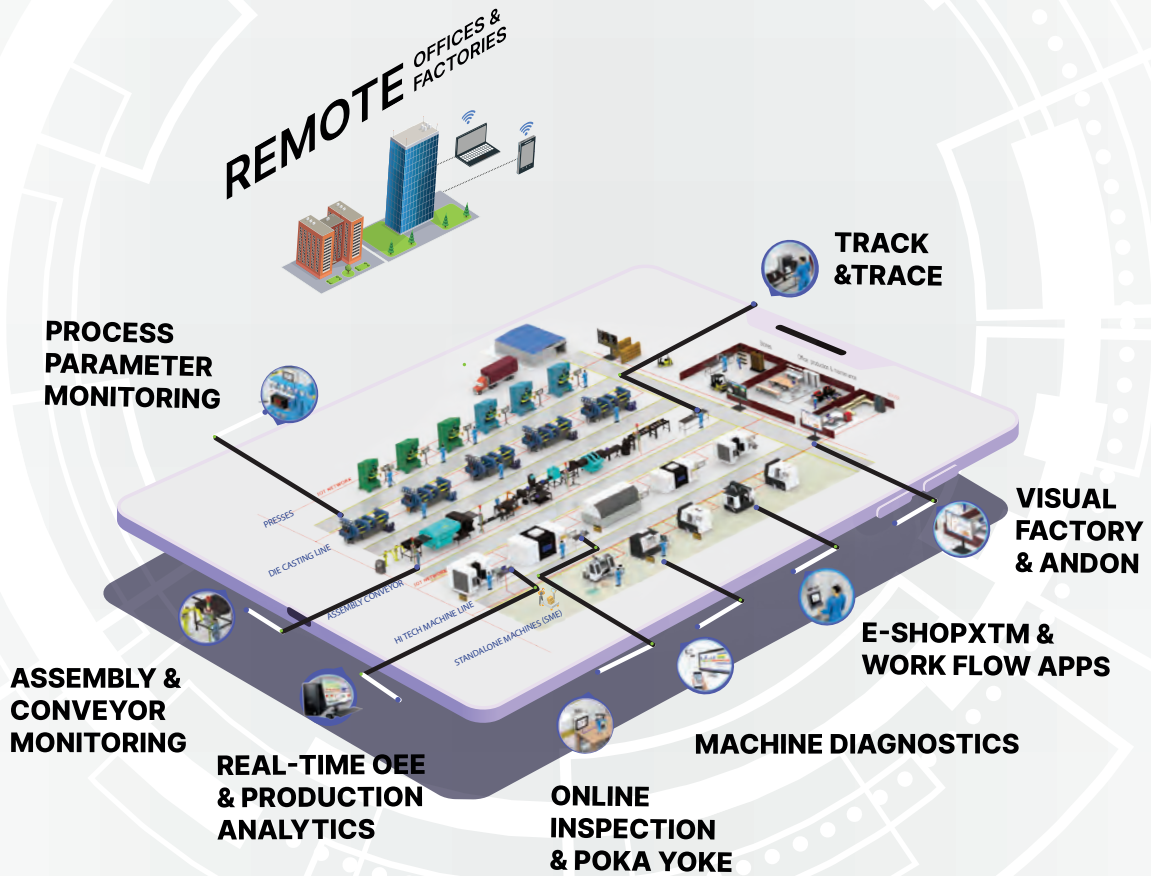

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