MARCHING TOWARDS DIGITAL MANUFACTURING

THE INDIAN MANUFACTURING SEGMENT IS KEEN TO ADAPT THE DIGITALISATION. HERE IS HOW ONE CAN DO IT.

BY SWATI DESHPANDE
TODAY, THE INDIAN MANUFACTURING SECTOR is in a transitional phase with new technologies being implemented. Technologies like Industry 4.0, Internet of Things (IoT), artificial intelligence (AI), etc. are making manufacturing efficient. When asked which are the key trending technologies, Asef Momin, senior director - operations transformation leader, Capgemini Invent India says, “There are many if you ask me! A variety of emerging disrupting technologies will have a significant impact on product engineering and shop floor operations. Some of these technologies include industrial IoT (IIoT) systems, Robotics/Cobotics, digital twins, augmented reality (AR)/virtual reality (VR) and additive manufacturing.”

Harsha Kadam, CEO India & president - industrial business, Schaeffler India feels that IoT is playing a major role in transforming manufacturing. “The fourth industrial revolution is revolutionising manufacturing by providing manufacturers with the opportunity to utilise advanced manufacturing capabilities and information technology throughout the product lifecycle. As a result, manufacturers are benefitting from increased efficiency in
"SG is another key catalyst for the digital transformation of manufacturing organisations."
– Asif Moonim

"Adopting these technologies will augment the potential of the Indian manufacturing industry in the global arena."
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"The demand for customised solutions has led to the development of various technologies, which are shaping the future of manufacturing."
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2. In order to build up this competency, automation and robotics will play a crucial role in providing consistency of quality at competitive costs.

operations, substantial cost savings, faster production times and the ability to provide excellent customer support. Manufacturers are increasingly leveraging the IoT, which entails the interconnection of unique devices within an existing Internet infrastructure, to achieve a variety of goals including cost reduction, increased efficiency, improved safety, meeting compliance requirements, and product innovation," Kadam notes.

Highlighting the impact of the technologies, Karen Ravindranath, director, WebNMS – IoT Division of Zoho mentions, “Manufacturing Industry predominantly focuses on ‘efficiency’ and ‘effectiveness’ of operations indicating the quality of processes and output respectively. IoT will boost the efficiency and effectiveness factors through digital transformation and data analytics for the manufacturing industry across verticals like automobile, pharmaceutical, food & beverage, etc. This data-driven, informed and transparent operations will also help create a haystack of opportunities for new business divisions, new product ideas and also provide sufficient data to produce user-driven products that offer better customer experience.” Further she adds that implementation of IoT underlines the importance of data. “From IoT being considered a luxury to now having become an integral part of operations, globally industrial players have taken a lead in transforming their businesses with data. So adopting these technologies will augment the potential of the Indian manufacturing industry in the global arena. With effective production, minimal errors and improved quality of output, the products manufactured in the country will seamlessly match global standards," she concludes.

Zuvan Marolia, head of the Manufacturing Council, Govrej & Boyce observes that change is happening gradually. “The demand for customised solutions has led to the development of various technologies, which are shaping the future of manufacturing. The trend for having customised solutions has been observed for over a decade and the expectation now is that it should be made available to a wider spectrum of the customer base thus leading to the need to be able to do so at a more affordable cost. Industry 4.0 has helped change the way in which manufacturing systems operate, thus allowing flexibility of manufacturing coupled with a continuous workflow. As the industry grapples with the changing customer needs, the efficiency of manufacturing processes took a beating as mass production was being replaced by single
piece flows, leading to two challenges — Accuracy of information and Setup time. Both of these have been addressed through the adoption of Industry 4.0 and IoT, with suitable Manufacturing Execution Systems (MES).” Seconing the customer-centric aspect in the technology adoption, Jasmeet Singh, AVP Corporate Communications & Corporate Relations, JCB India says, “The rise of informed customers and innovative technologies has made the manufacturing industry re-shape the overall operations of the organisation. The integration of production techniques with the latest technological developments has the potential to make infrastructure development more efficient. Robotics, IoT, data analytics, telematics and AI are a few digital solutions that are bringing revolution.”

Vijay Karunakaran, founder & CEO, TNQ InGaGe brought yet another emerging technology into the discussion from the safety aspect by saying, “VR training solutions are immersive and cater to both safety and productivity. Its safety training feature enables the performance of hazardous operations in a virtual setting, may cause injury or death in a non-virtual/physical setting. Performance training is provided in terms of product training, disassembly and maintenance training, etc. The training provided here is way interactive than what traditional training could offer, as it comes with increased retention and absorption ratio (which is proven). This can be attributed to its immersive and engaging nature, which strikes a chord with the trainee.” He further continued by saying that while VR provides the aforementioned benefits, AR Field Services cater to repair & maintenance — where technicians are allowed to work hands-free and faster, with each step in a troubleshooting or repair process displayed in their field of view, Expert assistance — through AR solutions that provide remote experts with virtual views, with which they can monitor and provide instant feedback; and Quality Control — through solutions that guide operators to perform inspection tasks and identify parts that are missing or incorrectly assembled.

IMPLEMENTATION OF TECHNOLOGIES

So when we are speaking about emerging technologies, what has actually been implemented? Speaking about his plant, Marcola informs, “We have kept pace with the changing market needs and started adopting a flexible manufacturing approach, for example, we moved from fixed tooling to turret punch presses to CNC programmed col-fed punching lines, and today have moved on to laser machines to address our need for flexibility in sheet metal punching. Along with this, we have incorporated a bar-code system which draws upon the relevant programmes to process material as per the customer’s requirement, thereby eliminating losses due to set-up time. In order to ensure that there is accuracy of information flow and optimisation of throughput, the planning for the entire system is done through an MES system, which assures that even in a single piece flow situation, the customer receives the right material manufactured as per his requirement.”

Highlighting how technology has helped the company in creating a safer environment, he continues,
India's average annual investments in smart factories as a percentage of revenue

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<th>Last 3 years</th>
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Courtesy: Capgemini Research Institute

"Safety is an area of critical importance and material handling in particular is a hazard prone area. To improve safety, we have automated the material flow through the use of AGVs. This has also helped cut losses due to waiting time, as the material movement is scheduled and optimised through the system. The use of MES and IoT together makes this possible. At the back end of manufacturing, there is a large volume of data entry, which is being automated through Robotic Process Automation (RPA)."

Puneet Vidyarthi, brand leader, CASE India shares the way his company is implementing technologies, "We are focusing on technology integration and engine efficiency which adds to machine uptime. Successful technology integration like IoT, telematics, robotics and modern manufacturing practices are the main advancements CASE India is working on. Our R&D team constantly endeavours to develop clever innovations to make the equipment more efficient. IoT, Industry 4.0 revolution, AR, and 3D printing are the next big changes being foreseen in the construction technology industry. These technological updates will revolutionise the practice of designing in the industry and also bring a surge in sales."

DIGITISATION — IS IT REALLY A BIG TREND?
Answering the question, R. Venkateswaran, sr. vice president, IoT Solutions, Persistent Systems replies, "There are two aspects for this – Acceptance and Adeptness. Today, there is a good awareness and acceptance about the importance of digitisation. This is primarily due to push from the industry associations and Government of India's initiatives like Samarth Udyog in conducting events and spreading awareness. On the other hand, Adoption of digitisation is still in early days. While it can be said that many manufacturing companies have explored point solutions for pilots and proof of concept implementations, these have typically been ad hoc initiatives. Many manufacturers are yet to create strategic viewpoint and road map for Industry 4.0 adoption. It is heartening to see that senior executives are championing these digitisation initiatives; however, a wider adoption requires better articulation of the overall strategy."

Presenting a slightly different view, Karunasekaran says, "Digitisation, which was a high-priced luxury few years back, has now emerged as a necessity. While the current trend doesn't portray widespread adoption, we can expect the same in the next 2-5 years. While digital sectors like IT and business process management have already adopted digitisation on a wide scale, the manufacturing sector has both the potential and need to embrace new technologies."

Cappromini Research Institute, recently published a research titled 'Smart factories @scale' which covered this aspect significantly. Revealing details of the report, Moonim says, "We found 30% of factories were transformed into "smart" in the last two years in India. This number is expected to go up to 40% in the next five years. We also found that manufacturers in India are ahead of their global peers with respect to investments in smart factories. When it comes to co-investment and integration of digital platforms and technologies, Indian companies have relatively higher adoption of manufacturing technologies than their global peers in some areas." Seconding the same, Vidyarthi continues, "The Indian manufacturing industry is ready to accept digitisation. It has become a current trend in the manufacturing industry as it brings automation, emerging technologies like IoT and digitisation together, which creates a smart factory." Debating this thought Marolia presents his point of view, "While the uptake on digitisation has been slow, increased efforts are being undertaken. There is a long way to go and there will be tremendous learning along the way."

HOW TO DEAL WITH DISRUPTION?
Of course, any change brings about causes disruption. In this regard, Vidyarthi describes how disruption acts as a motivator, "The disruptions are inevitable and are necessary to further revolutionise and optimise the industry. The disruptions in terms of technology, motivates our R&D team to work hard and give out the best product which ensures the safety of the drivers and efficiency of the machinery. It helps the R&D team to get more creative and walk in the same path as the new disruptions. In the end, the focus of
every player to create a better product. Therefore, it’s more helpful and insightful and we try to learn from it, to do better than the set benchmark.”

On this note, Marolia highlights challenges caused by new technologies. “One of the emerging trends with the expansion of manufacturing footprint is the need to move factories to increasingly remote locations. This brings on the challenge of availability of skilled manpower. However, with the shift towards more and more process automation, processes are getting deskilled, and this calls for building competences to suit the new automated processes. It also brings about the need to re-design products, creating platform designs allowing for meeting customised needs, through customised combinations of standardised components.”

Diverting attention to other practical difficulties, Moonim says, “While manufacturers are doing several things right with respect to digitisation, they are facing challenges when it comes to taking their digitisation initiatives to the next level. The top three challenges in scaling smart factories for Indian manufacturers are: • Deployment and integration of digital platforms & technologies; • Data readiness & cybersecurity; and • IIoT, soft & digital capabilities.”

Besides, current economic situation can also act as a hurdle in adopting newer technologies. Venkateswaran has observed two different mindsets in this regard. “Economic slowdown has definitely delayed some of the Industry 4.0 initiatives and adoption of newer technologies so that they can manage their costs for the duration of the slowdown. On the other hand, some of the forward thinking manufacturing companies have taken this slowdown as an opportunity to get their employees up-skilled in digital technologies and data driven decision making process. They have also looked beyond their immediate challenges to explore alternative technologies that can bring in cost effectiveness and other significant value in the future,” he says.

**WAY FORWARD**

Speaking about the coming future, Singh says, “There has been a significant focus on developing infrastructure over the past few years. The target of India becoming a $5 Trillion economy is dependent on having the requisite infrastructure and technology to leverage this opportunity. Thus, the construction equipment and manufacturing industry is likely to upscale innovations in machine automation segment to keep pace.”

In this situation, the government’s support for deploying newer technologies is definitely boosting the industry. “Manufacturing has gained tremendous importance in the past 5-6 years, particularly with the Make in India initiative which has given the industry a lot of impetus. However, as per reports, manufacturing accounts for only 16% of the country’s GDP, compared with the services sector which accounts for nearly 52%. India represents only 2% of the

**WITH SHIFT TOWARDS MORE PROCESS AUTOMATION, PROCESSES ARE GETTING DESKILLED.**

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5G IS ANOTHER KEY CATALYST FOR THE DIGITAL TRANSFORMATION.

world’s manufacturing output: a tenth of what our neighbour China contributes. Clearly India is punching below its weight in manufacturing and there’s a huge scope for improvement. This data provides us with an opportunity of not only improving the numbers but also the scope of work. Advanced and emerging technologies such as AI, IoT, robotics, and machine learning are gradually catalysing transformation across industries like healthcare, manufacturing, transportation and retail. Adopting the principles of Lean manufacturing will be key to joining the world’s leaders in operational excellence. As such, we at Schaeffler India, are constantly focusing on reaping the benefits of new technologies and processes through advanced R&D,” elaborates Kadam.

With the push given to the Indian Prime Minister’s call for Make in India and the target of achieving a $1 trillion manufacturing GDP, India will have to become competitive and stand up to competition in the global markets. In order to build up this competency, automation and robotics will play a crucial role in providing consistency of quality at competitive costs. Automation with a degree of human interface for flexibility is the way forward in the Indian manufacturing environment as fully automated lines come with their own challenges which may not help our competitiveness,” opines Marolla.

Further Kadam adds that the manufacturing Industry in India is one of the most promising segments in terms of development in the coming years. “From 2012 to 2018, India’s service sector boomed at a quick pace of nearly 7%. In the same era, manufacturing saw a development of around 4-5%, as indicated by the industry reports. In the present VUCA (Volatility, Uncertainty, Complexity and Ambiguity) environment, we probably have no choice but to reinvent ourselves continuously. As India turns out to be progressively associated, digitalisation – utilising digital technologies to change business activities – is a key differentiator that will empower organisations to stay focused. Digitalisation guarantees lower costs, enhanced production quality, adaptability & proficiency, shorter reaction time to client demands and market requests, and furthermore new and innovative business openings.”

Expressing his final thoughts on the topic, Karunakaran says, “It is important for manufacturers to understand how embracing change can help them stay ahead of competitors and win market share in the ultra-competitive environment of today. Factory automation and digitisation are critical for the sustainable progress of the manufacturing sector as it has a bearing on the entire supply chain, right from the manufacturing of a product till its sale. For example, AR/VR can not only aid in terms of training and field services but also facilitate the efficient sale of a product through virtual screening of the same. Not all products can be taken everywhere, right?”

While concluding Moonim lists few other technologies that will shape the future of manufacturing, by predicting, “5G is another key catalyst for the digital transformation of manufacturing organisations. In a recent global research, we found that 5G ranked as the #2 enabler of digital transformation for industrial companies. This was ahead of other technologies such as drones/robotics and even AI/machine learning. 3 in 4 global industrial companies told us that 5G is going to be a key enabler for their digital transformation in the next five years. Industrial companies have a significant and immediate appetite for 5G. In fact, we even found that a third of industrial companies would consider applying for 5G licenses to launch their private networks. Some of the India tecos have also begun to talk about 5G and its potential for industrial manufacturers and we should soon start seeing early plots with some Indian manufacturers.”

To sum up, it would be interesting to see the now ago Digital India with high speed networks and cobots.