

MARKET SURVEY:

Industrial Automation: Enabling the Next Industrial Revolution



Mrinmoy Dey is a senior correspondent at EFY

India is vying for a spot in the global manufacturing landscape as it aims to emerge as the preferred manufacturing destination for global players. Up until now China has been beating India hands down—it is still way ahead as India's manufacturing contribution to GDP is a mere 13 per cent as compared to China's 30 per cent—but now India has a chance to turn the tide in its favour. With the rising cost of production in China and strengthening of Yuan against the Dollar, investors are looking at alternate manufacturing destinations. To harness this, the Indian government has launched Make in India initiative to encourage domestic production.

However, if India has to realise its dream of becoming a global manufacturing hub, it must not imitate but instead focus on moving towards improving operational excellence. Compelled by the continuous pressure on profitability improvement, manufacturers are looking to invest in solutions that would help them increase their productivity by utilising minimal assets, in turn focusing on improving return on investment (RoI), increasing reliability and efficiency. This is where industrial automation will act as an enabler.

Anup Wadhwa, director, Automation Industry Association, opines, "The new wave of manufacturing in India will be about quality products (zero defects) and about managing

the manufacturing in a way to avoid polluting the environment (zero effect). Both are possible only with proper understanding and application of industrial automation."

Avenues of growth

The industrial automation market in India has been growing at a considerable pace over the last few years, owing to the growing need of complying with global standards in quality and cost-effective methods of production. And, future prospects for the industry look rather bright.

According to a TechSci Research report titled 'India Factory Automation Market Forecast & Opportunities, 2020,' factory automation market in India is projected to witness a compound annual growth rate (CAGR) of around 12 per cent during 2015-2020.

"Factory automation market in India is exhibiting significant growth due to growing demand from automotive hubs across the country. Further, Make in India initiative is also expected to play an important role in boosting the adoption of factory-automation solutions in the country. With major investments expected in the manufacturing sector in India in the upcoming years, demand for factory automation solutions in the country is also anticipated to rise over the next five years," says Karan Chechi, research director with TechSci Research.

The TechSci report noted that western and northern regions are the major markets for factory automation in India due to continuing industrial growth and the presence of special economic zones and various automotive hubs in these regions.

Deliberating on the sectors that are expected to boost the growth of automation, Wadhwa adds, "The sectors driving the demand at the moment are discrete manufacturing and energy management. Process automation is currently under threat because fresh investments in commodities like metal, cement and fertilizers are threatened due to

Industrial automation in action



Q&A: Industry association's view



In a freewheeling conversation with EFY, Anup Wadhwa, director, Automation Industry Association (AIA), shares his views on policy framework and required ecosystem to attract investment.

How are government policies accelerating the growth of the industrial automation industry? What more needs to be done?

At the ground level, the government is pushing for low-hanging results of digitisation. This is welcome but nowhere reflects the clarity or urgency to operationalise reform in advanced manufacturing education and material innovation. Industrial automation needs a strong manufacturing ecosystem to demonstrate its potential. There is a sense among experts that the next big thing in manufacturing would be use of the IoT, Big data and Industry 4.0, where automation will play a crucial role. The new possibility is backed by governments in Germany, the USA and Japan but is driven by their automation experts. India can leap-frog if it collectively visualises and assimilates the advantages that the IIoT brings to the existing ecosystem of Indian OEMs, SME suppliers, equipment makers and service industries. By doing so, we can seriously innovate and not land up with a copy-and-paste strategy.

Technologies are meant to serve people and social aspirations. Companies that have embraced PQRS values, which is short for productivity, quality, reliability, safety and transparency, have always been at the forefront. However, when country cultures need to change, government actions affirming those values become imperative.

These are some of the aspects where the government can act by announcing time-bound changes:

1. Laying down standards of workplace safety that are globally contemporary, so that machine builders and safety auditors can find their mandated SIL guidelines within the Factories Act of 1948

2. Tighter regulation on pollution by the industry and strict enforcement by regulators, using automated monitoring systems that work 24/7. Data from such monitoring systems can be made available on public websites

3. Setting energy-efficiency goals that stimulate energy saving and recycling processes. In due course, businesses will find the ROI in their favour

4. Incubating and incentivising industry-academia-research collaboration in engineering and manufacturing to attract more inspired minds into our manufacturing ecosystem. Kudos to Ministry of Skill Development and Entrepreneurship (MoSDE) for setting up a pilot project that connects the Industrial Training Institutes (ITIs) with the Indian Institutes of Technologies (IITs)

If this happens, the need for automation would become holistic as it will not only be about a machine that runs fast but also smartly adjusts, self-reports, consumes less energy and pollutes less. These are visionary areas and with sharper government policies and sustained execution, we could see businesses and education change gears.

What is your take on an ideal ecosystem that attracts industrial automation players to set up their plants in India?

The decision for an automation company to set up its plant in India will depend on the viability assessment by that company. There are a few challenges, though.

1. Like the IT industry, electronics hardware in automation keeps changing every few years. And the volume that is needed to sustain Make in India drive has to be economically viable.

2. Growth expected from local markets has to be a big chunk of the above. If the government is expecting an export-oriented plant, then it will either have to wait for global demand to surge so that an additional plant is required, or local factors have to contribute towards the success of that plant economically as well, so that over a period of time, making that product in India will be better than making it in Germany, Japan or the USA.

For companies that are announcing plants including Foxconn, I think a large part—about 40 per cent—of that production will be absorbed in India.

How do you see the scope of electronics industry in this?

Most of the players that are in India for the long haul make the housing for electronics in India. Wiring, fitment of supporting equipment like fans, heat-sinks, transformers and even power supplies are now being done in India. What is not being done in India is the manufacturing of central processing unit (CPU) boards and input/output (I/O) boards. My sense is that, there may be a chance for I/O boards to be made in India with a little more standardisation within the company and the industry. CPU boards, however, may be relegated towards the end.

What initiatives has AIA taken to accelerate the growth of industrial automation in India?

One charter is on regulatory compliances where we are working as a channel for the industry to send their message to the government.

Second, we are working on education and skill development. As part of our campus-connect drive, we have already developed the foundational elements of UG curriculum on Integrated Industrial Automation, which can be taken by any college or university for mechanical, electrical, instrumentation or chemical engineers. It is an open course designed for engineers and teachers for creating solutions by looking at a range of automation technologies available.

Another one is linked with the skill development or re-training of people who are already employed by the industry. As part of our latest initiative on this front, in WIN India exhibition 2015, we are setting up an automation training zone. The zone will have dedicated clinics for automation system engineering, energy management, industrial networking, safety practices and quality management. These are the five important skills in automation for integrated operations that more people must embrace and practice consistently.

global over-capacity. So, we are expecting a little flattening of demand from those areas but the sectors with good prospects are pharmaceuticals, food processing, engineering components and defence manufacturing. Also, the next big push is going to come from the infrastructure sector.”

On the same lines, Sameer Gandhi, managing director, Omron Automation India, adds, “Our key focus areas are food and beverage (F&B), FMCG, packaging and automotive

sectors. Basically these are the sectors driving the demand. Another key sector that is contributing to the demand is the infrastructure sector through projects like metros and smartcities.”

Sudhir Dembi, general manager - plant solutions, Schneider Electric India, adds, “Industries are being driven by increasing infrastructure investments in new economies, the push to modernise aging systems and equipment, increasing regulations, increasing market speed and volatil-

ity, and disruptive technology trends that change everything. Currently, automotive, power and oil and gas are the sectors that are driving the demand for industrial automation.”

What is holding the industry back

There are multiple challenges that have to be overcome to unearth the true potential of industrial automation in Indian market. “So far, in most of the automated plants in India



The Make in India initiative, which seeks to make the country a global manufacturing hub, is expected to be the biggest driver for industrial automation and the IoT to take the big step forward, as global organisations investing in India will no doubt leverage and integrate technology and skills to enhance their competitive edge and capture markets.”

— Sudhir Dembi, general manager - plant solutions, Schneider Electric India



including heavily-automated plants like automotive plants, usage of automation as the percentage of the total capital investments has been half of what it is in the West. That means, there are processes in India that we tend not to automate. For instance, you may have a paint shop that is highly automated, but you may not have a fully-automated material-handling system,” says Wadhwa. He adds, “The challenge lies in adopting automation as a strategic advantage.” So what are those factors that are holding the industry back?

Acceptability among end users.

Getting the end user to invest in something that adds cost to what he or she is doing is a challenge in itself. Gandhi feels that the decision to use automation is generally triggered by a push from the market. He says, “For example, a company may need to launch a new car variant, so there is a push for using automation to go for flexible manufacturing.”

Another example is the push for hygiene. “We have customers from the F&B industry who were getting a lot of push from the market to automate the factory where the packaging was being done. While baking has been automated, packaging is being done manually. So they are investing in automating the packaging too keeping the hygiene factor in mind,” informs Gandhi.

However, the most important criteria for such decision remain the RoI considering the tune of up-front investment. However, acceptability is going higher off late, which is good for the industry.

Lack of skilled manpower. This

is perhaps the biggest challenge facing the industry and to some extent is also responsible for the difficulty for end users to use automation. Wadhwa points out that lack of skilled people who can engineer, build and commission efficient and holistic automation solutions is a worrying factor.

The fact that these industries are spread in far-flung areas of the country further adds to the challenge of finding manpower locally to deploy automation and in some cases even maintain or operate the systems, adds Gandhi.

Wadhwa feels that it is imperative that the system integrators possess domain knowledge besides having expertise in installing an automation system. This is where the main challenge lies, as this domain knowledge, *per se*, lies mostly with the process equipment or capital goods suppliers and the end users.

“If a person with knowledge of computer programming and programmable logic controller (PLC) commissioning wants to become a system integrator, he or she has to decide the applications, the area of focus, while the challenge for a person with domain knowledge is in combining that strength with an understanding of automation tech-

nologies,” explains Wadhwa.

The industry association as well as the automation system providers are providing training with a conscious shift in skill-building now being made towards generating application-specific solutions. Gandhi adds, “We have invested heavily on training. We have training centres in Bengaluru, Mumbai and Gurgaon. Besides this, we also impart e-learning training, which is available to our channel partners or our customers.”

Market trends

Automation is not seen as a black box any more but as a piece of intelligence that is captured within machines. And human beings need to be able to interact with this intelligence. So evolution of smart human machine interface (HMI) is seeing a big shift.

Wadhwa opines, “The design of HMI is becoming really important, particularly in terms of how the data is presented. For example, a leading global company in the food-processing area has a project to standardise the look and feel of information across all HMIs at its plants, not only in India but across the globe. This is to enhance comfort among managers/operators/supervisors when they move across locations, from one plant to another.”

Another trend is the use of vision systems in quality inspection, informs Gandhi. However, the most interesting one is related to the use of Big Data in manufacturing processes. Gandhi opines that proper application of Big Data in manufacturing can lead to significant improvement in productivity as well as reduction



RoI is of course one basic criterion. Usually the decision to use automation is taken when the end user gets a push from the market. For example, a company may need to launch a new car variant, so there is a push for using automation to go for flexible manufacturing. Another example of this kind of push is the push for hygiene.” — Sameer Gandhi, managing director, Omron Automation India



in down-time and ensuring quality for the customer.

He adds, "Latest technological innovation allows PLCs and vision systems to interact directly with the enterprise resource planning (ERP) layer, ensuring realistic Big Data processing to improve productivity and aid predictive maintenance, and much more. For example, our Sysmac NJ controller can read and write, to and from a SQL server at high speed. One practical application of this trend is serialisation or traceability, which is coming into the market."

A shift towards Industry 4.0

Perhaps the most recent and biggest trend in factory automation is the adoption of Industry 4.0. In fact, many experts feel that if India has to emerge as the preferred manufacturing destination, Industry 4.0 should be embraced with open arms.

A recent report by HIS technology forecasts that industrial automation will make up the majority of the Internet of Things (IoT) by 2025, and Internet Protocol (IP)-addressable devices are the key enabling forces that will get the industry there. The report notes, "Industrial automation accounted for more than half of the installed base for all Internet-connected devices in 2012. By 2025, the sector will account for nearly three-fourths of all connected devices—a CAGR of 36.3 per cent."

Dembi echoes a similar thought process, "The next industrial revolution, Industry 4.0, the Industrial IoT (IIoT) or whatever you want to call it, is one of the primary megatrends impacting our market today and will continue to do so in the foreseeable future." He opines that, today's concept of industrial automation is based on having one centralised brain collecting information from manufacturing assets to facilitate production decisions.

Industry 4.0 focuses on smart-factories, connected machines, the IoT and the industrial Internet. Explaining how this works, Dembi



Industry 4.0 has been the talk of the town for quite some time now with the IoT and Big Data being some of the buzzwords associated with it. Not only is a connected factory a point of discussion but also easy diagnostic, quick maintenance and a seamless connectivity from the shop floor to the board.

— Ninad Deshpande, specialist - open technologies, B&R Industrial Automation representing Ethernet POWERLINK Standardization Group



says, "In smart manufacturing, intelligence is decentralised, with each smartasset within the factory having full information about itself and equipped with the processing power to optimise its own productivity and efficiency. These smartassets are also hyper-connected to optimise and coordinate each step of the manufacturing process."

Explaining the application of such technology, Ninad Deshpande, specialist - open technologies, B&R Industrial Automation representing Ethernet POWERLINK Standardization Group, adds, "Interconnection of machinery, sensors and control systems together via intelligent networks helps us achieve a slew of features. These include dynamic response to product demands, enabling rapid manufacturing of new products, real-time optimisation of manufacturing, production and supply chain networks, highly-flexible production, strong customisation of products and mass customisation, self-optimisation, self-configuration and self-diagnostics."

He further stresses on the need of embracing open source communication in smartfactories to bring down the cost of ownership. He shares, "We as Ethernet POWERLINK Standardization Group focus on open source communications that help manufacturers get a solution for a connected world. We provide open source Ethernet POWERLINK technology that can be used by manufacturers for achieving real-time deterministic communication. This is completely licence-free, having no patents and copyrights."

Future outlook

Today, manufacturing has evolved to an extent where only through innovation and investment in technologies can businesses gain the productivity and efficiency advantage that will allow them to compete in the global market.

A Frost & Sullivan whitepaper titled 'Enhancing India's Manufacturing Competitiveness - Reality of Adopting Technologies and Trends,' concedes that the next industrial revolution will be based on unification of information among participants in the entire value chain, from product inception to design, manufacturing, services and even refurbishment. The report notes, "It will transform the manufacturing processes in sync with the speed of change in customer needs, which implies making the production process flexible without taking excess time."

The industrial automation will also evolve in sync with these market pulses. In fact, industrial automation is ahead of most other industries in the readiness for the IoT and, more specifically, for the IIoT. "When one looks at the deployment of sensors, actuators and low-level devices that are needed to enable the IoT or the IIoT, industrial automation has an advantage," shares Dembi.

Keeping these trends in mind, Wadhwa feels that going forward, value-added operations in terms of engineering, software and testing will earn prominence, and the players that have got technical acumen in those areas are expected to grow at a faster rate. ●