WHAT WILL MANUFACTURING LOOK LIKE IN 2021?

The five top trends to watch

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EM - Interview
Anbu Varathan,
Director General, IMTMA & CEO, BIEC (p. 20)
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Technology was a blessing to everyone during the pandemic. Every new technological advance has the potential to improve the way we work and respond to the crisis like COVID-19 pandemic. In general, technology has made the situation far more tolerable. Who would have imagined working from home would be an effective alternative not just during the pandemic, but also in post-pandemic scenario? Who would have imagined there are so many digital tools that made the pandemic life so much more bearable?

In the manufacturing world too, many advanced technologies such as digitalisation have enabled the many business adjustments and pivots that were required to keep things rolling in this past year. In fact, operating digitally proved to be the only way to run the business operations through mandated lockdowns and restricted activities. The technological changes inspired by COVID-19 are coming in the form of an acceleration of existing trends as well as adoption of new technology advances. Now since the economy is on a fast recovery mode with businesses catching up with the growth momentum, there will be a further push to the investments in manufacturing technology to keep up with demand.

EM has been playing a very important role in its task of capturing and disseminating the right and updated information on new technology advances in the manufacturing industry. The magazine, through its print and online versions, has been reiterating its commitment to maintain a good industry interface and keep you informed, issue after issue, about the latest in the manufacturing technology world to keep your operations efficiently running. As always, this issue too comes packed with interesting and useful features on a diverse range of topics, to keep you abreast of the latest technology developments in the manufacturing world. Happy reading!

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“Since the economy is on a fast recovery mode with businesses catching up with the growth momentum, there will be a further push to the investments in manufacturing technology to keep up with demand”

Technological changes inspired by COVID-19

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For a large nation like India, the role of the manufacturing industry is very important and critical for economic growth, employment generation & development. A smaller country can have great economic stability depending only on the service or tourism sector but not a large country with a huge population and size like that of India.

Keeping this in mind and the need for economic stability, absorption of technology & providing employment opportunities for the masses, the government had immediately put a lot of emphasis & focus on the manufacturing sector after independence, by setting huge facilities & plants across the country in the public sector and supporting many in the private sector. These companies did fulfil their roles to a large extent in the initial years. They have been successful in the absorption of technology and providing the necessary impetus for the growth of the nation. However, after the markets were opened up in 1991, the fate of many in the manufacturing companies, particularly in the public sector, dwindled down as the country started looking for cheaper & easier imports and that too of a technologically more advanced version, putting Indian manufacturing companies in a huge disadvantageous position.

Another reason for the downfall of the Indian manufacturing companies was the reluctance to upgrade themselves with the latest technologies & methods and be contended to be more of an assembly unit of imported sub-assemblies. This resulted in the country becoming dependent on imports of many hi-tech manufacturing solutions.

Notwithstanding the above, there are exceptions, and many manufacturing industries have played a major role in the nation-building exercise in all core sectors of the industry – particularly in the nuclear & aerospace area, where dependency on imports today is almost nil. With the emphasis on Aatmanirbhar Bharat Abhiyan and the ban on imports of various items in the defence & other sectors, the need for self-dependency in the manufacturing sector has shot up substantially. The year 2021 is envisaged to be the beginning of a great period for the industry and to be able to meet the challenges as we try to achieve the Aatmanirbhar Bharat Abhiyan goals. It will be very essential for manufacturing companies to ramp up their engineering and Quality Assurance skills to meet this challenge of churning out products of global standards.

Another essential for manufacturing industries will be the need to implement the Smart Factory concept – Industry 4.0. It has to be compulsorily extended to the MSMEs so that the parts & components from these sub-vendors are also of the highest level of quality & workmanship. This will be the driving force for the manufacturing sector to be globally acceptable & competitive in the days ahead. India has the potential to be the global leader in the field of manufacturing, and as part of the nation-building exercise, the exports of manufactured goods will play a crucial & significant role. Indian companies in the manufacturing sector should not miss this golden chance and should encash the excellent impetus provided by the government for this & thereby play that significant role in nation-building.
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Government mulls making scrap recycling an organised sector

The Ministry of Mines recently issued the National Non-Ferrous Metal Scrap Recycling Framework, 2020, covering key non-ferrous metals like aluminium, copper, zinc and lead with an objective to promote a formal and well-organised recycling ecosystem in the country, which is currently highly unorganised with heavy dependence on imported scrap. It also aims to produce high-quality scrap for quality secondary production, thus minimising the dependence on imports and encouraging economic wealth creation, job creation and increased contribution to GDP through metal recycling. This framework is also seen to be prepared in the backdrop of the upcoming Vehicle Scrappage Policy for automobiles, ensuring sufficient availability of domestic scrap in the country. Some of the key recommendations are setting up a central authority to recycle metals as Metal Recycling Authority (MRA). The formulation of BIS Standards for Scrap usage, recycling & imports will be the first step to develop the domestic recycling ecosystem and promote a circular economy by utilisation of indigenous scrap thereby reducing dependency on imports.

AGI glaspac invests in German tech to build a new furnace

AGI glaspac recently announced its partnership with HORNS® Glass Industries AG, Germany. Both have joined hands to build a new furnace of 154 TPD AGI Speciality Glass Division in India for its Bhongir plant in Telangana. The facility will comprise end-fired furnaces with six forehearts for production. Discussing their investment, Rajesh Khosla, President & CEO, AGI glaspac, stated, “Our investment in German technology is aimed to strengthen our units to make products that are more efficiently used for global markets. We thrive by the Make in India concept, and it is important that we do not miss out on the great opportunities or technologies readily available – these technologies are to watch out for or invest in so that the products manufactured in India can compete efficiently.” Hitting the ball straight, Stephan Meindl, President & CEO, Horn Glass Industries AG, asserted, “We are confident that with our technological support, AGI glaspac’s will be able to thrive by its Make in India vision of manufacturing world-class level speciality glass very effectively.”

Mahindra Defence Systems procures a deal with defence ministry for 1300 combat vehicles

Mahindra Defence System (MSDL) recently finalised a contract with the Ministry of Defence to procure 1300 light combat vehicles for the Indian Army at the cost of ₹1,056 crores. The induction of these vehicles is planned to be completed in four years. Aiming to boost ‘Make in India’, the ministry stated, “Providing a further boost to ‘Make in India’, the defence ministry signed a contract with MSDL for the supply of 1300 light specialist vehicles to the Indian Army. The light specialist vehicle is a modern fighting vehicle and will be authorised to various fighting units for carriage of medium machine guns, automatic grenade launchers as well as anti-tank guided missiles.” The ministry also said that the vehicles are extremely agile with all-round protection against small arms fire, and they will assist small independent detachments. “This is a flagship project showcasing the indigenous manufacturing capabilities of the defence industry and will add another milestone to the ‘Aatmanirbhar Bharat Abhiyan’ & ‘Make in India’ initiative of the government,” the ministry mentioned in a statement.

Sona Comstar to invest in a new manufacturing facility

Sona Comstar (earlier known as Sona BLW Precision Forgings) recently inaugurated a differential assembly manufacturing plant in Manesar, Haryana, India, set-up at the cost of ₹370 crores. The facility, spread across five acres, is expected to generate direct employment for 720 skilled workers and indirectly create thousands of downstream jobs. The plant manufactures differential assemblies and e-drive modules for its global customers, furthering the vision of ‘Aatmanirbhar Bharat’ and ‘Make in India for the World.’ The location of the new facility is a preferred manufacturing destination on the Delhi Mumbai Industrial Corridor (DMIC) and provides seamless connectivity via road and rail with seaports on the western coast. Accrediting the vision of the development of the new facility, Sunjay Kapur, Chairman, Sona Comstar, stated, “This facility is being built to focus on manufacturing differential assemblies for our EV customers globally. We have used state-of-the-art technology and processes in this plant to meet the stringent quality requirements of our customers.”
Minda Industries to invest over business expansion

Minda Industries recently announced that it would invest over ₹250 crores in expanding its four-wheel lighting and alloy wheel business to meet the increased demand, as its existing units are operating at near capacity. As a part of this expansion, the automotive components maker will set-up a new manufacturing plant at Bhagapura, Gujarat, India, to cater to the increased demand for four-wheeler automotive lighting. Talking about the changes that have taken place in the automotive lighting industry, NK Minda, CMD, UNO Minda, conceded, “The automotive lighting industry is witnessing a gradual shift in technology to more LED-based lighting products. With strengthened technical capabilities in the next level of lighting technologies, we are well-positioned to benefit from these technological shifts and to achieve leadership in the segment.” He further added, “Similarly, in 4W alloy wheels, customer preferences are moving towards alloy wheels. Though the penetration of alloy wheels has increased in the last few years, it is still very low in comparison to developed countries providing ample opportunities for our growth in the future.”

Ambuja Cement Foundation hosts roundtable on gender equality in the manufacturing sector

Ambuja Cement Foundation (ACF), in association with Global Reporting Initiative (GRI) South Asia, recently organised a virtual roundtable on ‘Gender equality in manufacturing sector’. The event included several speakers from the industry, including René Van Berkel, Representative UNIDO, UNIDO Regional Office India; Rubana Huq, President, Bangladesh Garment Manufacturers & Exporters Association; Dr Aditi Haldar, Director, GRI South Asia; Suhas Joshi, Head – Sustainability & Business Stewardship, South Asia Bayer Group; Pratima Kirloskar, Promoter Group, Kirloskar Brothers and Magali Anderson, Chief Sustainability Officer, Lafarge Holcim.

Pearl Tiwari, Director & CEO, Ambuja Cement Foundation, said that women participation is lesser in developing countries – problems such as wage gap and skill gap exist. Dr Haldar further asserted that we, as a society, need to come up with affirmative steps to create a safe working space for women. The keynote address was given by Berkel on ‘Towards gender equality in manufacturing’, where he said that women are underrepresented in decision-making positions – in managerial roles and on boards. Later on, Huq talked about how women empowerment looks in Bangladesh and cited that women empowerment has happened in Bangladesh at the fastest possible rate because the readymade garment industry created the job opportunity for them. Then, Pallavi Atre, a sustainability expert at GRI South Asia, revealed that not necessary that the bigger the company, the more progressive the practices. It was then time for the virtual roundtable, moderated by Haldar, with Joshi, Kirloskar and Anderson as participants. Here, Kirloskar put across that from the management point of view, there is a fear that there could be a lower level of productivity from women due to physical limitations. She also divulged that two things are important – a woman’s right to property and a woman’s right to finance.

Sharing her views, Anderson said that the key learning is that we should accept true diversity and accept women with their true capability. Plus, she informed that they have 30% of women on the executive committee at Lafarge Holcim. Furthermore, Joshi highlighted that 50% of India’s workforce is still dependent on agriculture and the total working women employed in agriculture is around 80%. Therefore, if we are not making an impact on this sector, then our work in the manufacturing sector becomes quite meaningless. The virtual roundtable showed we already see a change in terms of gender representation in manufacturing and other industries. While we still have some way to go, women today can confidently consider a potential career in manufacturing.
TIMTOS 2021 Online: A new paradigm for the global machine tool industry

TIMTOS 2021 Online recently attracted the attention of the worldwide metal processing and machinery industry and gained over 120,000 visits in its six-day exhibition period. Its interactive mode commenced from March 15, 2021 to March 20, 2021.

According to the statistics, visitors from 58 countries have joined the online events. The top five among them were – India, Japan, Vietnam, China and Turkey. The exhibitors who got the most attention were – Fair Friend Group, Yeong Chin, Tong-Tai, Leadwell, Equiptop, Kao Fong and Victor Taichung. The products that visitors were most interested in were – 5-axis vertical machine tools, CNC lathes, turning & milling composite lathes, collaborative robots, rotary tables and automatic sanding belt grinders. More than 100 business meetings were held, which created fruitful business opportunities with positive feedback from both visitors and exhibitors. As per the visitor and exhibitors, TIMTOS 2021 Online seems to have set-up a new paradigm for the global machinery industry to follow in holding the online exhibitions.

A number of online visitors are old friends who deemed TIMTOS as a must-visit trade show. For instance, the General Manager of Turkish manufacturing company, HAKSAN Machine, highly affirmed not only the clear and easy-to-operate interface of TIMTOS Online to view exhibitors’ product information but also the fair price and high quality of Taiwan’s machine tool products. He said that he had identified potential suppliers as soon as he participated in business talks and looked forward to visiting the show in person and interacting with the suppliers face-to-face in the near future.

In addition, Italian visitors unanimously gave TIMTOS Online the thumbs up. An Italian journalist called TIMTOS Online “the best online trade show in the world”. As a visitor, the CEO of APM Trade also praised TIMTOS Online for its clear and easy-to-operate interface, adding that he had searched and negotiated with three suppliers through voice calls and business card exchanges. Other Italian visitors, such as FAUSTINO PITTORI & C and DIPLOMATIC MOTIONS SOLUTIONS affirmed the success of TIMTOS Online as well.

The Fair Friend Group (FFG), a high-profile exhibitor who received great attention in the online show, said that as global economic activities shift gears to online development, the transmission of information has turned out to be more comprehensive in terms of speed, depth and breadth. Not only did the online platform help FFG promote its technology and image but the TIMTOS Glimpse featuring the FFG launched with the organisers even helped support the FFG agents to promote business to markets which were less explored due to time & geographical limits, such as the Central and South America, from where inquiries keep coming one after another.

TIMTOS Glimpse, a highly popular series of events launched in August last year, was relaunched with the theme of ‘Smart Manufacturing Factory Tour’ during the online exhibition period. In addition, other events including the TIMTOS Studio for new product launches, the TIMTOS Factory Live for showcasing the factories of suppliers and the ‘Smart Manufacturing Summit’ were also aired to help buyers grab industry trends first-hand amid the pandemic. All those videos, which exceed a total of 10,000 views, will continue to spread their popularity online through the browse mode.

TIMTOS Online can be attended in the display and browse mode from March 21, 2021 to April 15, 2021. During this, the visitors can continue to communicate with the exhibitors through the text messaging function and check the Show Weekly in the online media centre every week. The global buyers are more than welcome to keep following TIMTOS Online. It is expected that the next TIMTOS will be presented in a hybrid format merging the real with the virtual.
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   - 06. 200 to 499
   - 07. 500 to 999
   - 08. 1,000 to 2,999
   - 09. 3,000 & more
“We abide by the Indian & global standards for manufacturing lubricants”

...mentions Kapil Gandhi, Head – Technical Department, Idemitsu Lube India – a leading manufacturer of automobile and industrial lubricants globally – in his interview with Juili Ekalahare. He throws light on the company’s next-generation cutting oil, its OEM tie-ups and their focus on deriving latest technology-based solutions for industrial and EV segments. Excerpts...

How have you seen the oil & lubricant market growing in India, especially, given the COVID-19 encounter? Which are the important markets for Idemitsu right now?

Your company recently introduced a next-generation cutting oil ‘Daphne Alphacool CS’. Can you tell us more about it and its USP?

With the rising awareness of environmental issues, what role is Idemitsu Lube India playing, especially with the regulations on chemical substances used in oils?

Does your company have any OEM tie-ups planned for this year?

What do you see as the biggest area of growth for your company in the future?

The oil & lubricant market in India had witnessed substantial growth until pre-COVID and is under migration as per change in regulations & policies, such as BS-IV to BS-VI implementations. The Indian lubricants market was valued at over 2,610 kilotons in 2020, and it is projected to register a CAGR of more than 1.5% during the forecast period, 2021-2026.

Moving ahead, we are strengthening our position as one of the leading lubricant companies and if we look at the Idemitsu India business profile, strategically, we have diversified it in various segments, such as factory fill, genuine oil, industrial and retail.

Daphne Alphacool CS is a water-soluble cutting oil, assisting to improve the work environment through a special surfactant imparted with a high heat resistance property. The excellent defoaming property makes it suitable for high-speed and high-pressure machining centres. Also, to add up, it can give excellent cost-saving benefit through reduced misting, reduced stickiness, reduced cost on machine maintenance, extended sump life, reduced oil consumption and improved tool life.

We abide by the Indian as well as global standards for manufacturing lubricants in India, and there are clear regulations on certain chemical substances which should not be used at all. As a responsible organisation, we always focus on reducing emissions by our fluid technology. This technology formulates products and helps in extending the life of lubricants, reducing harmful emissions & oil consumption and enables greater efficiencies & output.

We are already a preferred partner to key OEMs in India by offering the most innovative lubricant solutions. Currently, we are in discussion with several OEMs to derive the most appropriate product mix from the quality & performance point of view. We recently collaborated with OEMs in India to design optimised EV reduction gear for suitable breakthrough applications, and we wholeheartedly welcome all EVs and component manufacturing.

The automotive-based consumer segment is going to remain a key contributor in Idemitsu Lube in our India growth for the next few years. However, we are focusing on deriving the latest technology-based solutions for the industrial and EV segment to align ourselves with changing market dynamics. Our company will continue to contribute by reducing CO₂ emissions through innovative technology-based products, which will help deliver fuel economy, increasing drain intervals & reducing electricity consumption.
“We have enough initiatives. We need more awareness, more coverage & engagement.”

...mentions Arundhati T, Managing Director, Plazma Technologies – a company that offers cutting solutions with best cutting economics & quality – in her interview with Anvita Pillai. On the occasion of Women’s Day, she divulges her motivation to join the industry, strategies that can be implemented for a gender-balanced environment and more. Excerpts...

What made you decide to get into the manufacturing industry, given that it’s quite male-dominated?

I love creating technically unique things. Being a part of the team that builds unique products is a creative process that, to date, keeps me passionately interested. In my mind, I never thought about the industry being male-dominated at all; for me, we all are equals. I have always lived by that.

Do you think there is a male-female divide in manufacturing? What are the key components of a gender-balanced manufacturing organisation?

I encourage women to join my organisation and give them preference. Typically, the demands of a manufacturing job profile are greater and the understanding, lesser; fewer women apply or stay long enough to rise in the rank. The key is to understand that women operate in different & more challenging circumstances and need more conducive environments. There should be an overall belief that women contribute greatly and should be accommodated with greater effort.

When it comes to manufacturing industries, like aerospace, defence or automotive, we don’t see many initiatives/encouragement to attract female students. What initiatives can education institutions take to encourage women into the field?

I often get invited to seminars in prestigious rural and urban universities. Unfortunately, the ratio of girls joining manufacturing engineering is still dismal. There should be an awareness about these manufacturing opportunities from early educational years. Early on, awareness of the opportunities will help young girls to think differently. We have enough initiatives. We need more awareness, more coverage and engagement.

What are some myths related to women in manufacturing that you would like to bust here? How can the industry work on creating a more women-friendly environment to encourage the upcoming workforce?

Women don’t work long hours and are scared to be on the shop floors. They don’t know how to manage workers. The male workers don’t respect a female boss and are averse to reporting to a woman. These are some of the prevalent myths. I have been on various shop floors across the country, and none of the above instances are true in their absolute sense. We need more women to bring their perspective to this sector. The industry is waiting for women’s applications to get into manufacturing aided with conducive HR policies, but women need to take that first step.

What do you think is the best part of being a woman in the manufacturing industry? What would your advice be for women aspiring to enter this field?

A woman’s inherent ability to multitask, be patient and her skill of managing people becomes helpful. A woman needs to understand that her family, partner and support circle are with her, as long as she knows what she feels passionate about, what field of work challenges & interests her. She needs to bring her circle of people into her thought process or create such a circle of support. A woman is not alone, especially in today’s world.
While leading the GM team that created ‘intelligent assist devices’, including cobots, I worked with line associates to better understand their jobs. I learnt various things about the manufacturing ecosystem: Manufacturing plants are extremely complex, so at Drishti, we look at systems instead of individual stations; despite a misperception that robots have taken, humans perform 72% of factory jobs, which are incredibly hard on their body. Hence, we focus on empowering and uplifting individuals. Lastly, the best equation in a factory is human plus machine. So, we’re taking the machines’ processing power and using it to drive better human decision-making.

You are a veteran who has worked on the world’s first cobots at GM. Can you give us your take on the cobot evolution? How is Drishti taking this evolution a step further for manufacturing?

The years 2020 & 2021, both were and are erratic. Were there any opportunities & learnings in the crisis for your organisation?

How is Drishti a different experience in comparison to companies offering similar solutions?

Can you elaborate on Drishti Trace & Drishti Flow? How is it a potent solution in a time where WFH is still prevalent?

What is the long-term ‘Drishti’ for your organisation? Are there any collaborations/expansions in the pipeline?

Despite the tragedy, inconvenience and cost of the pandemic, there were a few silver linings. During the early onset of COVID, our customers paused all buying to see what happened next. We used that time to accelerate our product development; for example, our neural network training time is 14x faster than pre-COVID, delivering results in days instead of weeks. Also, since our products give visibility and liberty to conduct business away from the line, there was a high demand in 2020, and it has really driven Drishti’s growth in the past 12 months.

We are vastly different from anything in the market. We are the only company in the world offering real-time analytics, insights on manual assembly lines and thinking about manufacturing systems instead of single manufacturing stations. We extract information from video streams while almost every other computer vision vendor analyses single frames. This is what lets us roll out across lines.

Drishti Trace, a traceability solution, gives manufacturers live & recorded video streams and YouTube-like video searchability for root cause analysis, quality control and remote genba, among other uses. And Drishti Flow layers on AI-generated analytics from the video stream and converts those analytics to insights, like line balance, cycle variability, station histograms, etc. This identifies cycle time variances, eliminates production bottlenecks and rebalances lines, ensuring adherence to standardised work and more.

I love that play on words! There were two reasons we picked this name. The first is obvious – computer vision is at the heart of the product and company. Second, we believe, with AI-powered production, we have a vision for what the future of manufacturing will be.

In the near-term, we’re looking to expand our footprint into EMEA and Asia while we continue to build our customer base in North America.
How to weather-proof manufacturing for climate change

Don’t you hate it when it’s supposed to be winters, and it starts raining in the middle of the day or there’s a heatwave in the afternoon? Climate change is real, and the iceberg melting is not its only impact; it brings disruption with it in various strata of world functioning, like in country’s GDP. For example, temperature rise sucks the energy out of people, demands much more physical effort in day-to-day work and lowers productivity. This means labour-intensive industries, irrespective of the sector, suffer in productivity, ultimately affecting a country’s GDP in the long run. The paper ‘The impact of temperature on productivity and labor supply: Evidence from Indian manufacturing’ cites that hotter years yield lower economic output in developing countries, & climate control can significantly mitigate productivity losses. The data from 58,000 factories across India concluded that manufacturing units produce about 2.8% less revenue for every one-degree rise.

Climate change does not just affect sectors that have outdoor labour work, like agriculture, construction, etc, but also labour-intensive industries, like manufacturing, which work indoors. Now companies might think offering an air-conditioned/cool working environment would be the solution for it. But not really. The study also showed a 1-2% increase in occasional absence during hot weather, which is not penalised by wage contract despite an environment-favourable work atmosphere. And in some industries, daily wage workers prefer travelling back to their villages and live on government offered grants for the time being. If manufacturing industries wish to grow with the USP of cheap labour, they must learn how to make their environments more workable.

The manufacturing sector contributed to about 15% of India’s GDP in 2012 (about $270 billion), so a 3% decline in output implies an economic loss of over $8 billion annually relative to a no-warming counter-factual, according to the paper.

While digitalisation of factory floors would be a good solution, it is not the only potent solution. Technology is only as good as the man manning it. Technology, too, requires monitoring, i.e., labour on the shop floor. So, what could be a better solution? To begin with, more environment-friendly manufacturing methods, like adopting renewable energy, could be a step in the direction. Industries need to make sustainable manufacturing a mandate; regular checks analysing their environmental impact, recycling the manufacturing waste, choosing eco-friendly partners, stock management, etc could be a small step towards ensuring climate sustenance.

Everyone, especially country leaders, needs to recognise climate change as a fundamental factor hindering their growth. As promised in the Paris Climate Change Agreement, India could achieve carbon neutrality by 2050 and a 33-35% reduction in carbon emission by 2030. But for this, we need to make its regulations more stringent and ensure more mandates that enable sustainable, eco-friendly practices. It is a long-term investment, a slow investment – but the only way forward.
2020 was something different and unique for the manufacturing industry, both in a good and bad way. But it definitely gave manufacturing industries technology as a saving grace throughout the period. The article explores how the year 2021 would likely turn out for the industry and the top five trends to watchout for this year.

Asif Moghal, Senior Manufacturing Industry Manager, Autodesk
Major systemic changes to the manufacturing industry were well underway to converge the physical and digital prior to the widespread disruptions of 2020. And the disruptions aren’t finished. Trends arising from the effects of Brexit, new waves of COVID-19 and the rolling impact of all-digital living & working promises to keep shifting the ground under manufacturing in 2021. Even before the pandemic shredded plans and targets, manufacturers struggled to maintain cost-effectiveness while adopting or planning to adopt Industry 4.0 digitalisation initiatives. In 2021, the manufacturing industry will continue to face economic upheaval, evolving consumer behaviour and changes to global trade patterns. The efficiencies of fusing the physical with the digital in manufacturing — from disruption-ready supply chains to digital upskilling and intelligent automation — are vital for fulfilling sustainability goals. However, many industry thought leaders also believe this convergence is an existential challenge that firms must succeed in. There will be risks to mitigate but, more importantly, opportunities to grasp as the industry reimagines the new possible. Here are five ongoing manufacturing trends that will continue to define the near future, with some thoughts on how the industry can respond.

1. Higher demand for bespoke products

Mass customisation may not be new, but the demand for personalised products is rising. In saturated product categories, differentiation through features alone is getting harder to achieve. On top of that, 2020 made consumers acutely aware of the things they value most. From fast-moving consumer goods to industrial machinery, customers want products that reflect their individual needs.

This year, manufacturers will have to find ways to satisfy an even more personalisation-hungry market on a mass scale. They’ll need to do this while remaining profitable — despite the artisanal overheads that come with bespoke production. Meanwhile, design and manufacturing teams will need to avoid falling victim to product development systems overloaded with customisation requests, creating bottlenecks that kill innovation. Fortunately, as demand takes shape, there will be an opportunity to look again at both pricing and fulfilment. After all, research shows consumers will pay 20% more on average for bespoke products — and wait longer to receive them.

2. The rise of smart products

Consumers are rapidly evolving new behaviours, and their expectations are rising faster than manufacturing can follow. Of the 30,000 new products introduced to the market each year, some 72% fail to hit profitability targets. After the shocks of 2020, consumers want to live better lives, so everything they purchase has to add value. But what constitutes value? Manufacturers have to get closer to end-users to know the answer. In 2021, smart manufacturers will not only focus on concepts, such as Big Data and IoT but also get better at interpreting the data they already have. They’ll use it to develop smarter products that offer bundles of extended services and benefits, which provides ongoing insight into how consumer preferences and behaviour are evolving. Instead of products, manufacturers should think of whole ecosystems, attaching apps or software features, or new subscription models that deliver recurring revenue (and data).

Meanwhile, product designers will need to give customer experience their full attention. Rather than focusing on new forms, features and benefits, they’ll need a stream of up-to-

Industrialised construction has led to more prefabrication of building components for on-site assembly later—a direct nod to manufacturing processes.
date information from customers, suppliers and analytics to understand what the data is telling them and the tools to apply what they learn to design.

3. The use of data to inform automation

Automation of repetitive tasks is already well established in high-cost countries, particularly in verticals like automotive that feature standard product or series production. The challenge in 2021 will be to apply automation in markets defined by trends, like mass customisation, where many processes and schematics can’t be pre-programmed. For example, automation can be used to address customer preference categories rather than every individual whim, helping manufacturers create personalised products while remaining efficient. To do this, automation systems will need to be fed with data currently sitting in manufacturing’s technology silos: living on individual machines or inside disconnected software solutions.

Applying new levels of automation beyond the factory floor will also uncover value and become a key driver of new efficiencies. In the design phase, for instance, greater adoption of generative design will help automate the resolution of problems, letting engineers and designers focus on value-added tasks. If there’s a caveat, it’s to avoid seeing automation as a cost-saving cure-all. The human beings in manufacturing’s value chain are another kind of data silo, and the information and experience living in their heads are invaluable. Manufacturers will need to balance machine and human work or fall victim to cautionary tales, such as Tesla’s over-automation of production for its Model 3, which led to severe delays.

4. Increased supply chain resilience

When the pandemic upset supplier relationships this year, there was a knee-jerk assumption that procurement would simply come back onshore. That’s proven to be untrue. Even when local suppliers have the goods manufacturers need and the capacity to take on new orders — restrictions like lockdowns can keep people away from work sites and stop materials from getting through.

Supply chains need to be flexible enough to scale as business levels ebb and flow: 2020 demonstrated just how brittle they’ve become after years of relentless cost optimisation. It’s also revealed how much manufacturers still rely on critical strategic providers that can’t easily be replaced. In 2021, manufacturers will have to adopt measures to strengthen supply chain resilience. Reviewing supplier relationships to understand where critical capabilities might lie will help shield against the impact of disruption.

Firms can invest in greater digital connectivity with strategic suppliers to strengthen collaboration. They can also take steps to spread the risk of operational downtime by finding backup suppliers for the most vital materials, services or components. Investing in digital skill sets that support greater information sharing will take on new importance. Manufacturers might consider key strategic supplier training to help them adapt to new communication and collaboration tools.

5. The convergence of manufacturing with both construction and design

Are buildings just very large products? The construction industry seems to think so. It’s borrowing heavily from manufacturing: adopting tools, processes and working
methods that reduce costs and inefficiencies. That’s led to
greater cross-sector collaboration in areas such as data. It’s
also impacting how construction projects execute.
Industrialised construction has led to more prefabrication of
building components for on-site assembly later — a direct nod
to manufacturing process.

For manufacturers, greater convergence could lead to
stronger supply chains. Construction is also bringing more
agility to the sector, creating modular factories that can be
restructured and re-engineered quickly to create smaller
batches of high-value products. Designers are creating products
that have structural aspects, and architects are building
structures that function like products. Manufacturers should
be looking to recruit skill sets that complement both industries.

Placing data at the centre of the product-development
process has also led to the convergence of design and
manufacturing, where data in the cloud centralised within
software tools creates a common data experience and better
collaboration across departments, from the factory floor to the
C-suite. This data-led convergence can exponentially accelerate
product development by breaking down silos of communication
between departments and unlocking the potential for greater
automation, which in turn increases productivity by reducing
the delays of working manually.

Automation technologies, such as generative design,
harness Artificial Intelligence (AI), cloud computing and
data to automate design and manufacturing aspects while
further blurring the lines between both disciplines. There is
also an enormous potential to reduce waste by cutting down
on the material used, reducing part counts and moving more
of the testing and validation processes from physical to
simulated environments. These convergences point toward
the future of work when designers are freed from mundane
manual tasks and have more time for innovation. Executives
will have more bandwidth to focus on business growth.
Manufacturing professionals will gain new skills working
alongside robotics and automation while staying connected
24/7 to the entire supply chain.

As more construction elements are manufactured in
controlled environments and specialised construction robotics
aid in tough manual labour, workers will enjoy safer and less
physically debilitating conditions. And for all employees
involved, the thorough line of a common data experience will
make remote work — with the added utility of augmented-,
mixed- and virtual-reality tools — more efficient, whether it’s
simply desired or required.

2021: Manufacturing’s year of digital

The common thread of digitalisation runs through all of these
2021 trends. This will be the year when manufacturers realise that
digital transformation isn’t limited to production applications like
robots. It applies to the full business lifecycle: concept, design,
engineering, production and customer experience, through to
management and operations. With its vast potential to reduce
material waste, allow seamless remote collaboration and foment
other efficiencies, a digital transformation is a key to the
sustainable transformation of industry.

This year, manufacturers will need a digital strategy that
can overcome the challenges of globalisation, customisation,
resilience and complexity — and take as much guesswork out
of product development as possible.
“All of us are going through a learning curve to take advantage of new modes of engagement”

...mentions Anbu Varathan, Director General, Indian Machine Tool Manufacturers’ Association (IMTMA) & CEO, Bangalore International Exhibition Centre (BIEC), in his interview with Anvita Pillai. IMTMA, a single point of reference for India’s machine tools industry, is a national association of machine tools and allied industries. In this conversation, he discusses the reboot of the exhibition and manufacturing industry in 2021, IMTEX 2021, growth opportunities in the global market, highlights of Tumakuru Machine Tool Park and more. Excerpts...

The manufacturing and machine tools industry has suffered severely due to the pandemic in the last year. How, according to you, is the industry regaining the growth pace? Can you tell us about some of the latest developments in the industry? The manufacturing industry has taken last year’s setbacks in its stride, reinvented & strategized its businesses and bounced back. Industries have received encouraging enquiries and orders over the last few months, auto sales have picked up, which is encouraging news for the machine tool industry. India’s manufacturing PMI, as per IHS Markit for January 2021, was at 57.7, reflecting the strongest improvement in three months. If the situation continues to improve, we may reach pre-COVID levels of growth by mid-CY 2021.

How was the overall response for IMTEX Connect? What are your plans for the forthcoming IMTEX show scheduled in June 2021? Do you think the pandemic will have some effect in terms of people visiting the show? IMTEX Connect 2021 successfully brought the machine tool industry and user industries together on the digital platform. This digital initiative enabled exhibitors to present their products and interact with visitors successfully. The exhibition drew a good response from stakeholders across the world. The event featured over 90 exhibitors and more than 7000 visitors from 45 countries.

IMTMA will organise IMTEX & Tooltech 2021 in June 2021, with BIEC being ready to host the show with all SOPs in place. The invention of the vaccine has given people the confidence to step out and conduct business transactions; more people are eager to participate in physical exhibitions. IMTEX will be one of the first major shows to be organised post-pandemic, and the success of the show will pave the way for many other events.

You recently took over as the President of UFI for 2020-21. What are the opportunities the Indian exhibition industry can expect from the global market? How can the industry grab and make full use of these opportunities presented by the global market?

India is a growing economy with many multinationals looking at it as an alternative manufacturing destination. Post-COVID, India will bounce back strongly with 11.5% GDP growth in 2021 (according to IMF), which, if achieved, is going to be a phenomenal feat. Going by these indicators, we foresee strong growth in the Indian exhibition industry. This is because the exhibition industry has played a crucial role in bringing new technologies into the country.

I am sure many new portfolios will be added to the existing shows who are looking to expand. Also, whilst there will be new shows in niche sectors, we will also see more mergers and acquisitions. The Indian exhibition industry is primed for such growth. There are a few
world-class venues and a few others in the pipeline that will enhance both the exhibitor and visitor experience.

‘New normal’ has been the slogan for the last year and seems like it would be for this year, too. What would be the new normal for event organisers, exhibitors & visitors hereon?

Our entire ecosystem, be it the exhibitors, visitors or show organisers, are moving from an emergency response to the new normal, where we mix the best of what technology has to offer with increasing access to physical spaces. There are many things that exhibition industry stakeholders have learnt during this period which they want to build into what would be offered on an ongoing basis. Technologies are bringing value proposition to shows by helping visitors explore and understand more about the products before they visit exhibition venues to spend quality time at the expo. This is expected to result in a better business outcome among exhibitors. Also, the exhibition industry stakeholders will be focusing more on safety and hygiene aspects while organising shows. Technology will come as a rescue for people who cannot travel as they can explore the hybrid format of physical exhibitions and gain insights into products and service categories that they could access. All of us, whether event organisers, exhibitors or visitors, are going through a learning curve, and we are learning to transpose our events in ways to take advantage of new modes of engagement.

The MSMEs’ recovery has been crucial on the government’s agenda, and the industry has also appealed to the government to help the sector. How do you think the industry and the government can collaborate for the growth of the sector?

Do you think the Union Budget presented recently will help the industry grow and expand in the coming years?

The Union Budget unveiled recently is growth-oriented and holds promise for kick-starting India’s economy in the medium- to long-term. The increase in budget outlay for railways, power, infrastructure, etc, is expected to increase the demand for construction equipment and machine tools. Some key budgetary allocations, such as provisioning of ₹15,700 crores, more than double the previous year, is a positive step for developing MSMEs. Other incentives, such as collateral-free loans for businesses, fund of funds for MSMEs and MSME grievance redressal launched last year, will also help the manufacturing industry grow long-term.

Can you share with us the progress of the Tumakuru Machine Tool Park? What are the highlights of the project?

The Government of Karnataka has recognised machine tool manufacturing as a primary growth area. To support this, the Government of Karnataka, along with the Government of India, has set-up an exclusive industrial park for the manufacturing of machine tools and related items. The machine tool park is located in the Tumakuru district, close to Begaluru and offers plug-and-play infrastructure ready to build factories at a very attractive land price. About 115 acres have been allotted to the investors. The park provides a great ecosystem and opportunity for investments in machine tools manufacturing for global machine tool companies. Indian companies can look for joint ventures and collaborative efforts with global players.

Anbu V has been associated with IMTMA for over 17 years and has been the CEO of BIEC for nearly 13 years. He has been a Board Member of UFI since October 2011 and has recently been elected as the President of UFI for the year 2020-21. He has a degree in metallurgical engineering from the IISc, Bangalore, and has work experience of 27 years. Before IMTMA, Anbu was with CII heading various key areas of technology/IPR activities.
RFID for injection moulders: A step towards Industry 4.0

Mould management using RFID enables an interference-free production process and reduces downtime to a minimum. Upgrading it a step further towards Industry 4.0/IoT is possible. The white paper uses an example of manufacturing plastics with injection moulding machines to describe how Industry 4.0 can quickly gain entry into production, make processes more efficient and minimise costs.

The terms Industry 4.0, Big Data and Industrial Internet of Things (IIoT) are now on everyone’s lips. They describe the intelligent networking of extremely diverse areas in the industry. For example, in production & logistics, machines, storage systems and equipment exchange information with each other and can independently trigger actions.

But what does Industry 4.0 mean in practice for everyday applications?

It’s often the little things — ingrained habits that we hardly think about — that can make daily life difficult. Solutions are available today that would make a lot of these things more convenient. Things that are currently accepted as a matter of course in everyday life, such as e-tickets & mobile check-in using a smartphone or making an online purchase with a one-click order process, are convenient and can already be called standard. It is already standard for state-of-the-art cars to signal when service or an oil change is due. This depends, of course, on the driving style and usage behaviour rather than just the odometer reading. And so, this data is already automatically transmitted to the manufacturer or service shop. If this transparency may already go a little too far for some of us, industrial production is somewhat different. Big money and competitiveness are at stake. And such transparency certainly pays off.

Today, we still cannot estimate the ultimate extent of the ‘smart home’, which includes not only the controls for lighting, heat and blinds but also refrigerators that automatically reorder food. Though now it is clear that the consumer sector
can’t imagine life without tablet, computers and smartphones, when Apple launched the iPad in 2010, just five years ago, many did not believe they could manage without a keyboard and operate it using just their fingers. Today, there are already more users swiping their fingers while on the go with mobile internet than users at desktop computers. We must pay a lot of attention to this to prevent industrial manufacturing from being left far behind by these trends.

The expandable modular concept

The moulds and tools used in manufacturing plastic parts are usually very complex and expensive. They are subject to wear & contamination and require regular care, cleaning and maintenance. Unfortunately, this care is often neglected due to lack of time and the associated effort & expense; likewise, the documentation of mould data, which often has to be entered by hand in mould sheets or books, is a time-consuming hassle. Moreover, these manual processes are also error-prone and lead to problems ranging from trouble with equipping all the way to mould breakage.

An initial goal is to reduce the effort for manual documentation or automate it, which is no longer a problem using RFID data carriers. Such data carriers, the ‘memory’ of the mould, can now be read using a commercially available smartphone with Near Field Communication (NFC) and, in turn, every mould into a ‘smart mould’. Automated mould management of injection moulds in manufacturing also eases preventive maintenance, reducing unexpected and costly production downtimes, making planning for the available resources more accurate. Usually, such solutions can be used by means of Manufacturing Execution Systems (MES) software, but only for newer, networked machines and often for a specific manufacturer. The option described in the following is meant to show a universal, non-proprietary solution that can be retrofitted without modifying the machine control system. This is not an isolated solution but a future-proof, expandable modular concept, with the outcome being a comprehensive lean production solution.

Manufacturing Execution System (MES)

The basis for state-of-the-art production planning and control systems is MES, which ensures, for example, that the machine facilities are working efficiently to capacity and the production quantities are manufactured according to schedule. Furthermore, manufacturing process data, which also contributes to quality assurance, is collected and managed. Such data is indispensable, for example, for regularly performed audits. Some machine manufacturers offer proprietary solutions, making sense if the machine facilities are uniform and consist predominantly of machines from one manufacturer. But if machines from different manufacturers are being used, including older machines, then non-proprietary solutions are better suited. An MES is a complex tool that provides extensive functions that are available to users but, in many cases, not at all to the full extent. An introduction requires good planning because it involves a significant investment, and though long-term cost savings are no doubt possible, the total savings potential is not easy to illustrate. Savings that can be achieved through MES, and thereby through lean production, consist of many different components. These primarily include lower throughput times & fewer rejects, more efficient utilisation of machines and optimisation of set-up time, to name a few. It is entirely possible to have transparent manufacturing in
which IT systems, Operating Data Acquisition (ODA), material planning & order planning are networked with everything from the shop-floor management (MES) to logistics using Enterprise Resource Planning (ERP). Now, there are even standardised Key Performance Indicators (KPI), which are derived from the VDMA standard sheet 66412-1 and listed in the ISO 22400-2 standard. These include machine capability index, set-up ratio, utilisation efficiency, scrap ratio, technical efficiency, good quantity and Overall Equipment Effectiveness (OEE).

Machine Data Acquisition (MDA)

An easy first step in Industry 4.0 is the automatic collection of machines, production and mould data. A central metric for injection moulding is recording the shots produced. A large number of parameters can be determined using the shot count and the mould master data. This is the basis for the mould’s product memory. That takes care of the first step for efficient mould management. Solid, predictable maintenance depends on easy monitoring of service life, cleaning cycles and maintenance cycles. But here, the term ‘monitoring’ is already incorrect. Rather, the ‘smart’ mould independently tells the maintenance personnel when cleaning/maintenance is due. Production planning is simultaneously notified that, as of a certain time, the tool will not be available for an exactly defined period. This information is processed in production planning, and if needed, the usage of machines and moulds is adjusted, much like with a navigation device that calculates alternative routes when traffic is disrupted. Unlike preventive maintenance, the procedure returns reliable values, which can serve as a basis for predictive maintenance. Thus, it makes an important contribution not only to cost minimisation but also to comprehensive total maintenance.

Mould management – Life-cycle management

Although the inventory of injection moulds represents a large financial investment and usually far exceeds that of the machines, mould management that functions well is often the neglected child in an injection moulding business. Even companies that contract out their parts to contract manufacturers, making them mould owners, rarely have an accurate overview of their mould inventory’s respective status (asset tracking). Handwritten mould manuals, appended sheets, disks or USB flash drives are common, while databases and Excel tables are already the marks of a progressive shop.

Maintenance

The most expensive maintenance is usually the repairs after the damage has occurred with associated downtimes. Since many problems recur, one can use empirical values, provided they have been documented, and easily estimate when a certain error will reappear. The shot count is an essential factor for this. But the produced quantity is not all that is critical; blank shots when moving in also add to the wear. Likewise, the number of mould changes is important for maintaining the multi-couplings, for example. Many of these parameters can be stored directly at the mould to be called up everywhere at any time. This means the moulds are ‘smart’ and can save & provide this information.

Savings potential – ROI calculator

To enable a statement to be made about the ROI for such a solution, users were asked for their assessments. Some aspects from their practical experience were summarised, and the basic conditions were evaluated. Therefore, the ROI essentially
depends on the number of available machines, moulds as well as the number of mould changes, the time for maintenance and documentation connected with this. Accordingly, the savings’ potential results from better capacity planning by the maintenance department and altered maintenance cycles. It is better to determine them based on actual production figures rather than on periods of time. In exemplary applications, this yields an ROI of less than one year. Of course, well-maintained moulds also achieve higher production figures than those for which maintenance is neglected.

Optimisation of set-up time

A major lever for cutting costs in injection moulding manufacturing is optimising and reducing set-up times. The more often moulds are changed, the greater the potential savings. Maintenance of the moulds themselves also often requires disassembly and causes several hours of downtime. Reducing these forced breaks or enabling them to be planned has a positive effect on the production process, too. The prerequisites for lean production are fulfilled by introducing an automatic mould change system. To ensure the use of the correct mould and corresponding gripper of the removal robot during an automatic mould change, these components are often already equipped with non-contact data carriers. Consequently, only a small step needs to be taken to use this technology even more effectively and simultaneously for mould management.

Cycle of an injection mould in production

Even without this degree of automation, however, automatic maintenance monitoring can be used successfully. This is shown by the following example of an injection moulding application in which the insertion of parts and the
mould change are done manually.

Application example: In one manufacturing process, miniature sensors are over moulded with plastic housings. Two cassettes serve as moulds for this purpose; they are manually populated with the sensors to be encapsulated and alternately inserted into the main mould holder.

Problem: After some time, deposits pose the danger of the small, vulnerable fitting pins on the mould getting damaged or breaking while closing the mould.

Previous solution

This problem can be prevented by regular cleaning. Since cleaning during production leads to the mould cooling off, this would disrupt the production process and increase the scrap rate. Therefore, cleaning should take place only as often as necessary and, as much as possible, during scheduled breaks in production. This is why the mould was cleaned only once each time before the installation (mould change). But since this cycle depends on the produced lot size, cleaning may be done too infrequently (for large production lots) or too frequently. The lot size fluctuates between 1000 and more than 5000 pieces. In the case of large production lots, cleaning is usually not done in a timely manner. In the case of small lot sizes, cleaning is often even omitted. Experience has shown that a reasonable cleaning interval is about 3000 shots.

New solution approach

The shot count and various mould-specific process parameters are stored in non-volatile memory in an RFID data carrier due to the retrofit RFID solution. Detection of which mould is installed, additional mould master data and the current shot count are continuously counted and saved in the mould’s data carrier. A system with 13.56 MHz is used to enable easy mobile access via the NFC standard. Then the mould data can be read out at any time using a handheld scanner or mobile phone and can be called up online via web interface & web services. The data carrier can be easily fastened to the mould. Easy and individually adjustable options are available for installing the read head. An externally attached inductive or optical sensor, mounted at a suitable place on the machine, serves as the shot counter. The user can obtain the actual mechanical shot count by this means without accessing the machine control system.

After 3000 shots, the operator is shown a warning that changes colour incrementally up to 3500 shots to signal that the warning level is reached. Cleaning must be done no later than when the limit of 3500 shots is reached. Afterwards, a handheld scanner or Near Field Communication (NFC)-capable smartphone is used to reset the counter in the mould with password protection. A flashing red warning light will indicate if the resetting or cleaning was forgotten. Optionally, an e-mail can be sent to the production manager or machine setter in the event of a warning. All machines can be connected to the control level and an ERP or MES system using of LAN, Wi-Fi or Powerline. The result is direct access to the data and the process from everywhere.

Next steps

With only the basic functions of this stand-alone solution, it is possible to access the application via a web server or connect to a mould database using JSON or MQTT. The range of possibilities also includes a professional mould management program or production control with standard MES software. This fulfils requirements for seamless automatic documentation, which customers are requiring evermore and also makes it easy to track parts or batches. One can move production into the IoT with a manageable amount of effort. This does not rule out further expansion stages; rather, one can use such a small solution to gain initial experience. It will then be easier for one to begin using MES tools as well as define and select further MES tools, helping to reduce the risk of investing in sub-optimally dimensioned systems.
Ever since India has noticed opportunities in the coronavirus pandemic because of the world turning away from trade with China and also the China-India border conflicts that have come along, the manufacturing industry has been excitedly talking about turning local. We also have Make in India and Aatmanirbhar Bharat to consider, given its push to start manufacturing locally. But how focused has the Indian manufacturing industry been in looking at producing locally and how much of localisation has been made a priority in the country yet? It’s time that India supported local manufacturing with the highest priority and took advantage of the current situation. The Viewpoint finds out how.

“We must acquire all the critical technology that goes into the making of complex engineered products”

The manufacturing industry can become more export-oriented only when we demonstrate consistent quality & become cost-effective by using more local content. We need to invest in technologies & offer incentives to R&D related activities. We must acquire all the critical technology that goes into the making of complex engineered products. Once we do that, we can break free from import-substitution trends. For successful localisation, the government needs to ask all MNCs to improve their manufacturing footprints in India, apart from asking local manufacturers to invest in new manufacturing techniques. The government tenders should stipulate stringent technical qualification in tenders so that local manufacturers can’t get away with inferior quality/cheaper prices. 2021 looks promising as at least a few sectors in the government have started asking for 60% local content in tenders. As for Aatmanirbhar Bharat, it sounds more like wishful thinking. We have a long way to go. We just can’t substitute critical technology currently being imported by the local manufacturing industry. We need to upgrade the local manufacturing level by several notches, and this will not happen overnight. The government must create an ecosystem for world-class manufacturing in India and not find cheaper alternatives.
“The pride in making world-class products is something which must be imbibed in organisation cultures”

Zero tolerance in product quality and innovative sustainable packaging are two important pillars to be export friendly. Rather than cost, complete cost productivity is the foundation to beat the competition. The involvement and total commitment of ground-level personnel is not only essential but necessary. The pride in making world-class products is something which must be imbibed in organisation cultures. Plus, vocal for local is a parallel need in this globalised economy, understood only during the last year’s pandemic crisis. Of course, there are sectors where one needs volume to offset cost effects; however, systematic efforts and creative, supportive infrastructure would take localisation into the next orbit.

The Aatmanirbhar Bharat Abhiyan, too, is a good step forward. However, the governmental machinery is far from understanding the ground realities of industrial difficulty. Till date, the industry is considered a burden to society from a socio-economic perspective. More & more rules are being drafted & forced on industries to make them unviable. This must stop, and someone running an industry should be given equal respect, like farmers or any other societal pillar.

“The government must raise the customs duty”

India can become more export-oriented in the manufacturing industry by adopting some leverages. For example, localisation of the raw material being produced in India will reduce customs duty on importing raw material, but more focus will come on end-to-end value & job creation.

I am also seeing tremendous change in the approach of Aatmanirbhar Bharat, especially in the defence & aerospace sector. What predominantly is required that sectors like the automotive, consumables, utility, infrastructures, FMCG, power, IT, textiles, steel, telecom and oil & gas must be given the specific targets that they need to reduce imports & work on backward integration. The government must raise the customs duty so that most of the industries are forced to make products in India. Plus, foreign companies setting up manufacturing units in India will help us in job creation as well as building up the technology for Make in India sooner or later.

“The Aatmanirbhar Bharat concept needs to be transferred into an outcome”

India is already producing a lot of raw material and finished goods that could be exported globally, but very often, the potential exporters lack international standards in terms of health & environment. The Environmental, Social and Governance (ESG) criteria in Europe and the US, for example, are extremely high. Exporters not meeting these criteria will face problems. India must be able to produce raw materials and goods that meet the highest international standards in terms of technology, adhering to the ESG criteria. This will require strong cooperation with other technology companies worldwide and will take three to five years to see the first significant outcomes. Coming to Aatmanirbhar Bharat, it is a very good concept and should significantly boost India’s industry. However, the concept needs to be transferred into an outcome. Here, India needs to increase its industrial competence on international standards. These often go hand-in-hand with foreign technologies. I see this concept as a mutual benefit rather than isolating India’s industry.
“A long-term strategy is to build on India’s strengths”

The successful management of COVID, a robust legal framework and a big domestic market make India an attractive destination. All India needs is to encash the opportunity with suitable policy measures. The items necessary to emerge as a manufacturing base and export hub must be produced domestically. We must take care not only to focus on import substitution but to use the same judiciously. A long-term strategy is to build on India’s strengths and to overcome its weaknesses. This is a continuous process and 2021 is the beginning of the process. Success depends on how resolute the nation is in reaching the objective. Aatmanirbhar Bharat, too, is rapidly evolving. The aim is to create India as a global manufacturing hub which necessitates inter alia attracting global brands having the best technology and know-how to come & set-up base in India.

“If the market demand is good, then there is a higher motivation for localisation”

We need to focus more on digitalisation and enhance our operating efficiencies further, which would reduce our throughput time. The Aatmanirbhar Bharat Abhiyan is a very good platform and push by the government. If we want to start making in India, then we need higher skills. One element we need to look at is that our ease of doing business today is limited to setting up the businesses – it has to be more on running the business. 2021 looks very good for localisation. If the market demand is good, then there is a higher motivation for localisation. Plus, there are also some incentives and various supports from the government to see that more companies look at localisation in India. Also, if we look at the auto and other industries, the state governments are doing their bit quite aggressively to position their respective states in order to attract investments.

“The long-term localisation strategy involves working with efficient local vendors”

The Indian manufacturing industry is bound to become export-oriented because of the packages the Indian government has launched to promote exports. The awareness of dumping & buyer perception of import is slowly but steadily changing and buyers prefer quality over cost. The commitment of being Aatmanirbhar has percolated down to all industries. The push from specific sectors, like transportation & defence, has pushed manufacturers to look inwards locally for high-end technological development, which was earlier being imported.

The long-term localisation strategy involves working with efficient local vendors, stringent quality checks and consistency in supplies quality. The fluctuating currency and unstable global supply chains will accelerate the localisation efforts for sure in a big way. India has a massive workforce, including non-skilled workers and a rich talent pool of skilled workers, making Indian industries even more attractive to alleviate the challenges for successful localisation for 2021.
The magical future of lasers

Lasers, over the years, have managed to establish their prominence and have become a crucial technology in many industries. But over the years, they have lost their ‘wow’ factor, too. The article brings in the promising trends of lasers in the future, which could probably restore that lost wow factor.

After years of attempting to reach the top, the laser is now the smartphone of industrial tools. Like lasers, smartphones are truly small marvels of engineering, but hardly anyone is amazed by them anymore. They’ve simply become too ubiquitous, too normal. But there is a lot going on in the field of laser technology at the moment – laser users are learning to think differently. This is because future new productivity gains will only be possible if we start viewing laser machining as part of a larger process. Let’s now take a look at the most exciting and promising trends & industries when it comes to the future of laser technology.

Promising new fields
Optics and beam guidance

When laser experts finally succeeded in using ultrashort laser pulses to drill tiny, closely spaced holes in rapid succession a few years ago, it was an incredible feeling. So, what’s next? We’ll soon be able to drill a thousand holes at once, of course. But this huge leap in productivity will require a fundamental shift in perception. We used to talk about a laser beam hitting a material at the focal point, but experts now prefer the more precise definition of a laser wave being generated within the material and a focus that is a spatial distribution of intensities. This new way of thinking is called wave optics. The previously predominant model of ray optics describes the propagation of laser light as a ray; the far more complex model of wave optics views laser light as a wave. This is not merely a theoretical exercise. It is driven by what certain materials and specific applications actually need from laser light. Glass, for example, can be – tech term ahead – ‘intrinsically modified and therefore divided by a laser (this no longer has anything to do with cutting). Thanks to wave optics, it’s even possible to split laser beams into a thousand parts. The result? Processes that are a thousand times faster. The future task will therefore be to form, bend, squash and stretch this coherent
bundle of waves, to chop it into pieces and deliver it to the precise place where we want it to act everywhere simultaneously. That requires very different things from process development and optics. Put simply (and please don’t take this personally), focusing is a beginner’s game because, over the next ten years, the real interest will lie in diffraction. Constructing models for this is a highly complex task requiring Herculean mathematical efforts. But once the systems are up and running, laser operators will benefit from tremendous productivity gains and fields of application that were previously impossible to imagine.

Sensors and process monitoring

The first five-axis machine was the pinnacle of precision engineering: it held the part under the optics in exactly the right position and at exactly the right angle, with micrometre accuracy – only for the optics to fire blindly into the chamber. So, what’s next? In the future, when we put part X in the machine, sensors in the optics will immediately identify the type of part, material, position and welding points, and the laser will make the welds in exactly the right places. The whole crazy complexity of high-precision clamping will suddenly become so much simpler once machines can align themselves automatically – and machine design will be turned on its head. Sensors are the logical answer to a number of questions that the industry is currently asking itself: How can we deal with ever-stricter standards of quality and precision? How can we verify the results? What’s the best way to obtain data for simulations or Artificial Intelligence (AI)? How can we increase the level of automation in order to boost productivity? The answer to all these questions is to give machines the ability to sense their environment, to perceive and interpret the world around them. So, in the future, when a component is fed into a laser machine, it will automatically detect what needs to be done, thanks to a large number of sensors, and begin the process immediately. We’re probably already close to achieving this in laser marking – and all the other laser applications will follow suit in the years ahead.

Digitisation and AI

Connected manufacturing has gotten off to a good start in recent years, but the transformation of workshop and production halls into smart factories is far from over. This becomes apparent, for example, when looking at the fields of remote maintenance and remote condition monitoring. The big question is one of availability and uptime. Obviously, every user wants their laser system to run all the time reliably. But things have moved up a gear since the semiconductor industry and consumer electronics threw their weight behind lasers. These two industries take system availability requirements to an almost absurd level, so their expectations drive the entire laser technology sector forward. That’s good news for all industries. Meanwhile, AI is making its way onto the factory floor. While AI’s strengths used to lie more in intangible processes, such as production planning, they are now moving closer to the machines themselves. Over the next few years, these electronic brains, fed with data from sensors and simulations, will come up with completely new kinds of laser processing strategies, refining each step in the process as they learn more, eventually taking over the programming of connected machines themselves. This will lead to huge gains in productivity.

New beam sources

The basic beam source concepts have all been common knowledge since the 1970s – CO₂, solid-state, diode and fibre. But there’s still plenty of room for improvement. Engineers are constantly finding new ways of getting more out of their laser systems, from higher pulse energies and higher average power to shorter pulses and better beam quality. This looks set to continue in the years ahead. But apart from the race to set new records in this or that aspect of industrial lasers, what are the key developments that users should be keeping an eye on? First, the range of wavelengths is getting larger. In theory, we already have access to laser light at all possible wavelengths, it’s simply a question of finding the necessary power. This obstacle is gradually being overcome in all wavebands – the reliability of the disk laser has given us the tools we need to generate high-power laser light in all possible colours ready for industrial use. One of the most recent examples is green laser light, which is readily absorbed by non-ferrous metals, making it the perfect choice for applications in e-mobility. Soon, it will be possible to generate powerful beam sources at exactly the right wavelength for all conceivable applications. Second, lasers are getting smaller. Semiconductor lasers, direct diode lasers and other lasers are steadily shrinking into miniature formats. This makes them easier to be used in all kinds of systems, from cell phones to operating rooms. It also paves the way for entirely new
applications, such as laser-based scanning of the environment in autonomous vehicles and quality control. The first developers are already working on ways to pack the laser medium into an optical fibre, allowing laser light to be generated ‘on the go’. Although such beam sources are not fundamentally new, they illustrate how old concepts are revealing a level of flexibility that most people would have thought impossible.

Electric vehicles

The transformation of the automotive industry from the internal combustion engine to electric-powered vehicles is creating a wealth of new applications – and it is, of course, lasers that make the highly efficient mass production of the new components possible. First and foremost, the battery. Despite being succinctly referred to as a ‘battery’, this is actually a complex structure consisting of a battery cell, battery module and battery pack. Batteries for electric cars consist of several layers of wafer-thin copper and aluminium foil that have been cut and welded by a laser. Afterwards, the liquid electrolyte is poured in, and then the battery is welded shut with a cap. These welds must completely seal the battery to minimise the risk of fire and injury.

Second, the electric motor. Here, manufacturers are increasingly relying on what is known as hairpin technology. Normally, the stators in electric motors are equipped with coils of copper wire that create a rotating magnetic field that makes the motor run. Each individual slot in the stator is wrapped in a coil that goes in and out, in and out, almost like knitting! But due to the thick copper wires, this would be too time consuming and too expensive for powerful electric motors that must move an entire vehicle. This explains why manufacturers are relying on hairpins. This involves using a compressed-air pistol to fire a rectangular copper wire, similar to a hairpin, into each slot. The protruding parts of the wire are then twisted together and welded using a laser – this also creates a coil. And third are the high-performance electronic components. With charging plugs, transformers and rectifiers, electric vehicles feature a whole range of new power electronics. While a 24-volt battery is enough to power all the electronics in a vehicle with a combustion engine, electric cars can easily hit 800 volts or more. This means that extremely rugged connections are required. As an excellent conductor of heat and electricity, copper is the material of choice. But copper can only be welded efficiently with a very special laser – namely the green laser – otherwise, too many spatter occur, and the risk of short circuits increases.

Quantum technology

Quanta are everywhere, but the way they behave is something the human mind struggles to grasp. For example, in quantum mechanics, it’s possible for something to exist simultaneously in two mutually exclusive states or occupy two different positions at the same time. This is beyond confusing, but it opens up exciting possibilities. Quanta carry specific information encoded within them, for example, on their intrinsic angular momentum, or ‘spin’. In order to read this information and use it for calculations and other purposes, we have to make it visible, in other words, amplify it to some degree. This is possible with quanta of light, i.e., photons. But not just any old photons. Depending on what one is trying to measure, these photons need to exhibit certain properties, for example, a precisely defined wavelength or polarisation. This requires a beam source that does exactly that, namely produces photons with a precisely defined wavelength and with a very specific polarisation. The Trumpf subsidiary Q.ANT develops and produces industrial solutions with these types of beam sources. Its potential areas of application are virtually endless. Quantum technology will play a key role in numerous different areas, from novel sensor systems for medicine and autonomous driving to new types of data encryption to new microscopes & equipment that we can’t even imagine yet.

Courtesy: Trumpf
Cobots empowering the manufacturing industry

In a period of robotisation, how humans work with robots makes a world’s difference. Collaborative robots (cobots) offer manufacturers wide-ranging competencies in the industry. They are designed to work with humans and are investment worthy. The article throws light on the rise of cobots, types of cobots and robotics in manufacturing applications.

Robots have been in use within the industry since the 70s. The adaption to robotic solutions was easy during those days as the use cases were well-defined, structured and stable in terms of workflow, processes and operation sequences. Unlike before, to catch up with the current market demands, there are frequent changes required throughout the product lifecycle. Hence, conventional robotic solutions addressing repetitive problems are no longer a good fit to accommodate these changes.

The fourth industrial revolution is the answer to the above issues. It enables the connected manufacturing environment where machines, inventory, tools, jobs, logistics, latest market requirements, etc, talk to each other through a network and make necessary decisions to enhance quality & productivity. It is also possible to perform preventive maintenance as the failures can be predicted well in advance.

In fact, COVID has worked as a catalyst for the adoption of Industry 4.0. Since the pandemic has affected the physical closeness and cooperation of the human workforce, collaborative robots gained a lot of importance. The opportunity of post-COVID industrial robotisation spreads across the design, procurement, manufacturing, supply chain, product lifecycle management, logistics, quality assurance and so forth.

Upcoming trends to watch out for in industrial robotics

Even before the pandemic, robotics was getting ready to transform the world by introducing a digital workforce in combining the major game-changers, like collaborative robots, Big Data analysis, IoT, 5G and cloud computing. The interesting fact is that the involvement of IoT and 5G has made it more accessible to the common man, and hence, this revolution is no longer limited to the manufacturing industry. Automation is going to become a part of our day-to-day activities, taking...
robots from iron cages to alongside human beings, from repetitive tasks to intelligent jobs.

As robots are more and more close to human beings in the form of an assistive or collaborative workforce or as companions, they will be able to provide highly personalised services, even better than human beings. Manufacturing, logistics, retail, hospitality, security, medical and education are the key industries to experience this advancement in the first place. Robotics will also continue to see advancements in military & space applications.

Robotics in manufacturing applications

If we watch closely, we can observe a paradigm shift in manufacturing priorities, from productivity to quality and, latest, the speed of adoption to the changing customer needs through these years. Having said this, the reduction of cycle time in terms of refinement and optimisation for quality cost & value addition remains as the standard requirements and thereby, improving the overall customer experience. Such a manufacturing ecosystem needs to have three basic aspects – prediction, correction and adaptation. This philosophy is also popularly known as Flexible Manufacturing System (FMS) wherein robotics and AI play their vital roles.

The rise of cobots

Cobots are the most useful category of robots in an FMS environment to assist human beings in performing repetitive, heavy duty and risky tasks. A recent study on the efficiency of collaborative workforce revealed an interesting fact that the human-machine collaborative workforce is the most efficient arrangement in contrast with human-human and machine-machine workforce combinations.

However, the development of collaborative robots is a technologically challenging job. To behave intelligently, these robots have to collect continuous information from the environment through a wide variety of sensors and vision systems. These data have to be interpreted to come out with meaningful decisions so that humans and robots can work together seamlessly without physically hurting or damaging each other while performing a collaborative task.

Types of cobots

As the name indicates, cobots are collaborative robots which coexist and cooperate with the human workforce, unlike their older versions that work inside iron cages. Even though collaborative arm manipulators working with humans are popularly referred to as cobots, a certain category of Autonomous Mobile Robots (AMRs) and Autonomous Guided Vehicles (AGVs), which can seamlessly work with the human workforce, can also be considered as cobots by definition.

Cobots in logistics

Today, AMRs and AGVs are widely used to transport goods by almost all major e-commerce players. However, due to a well-structured work environment and minimal human interventions, these robots are not considered cobots, albeit their autonomous nature. Whereas, if we take the case of logistics requirements within hospitals, hotels or busy workplaces, human interaction cannot be completely replaced with robots. On the other hand, robots must work by complying with human workflow to enhance the final throughput & performance. At the same time, they should never pose a challenge to human actions throughout its operation. Logistic cobots are used in such cases to supplement the human workflow. One or more cobots can be deployed to handle the entire logistics requirements within an organisation or departments based on the type & volume of material to be transported.
AMRs and AGVs to become cobots

AMRs and AGVs can be transformed to cobots by adding an additional layer of control on the top of the existing software architecture for autonomous point-to-point navigation. A typical autonomous mobile robot has a three-layer software architecture to control the robot hardware, such as –

1. The low-level motor speed control.
2. Linear velocity and direction control for forward, backward and steering in accordance with the drive system used.
3. Autonomous point-to-point navigation with Simultaneous Localisation And Mapping (SLAM).

In addition, most autonomous mobile robots have obstacle avoidance functionality, too. Based on the terrain and the use case, the drive system can be chosen between –

1. Two-wheel differential with caster wheels.
2. Four-wheel drive with differential steering or independent steering.
3. Mechanum or Omni wheel configuration or any other holonomic configuration to negotiate the given terrain characteristics.

All these robots selectively make use of a group of sensors, such as odometry, Lidar, Inertial Measurement Units (IMU), indoor GPS, depth cameras, sonar rangefinders and other proximity sensors, as per the use case. These sensor data are infused & interpreted in real-time to perform the self-localisation and navigation within a specified area.

The introduction of the fourth layer of control, which is typically behaviour-based, enables the robot to understand the human behaviour inside a workplace and helps it to fine-tune the navigational goals from time to time. The behaviour control scheme makes use of the information gathered by tracking the human movements in real-time using global cameras and passive or active wearables on the human resources. In most of the cases, in addition to the instantaneous information, data collected over a long period will also help the robot to perform more intelligently and in a user-friendly way through Machine Learning techniques.

Cobot arm manipulators

Cobot manipulators are the key component of Industry 4.0 hardware and they may need to have the same level of dexterity as a human being. Therefore, most cobot manipulators come with six to seven Degrees Of Freedom (DOF) or higher. Along with higher dexterity, the ability to execute a task has multiple possibilities and hence, the control becomes complex.

However, the most important aspect of a cobot manipulator control is the force control. Force/torque control enables the manipulator to perform back drivability and anti-gravity so that they can safely work by physically interacting with human beings. Back drivability is the ability for interactive transmission of force between input axis and output axis. The force control also enables the robot arm by compensating the self-weight so that the operator can fly the end-effector of the manipulator within the work volume with an ease of handling a feather by changing the three DOF positions and three DOF orientations simultaneously.

The complementary skill-sets of humans & cobots

Having said that, cobots are extremely capable of undertaking precise operations and allow human colleagues to work safely side by side with them, they are currently unable to respond meaningfully to unusual situations and also require a minimal configuration to get ready for a fresh task. At the same time, human workers can compensate for these limitations just by providing a high level of supervision while focusing on more complex tasks. With these complementary skill sets, humans and machines working together will open up endless possibilities to undertake difficult & mundane tasks more safely and comfortably during the post-COVID era of industrial automation.
Safety audits for high-risk industrial operations

Industrial safety is more than just protecting workers; it is about enhancing productivity and increasing revenue growth, too. One element that helps determine maximum safety in the industries is safety audits – it helps regulate the overall safety & environment of an organisation. Leading a workplace safety audit is an utmost complete way to measure the effectiveness & efficacy of a company’s entire health & safety management system. The article finds out how an audit for high-risk industrial operations works and how companies can benefit from it.

It is estimated that more than four million people die from injuries across the world. Going by reports, there were over 400,000 deaths due to unintentional injuries in 2015 in India itself. Experts also agree that the manufacturing industry contributes significantly to injury morbidity and mortality. In fact, workplace-related accidents in India claim an average of about 48,000 lives every year. After road traffic collisions, workplace accidents are the next major cause of injuries in India.

Injuries can put a huge burden on industrial workers who are already financially constrained. Apart from having to bear hospitalisation and treatment expenses, they also face a decline in earnings & rehabilitation cost. Moderate and severe grade injuries may lead to poor quality of life and have long-term psychosocial impacts.

Accidents due to fires, fall from heights and mishaps during freight handling are some common workplace hazards. And many a time, such accidents are caused by minor lapses in processes.

Companies should take note of the fact that workplace mishaps may have far-reaching consequences in the long run. Without undermining the risk to human life itself, one
should also consider the damage to machinery, equipment and property, leading to production delays, which can take a significant toll on business. This may adversely impact the commercial viability of a business.

In the aftermath of an unfortunate incident, most companies are seen spending money on mobilising manpower and other resources to investigate causes and implement remedial measures to prevent such incidents from happening in the future.

Industrial accidents and consequent deaths can be prevented. There is no doubt that the prevention efforts would lead to large gains, both in terms of human life and business profits. It may therefore be wise for businesses to consider a proactive approach in mitigating any crisis arising out of high-risk operations. And this is where the need for a safety audit for high-risk operations arises.

What is a high-risk operation safety audit?

A high-risk operation safety audit is an in-depth audit of situations that could potentially cause serious injuries and harm to people & property and assists organisations in focusing on these activities. The audit actively looks at high-risk activities, such as working at heights, confined space entry, lifting operations, ground excavation, electrical safety, fire safety management, contractor safety and specific areas, like molten metal. Also, leadership commitment & accountability, risk assessment & management and permit to work are reviewed in detail. The audit process involves a greater level of interaction with staff, site rounds and review of documentation.

How does an audit for high-risk industrial operations work?

A high-risk operation safety audit is a deep dive into the controls of hazardous activities and the effectiveness of existing safety initiatives related to the prevention of serious injuries. The audit is a quantified, customised approach that benchmarks an organisation’s current safety performance level concerning high-risk activities against global best practices. A suitable and customised approach is created in an audit report form that meets the organisation’s requirements. The findings from the audit will give the organisation visibility of where they stand in terms of high-risk activities, identifying opportunities for improvement. This is then followed by a consultancy that will help strengthen the areas that require attention through recommendations, knowledge sharing and training.

The audit process requires active participation from all employees of the organisation. It is mainly divided into four key phases:

1. Leadership commitment and planning
2. Implementation and operation
3. Performance monitoring and measurement
4. Evaluation and continual improvement

How companies with high-risk operations can benefit from a safety audit

Studies have shown that occupational safety regulatory compliance is a necessity that must be addressed and integrated into routine business practice. This is especially
true for businesses with high-risk operations. Non-compliance can expose enterprises and individuals to unnecessary injury, risk and liability questions. These issues can be prevented or at least identified & corrected through effective safety auditing.

Going by the findings of a study that aimed to evaluate workplace safety performance and the impact of the safety auditing process, the benefits of auditing can be both tangible & intangible.

Some of the intangible benefits of safety audits are –

- It can help with building an effective employee hands-on hazard reduction learning tool
- A safety audit can help in setting up a forum for identifying safety hazards, root cause analysis and implementation of corrective actions
- It can lead to increased employee awareness and positive behaviour towards safety
- Safety audits can help with achieving established benchmarks for safety performance, injury-related cost avoidance & reductions and continuous improvement
- A safety audit can help improve the factory safety record with fewer accidents, injuries, near misses and physical hazards
- It can facilitate root cause analysis and corrective actions to eliminate hazards
- An audit can set the ground for providing on-the-job training for team leaders and shop floor employees
- It can help achieve heightened safety awareness for factory safety hazards

Some of the tangible benefits of safety audits are –

- It can help put in place an employee-based team approach for every department safety audit
- A detailed checklist covering items can be prepared as per industry standards
- It can help set the process with pre-audit meetings to review the checklist, answer questions and develop audit routes facilitated by the management
- Safety hazards and corrective actions can be documented
- Post-audit discussions can be reviewed for hazard findings and corrective actions
- Post-audit meetings for the corrective actions can be conducted to review progress, answer questions and ensure safety findings are being addressed

For companies running high-risk and hazardous industrial operations, a safety audit should be made a priority. The management should review & work on improving its safety and health management system continuously, so that its overall safety and health performance across all functions improve constantly. Companies should be committed to continuous improvement involving the development of policies, systems and techniques of risk control.

A comprehensive & thorough audit will help evaluate and addresses potential high-risk areas and provide opportunities to improve & strengthen them in line with the best practices. A high-risk safety audit helps build confidence in the safety system and its ability to prevent injuries & fatalities. It will help the management to understand high-risk areas of work and the situations that could cause serious harm and the control that needs to be taken. An audit process will also help the management focus on areas of high-risk rather than looking at all activities in an equal manner. All in all, a safety audit for high-risk operations will help create a happy, confident and safe work environment for everyone. ☐
While economies from across the world are still doing their best to come back to normal in the present times, we certainly cannot say that the coronavirus pandemic is gone. As the manufacturing industry, too, is attempting to work like before, how long will it be before it can do so with confidence? Manufacturers have and should assess their capability to figure out where the enterprise & industry is heading & take action immediately. From localisation to accelerating digitalisation, the current situation has certainly emphasised the need for these. Keeping this in mind, VDMA (German Engineering Federation) recently held the 9th VDMA Mechanical Engineering Summit that discussed how we need to become technically & commercially competent in the world, how we need to target for 100% localisation and also had a ‘Pitch by start-ups’ session. A post-event report…

The coronavirus pandemic hit manufacturing in an unprecedented way. The virus, in fact, highlighted various critical gaps in the manufacturing sector. Companies should continue having strategic edges to quicken measures for retrieval and surge their flexibility. Moreover, there needs to be the adoption of new ways of working and governing within the manufacturing industry to increase its enhancement. In this context, German Engineering Federation (VDMA) recently organised the 9th VDMA Mechanical Engineering Summit, which highlighted topics such as the ease of doing business, Aatmanirbhar Bharat’s role in Indian manufacturing and emerging trends in manufacturing.

The lockdown – A learning experience

The summit commenced with the welcome address by Rajesh Nath, Managing Director, VDMA India, who not only described the blow to the economy and industry during the pandemic months but also celebrated the resurgence and recovery from it. On this occasion, the Summit Special issue was also released by the dignitaries. This was followed by the address of the Chief Guest, Dr P Anbalagan, IAS, CEO, MIDC, who spoke on ‘Investment opportunities and the new initiatives by the State administration for enhancing the development of the manufacturing industry in Maharashtra.’ One of the important
things he mentioned about was Magnetic Maharashtra 2.0 – a new initiative to facilitate business in the state.

The exchange between India & Germany

Furthermore, in his special address, the Guest of Honour, Dr Juergen Morhard, Consul General, Consulate General of the Federal Republic of Germany, Mumbai, informed the audience about the latest FTA updates. He highlighted the importance of exchange between India & Germany and a need for continuous dialogue to facilitate better understanding & mutual benefits. There was then a virtual address by means of a recorded video message by Ulrich Ackermann, Managing Director, Foreign Trade division, VDMA Frankfurt, who gave a presentation on ‘Challenges for global trade during pandemic’. According to Ackermann, India is the second most important mechanical engineering industry in Asia, after China, for the German industry. Additionally, on occasion of the summit, a knowledge paper on ‘Prospects of selected industries in the new normal era of post COVID-19’ was released by knowledge partner, BDB India. In his brief presentation, Chetan Ligade, Director, BDB India, highlighted the economic overview & manufacturing trends in India.

Labour law reforms

Later on, the summit moved on to Technical Session I, which commenced with a presentation by Sachin Shinde, Director – Indirect Tax, Deloitte India, who spoke on ‘Ease of doing business - new tax initiatives.’ He threw light on the recent initiatives by the Government of India on e-invoicing and how it has gained momentum in the last 10 years. After that, Dharam Veer Singh Krishnawat, Associate Partner, Team Lead – Mumbai, Roedl & Partner, gave an overview on the recently introduced new labour law reforms through a presentation. He highlighted the importance of the four new laws which consume 100 state laws and 40 central laws previously governing the labour law matters.

The last speaker of the session was Aditya Nagarajan, Vice President, Guidance Tamil Nadu, who spoke on ‘Realigning global value chains in the new normal’, where he discussed the importance of Germany as a country for the state of Tamil Nadu with a 35% share in FDI.

Need for a prerequisite digital environment

It was then time for Technical Session II, which was devoted to the theme 'Emerging trends in manufacturing'. This session started with a presentation called ‘AI in manufacturing’ by Stephen Raj Arokiasamy, Head - Data Science and AI, Robert Bosch Engineering and Business Solutions. He highlighted the importance of AI and how it has become an integral part of the latest developments. This was followed by Dr Shiv Venkatarami, Vice President – Operations, Lapp India, highlighting the topic ‘Smart value chain enabled by Digital Factory’. He stressed the need for a prerequisite digital environment with a digital supply chain to use AI effectively and the importance of analytics.

The final leg of this session was a presentation by Anup Kapadia, Product Manager – Device Connectivity, HARTING India, who spoke about ‘Technology leaps in connectivity solutions for Smart Manufacturing’. He explained extensively about the Single Pair Ethernet (SPE) on its features, benefits, applications and how it considerably improves the existing multi-pair Ethernet.

The capital goods sector

The final session of the summit was devoted to a thought-provoking panel discussion on ‘Atmanirbhar Bharat propelling Indian Manufacturing sector towards 1 trillion dollar economy?’ The discussion was moderated by Nath and the esteemed panellists were Vivek Bhatia, Managing Director & CEO, thyssenkrupp
Industries; Harsha Kadam, CEO & MD, Schaeffler India; Suresh K V, President & Head – Region India, ZF India; Rashmikant Joshi, Managing Director, Festo India; Sanjeebit Choudhury, CEO – India, Vice President – Asia Pacific, WEISS Automation Solutions India and Nobert Wirth, Managing Director, Haver & Boecker India. The discussion began with Nath putting his first question to Bhatia, where he asked him how Aatmanirbhar Bharat would help increase the contribution of manufacturing to propel us to the one billion economy. To this, Bhatia responded, “Aatmanirbhar Bharat is different where India is saying that we have a significant amount of local demand. When it comes to capital goods, we have made some progress, but perhaps, some additional focus is required.”

Attracting global buyers & investors

Nath then turned to Joshi with the question about how India can increase its manufacturing value-add and increase its global share as per the aim of Aatmanirbhar Bharat. Joshi answered, “This can be done by attracting global buyers to buy from India. Secondly, we should attract global investors to invest in the country to manufacture for India & the global market.”

100% localisation

Continuing on to Wirth with the discussion, Wirth, as the Managing Director of a German company in India, was asked what his experience is on ease of doing business. Wirth put across, “Speaking a little bit about the perceptions of my friends & colleagues, the problems that come across are immense bureaucracy, work with government officials and also many companies missing certain standards. These small things are making it difficult for companies to come to India.” Moving on, when it comes to the possibility of becoming suddenly self-reliant through Aatmanirbhar Bharat, Suresh K V clarified that it’s his personal belief that India has the capability of delivering any product. “But that needs two important things,” he cited and went on, “The will and the discipline. We also have to target for 100% localisation; 99% is not okay.”

Market competitiveness for MSMEs

Following this, Choudhury was asked how MSMEs can be strengthened & can contribute effectively to the Aatmanirbhar Bharat initiative. He replied, “When it comes to equipping the MSMEs to the next level, the government is doing its part, but the most important thing is the market competitiveness of their product.” Nath then came to Kadam, asking him if Aatmanirbhar Bharat would stoke innovation, passion & entrepreneurship. Kadam responded, “People are innovative; it’s just that we need enablers to get that innovation. India’s intellectual capital has been recognised.”

Pitch by start-ups & 3rd VDMA Manufacturing Excellence Awards

Post the panel discussion, a ‘Pitch by start-ups’ session connected to the manufacturing sector was organised, where Rahul Lahane, Founder and CEO, Chistats Labs and Mohan Babu, Business Development, Uthunga Technologies shared about their start-ups and their activities. After this, the stage was set for the 3rd VDMA Manufacturing Excellence Awards, aiming to recognise the VDMA members who have implemented methods, either in energy efficiency & conservation or improvement in work condition & work safety in their manufacturing process.

Light at the end of the tunnel

The summit made clear that the future of the manufacturing industry is certainly not a grim one; in fact, it’s one with hope. With the right will & discipline, set of skills and improvements in the right areas, the sector has only light to see at the end of the tunnel. □
IMexI prize 2020

Kaizen Hansei concluded its inaugural edition of the Integrated Manufacturing Excellence Initiative (IMexI) recently with a virtual prize ceremony, where manufacturing organisations were recognised for manufacturing & supply chain excellence. EM magazine was the Prime Media Partner. Excerpts of the virtual ceremony....

Eighteen applications were received for IMexI, as against an initially estimated 40, of which 7 applicants eventually withdrew because of the lockdown. The executive committee was insistent on physical site assessments, which also became a constraint for various sites. 11 sites were finally assessed during December 2020 and January 2021. While one site each qualified in the Platinum Medallion Zone and the Gold Medallion Zone, five sites qualified in the Silver Medallion Zone and one site scored in the Certificate Zone. The other three, who didn’t make cut, have been offered a complimentary audit in the 2021 cycle, hoping that they would get time to address their COVID woes & bounce back.

The virtual prize ceremony

The prize ceremony was anchored by Jayanth Murthy, JMD, Kaizen Institute. Vinod Grover, Founder & MD, Kaizen Institute, South Asia, while welcoming the audience, very crisply presented his views on the disruptive megatrends and what it means to the manufacturing and business excellence.

The keynote was delivered by Ajay Shankar, Distinguished Fellow, TERI, who brought in the policymakers’ perspective and emphasised that sustainability will be the key lookout factor going forward. Vijay Kalra, Head, Mahindra Institute of Quality & Chairman — Central Safety Council for Group, spoke next, delving on his perspectives of change and what it means for the industry to adopt by way of a quality culture. Dr Ravichandran, Chief Mentor, UCAL Fuel Systems & Former CEO, Lucas TVS, emphasised the need for meaningful and relevant change in order to remain sustainably lean. Of the eight companies that qualified in the ‘zones’, each one of them showed the grit and resolve to ensure that the right message is propagated through the manufacturing organisation through this participation. That operational excellence is not compromise-able, irrespective of the upswings or downturns in business! True corona warriors!

The prize winners

The highest honour of the programme, the Platinum, went
to the Wabco India unit in Chennai (now ZF). Be it the innovation and concurrent engineering, or other crucial routine activities, like daily work meetings, it has been practising it all. A good visual factory, with adequate representation of monitored critical metrics in dashboards, placed strategically in the plant, says it all. The digital roadmap showcased had a clear purpose, and it was being leveraged in manners that were brainstormed to achieve selective strategic advantage. M S Ravikumar, Integrated Supply Chain Leader, Wabco India and his team were online while accepting the prize.

The next highest prize, the Gold Medallion, went to ICML, Panchla unit of ITC Foods division. A dynamic leadership coupled with the on-site observations wrt PLC control, OEE calculations, capturing of important critical data manually, selective investment in IoT for packaging lines, constant effort to balance the fryer with the downstream packers, excellent HR policies and much more indicate that this highly motivated team would very soon become a benchmark site for others to emulate. With a constant focus on downstream supply chain inventories, it is on its way to lean. The prize was accepted by Partho Bhattacharjee, on behalf of his team.

Silver Medallion winners

1: ACG Pharmapack, Shirwal

This facility makes products that ensure we live healthily. The visual display of production metrics and the investment in newer state-of-the-art plants were truly commendable. The enthusiasm of their workforce, a young one at that, with special mention to the NPD team that represented their department well were all truly appreciable. The visual boards with updated metrics of performance was a feel-good factor, and the fact that the team was contemplating a few correctly identified tactical steps hinted that they were thinking in the right direction.

Recipients: Shiv Shankar (CEO) & Balasaheb Phalke (Chief Mfg Officer) & Team
Acceptance speech: Phalke

2: Microtek New Technologies, Parwanoo

A part of a rapidly expanding group of companies, the Microtek facility is headed by a visionary who pushes his people to dream big and supports them to the core to achieve the same. Note the speed of their response when they ideated, conceptualised and implemented a project to make remote sending thermometers – a national mission to provide these critical and now almost-everywhere used equipment, at very affordable rates. Import substitution & addressing the demand-supply gap in such a short time. The facility, though small, took herculean efforts to put up the unit in a few months which was largely compliant to all GMP.

Recipients: Vivek Talmale, Akash Somkuwar, Rajan Khurana
Acceptance Speech: Vivek Talmale (COO)

3: UPL - Unit 8, Jammu

The unit of an Agrochem company making products that ensure our crops and produce is secure. This unit impresses with sincerity, dedication and display of concrete steps taken by its team in various aspects of OEE improvisation, capacity utilisation, etc. Yet again, this plant hardly saw a shutdown, except when it was legislated into the closing for a few days. The constant focus on cost reduction at a unit level is well aimed at ensuring that more products get shifted to this unit from the global portfolio of the parent organisation.

Recipients: Ponnsamy, Sanjay Misra, Radha Raman, Aman Sharma, Atul Verma & Team
Acceptance Speech: Ponnsamy Pillai

4: Kalpataru Power Transmission, Raipur

Having made selective investments in equipment and having identified new business areas (railways), this facility has also started off on its plan to digitise critical parts of its processes. What strikes one is that most of the processes have been coupled, and the incoming rolled aluminium RM almost proceeds continually to galvanising. A huge positive, especially given the industry that it represents. There are opportunities for improvement; however, the KPTL Raipur team is committed to heading in the right direction.

Recipients: Kamal Kishor Jain (Director - India Operations), Harish Lalani, Ketan Nirnmal & Team
Acceptance Speech: Ketan Nirmal

5: UPL Unit 1, Ankleshwar

It’s headed by a charismatic leader; for those who have seen this unit a few years ago, this presents a pleasant transformation into where concepts of TQM and Statistical Process Control are fast gaining pace. As one of the plants identified for challenging Deming prize, concepts wrt first stabilising and then becoming capable are already becoming target focus in many process areas. The KPIs on boards in the plants, the daily meetings at the plant and setting up of the Obeya rom, etc are all assurances that this plant is on its way to achieving what its corporate has given it as a mandate – the Deming!

Recipients: Vinod Singh, Amol Rade, Sanjay Dharajiya & Team
Acceptance Speech: Vinod Singh (Unit Head - UPL 1)
Certificate of Appreciation: UPL Ltd - Arysta Unit

Advisory panel members:

Ajay Shankar, Distinguished Fellow, TERI
Vijay Kalra, Head, Mahindra Institute of Quality & Chairman - Central Safety Council for Group
Dr N Ravichandran, Director, India Japan Lighting; Chief Mentor, UCAL Fuel systems
Y Shashidhar, Advisor, Dubal Holdings LLC; Former Partner & MD, Frost & Sullivan
Pradeep Banerjee, former Executive Director, HUL, VP Supply Chain South Asia & Chairman Nepal Unilever.
8 manufacturers paving the way for success...

These professionals have shown true commitment to excellence with their persistent efforts. They faced the test of time and emerged victorious. IMexI would like to extend our heartfelt congratulations to all the winners.

**The Medallions**

**PLATINUM**
- WABCO India, Chennai

**GOLD**
- ITC Foods, ICML, Panchla

**SILVER**
- UPL Limited-Unit 1, Ankleshwar
- ACG Pharmapack Ltd, Shirwal

**SILVER**
- WABCO
- ITC
- UPL
- ACG

**SILVER**
- Kalpataru Power Transmission Ltd, Raipur
- UPL Limited-Unit 8, Jammu
- Microtek New Technologies Private Limited, Parwanoo
- UPL Limited-Arysta Unit, Kalol

As a token of appreciation for their hard work, these participants were conferred the medallions in the presence of luminaries such as Mr. Ajay Shankar, Mr. Vinod Grover, Mr. Vijay Kalra, Dr. N. Ravichandran, and Mr. Pradeep Banerjee.

Announcing the Launch of IMexI 2021, in a New Avatar, Version 2.0

Visit: www.imexi.org  Query at: queries@kaizenhansei.in
Cut-resistant adjustable nitrile gloves

Mallcom recently introduced its metacarpal protected, cut-resistant seamless nitrile gloves velcro adjustable cuff with a sandy finish. This glove provides durable hand protection and supreme cut resistance with outstanding dexterity. The 13-gauge gloves are made with glass & UHMWPE-based blended yarn, and its nitrile coated palm and fingertips offer an increased grip and chemical & mechanical resistance. These gloves are available in sizes 7, 8, 9 & 10. Various features of these gloves are:

- Optimal combination of cut resistance, comfort & dexterity. It uses innovative technology for improved cut resistance, excellent flexibility and a higher level of user comfort.
- Open back configuration provides superior ventilation
- Ergonomically correct design conforms snugly to the natural shape of the hand, increasing comfort and reducing hand fatigue
- Colour coded over lock binding helps to identify different sizes (07 – Red, 08 – Yellow, 09 – Brown, 10 – Black)

Mobile hydraulic crimpler unit

UNIFLEX Hydraulik GmbH recently offered a practical accessory, an ingeniously simple external drive.

Using this easy-to-handle unit and an off-the-shelf screwdriver (drive torque: at least 25 NM), manually operated workshop crimpers for 1” hoses (4SH/R15) can be driven hydraulically with low- or high-pressure. It weighs 8.5 kg (incl. 1.8 l of oil), with a length, width and height of 235 mm, 175 mm and 215 mm, respectively. Equipped with a shoulder or neck strap, the unit can be comfortably carried with both hands free to adjust the necessary settings with the cordless screwdriver (not included). The unit works with a maximum operating pressure of 700 bar and automatically switches at a pressure of 50 bar between high-pressure and low-pressure levels with two conveying speeds. The low-pressure volume flow (fast stroke up to 50 bar) is 3.2 l/min at 2000 rpm and the high-pressure volume flow (slow stroke with more than 50 bar) is 0.19 l/min at 500 rpm. Moreover, the respective flow volumes can be doubled to 6.5 and 0.38 l/min by optionally doubling the pump elements from three to six. The flow volumes depend on the standard rotational speeds of the cordless screwdriver.

The mobile high-pressure unit stands out due to its control elements: a pressure relief valve, an adjustable Pressure Limiting Valve (PLV), a manometer measuring connection, a connection to the tool (actuator) and an oil inlet screw with a measuring stick.

Battery-driven hose-cutting machine

For unbeatable mobility, the new battery-driven EM 1SB cutting machine cuts hydraulic and industrial hoses up to an outside diameter of SAE R12 1 ¼” like a hot knife through butter. Weighing only 7 kg, the device is extremely compact, can be fixed quickly and guarantees clean cuts – thanks to the TM C high-quality cutting blade and the extra long fixing bolts for the workpieces to be cut. The EM 1SB standard package comes with two exchangeable batteries for cutting at 5000 rpm with 90 Wh. Independence in the precise cutting of smaller hoses, with a diameter of 1¼” (outside diameter of 2”), is now possible with the new battery-driven cutting machine EM 1SB.
Highlights - May 2021

- Metal-cutting Technology
  As manufacturers constantly look for and apply new manufacturing materials that are lighter and tougher, it is obvious that cutting tool makers must create tools that can machine the new materials at the maximum possible levels of throughput. By modifying amalgamations of tool material compositions and geometries, the next issue finds out how machine tool builders can allow users to make more parts at a quicker rate and at less manufacturing costs.

- Lean Manufacturing
  Lean manufacturing is essentially a consistent organisational culture that needs to be adapted to a business and its manufacturing operations. New processes and ideas are always there that are improved from previous experiences. The next edition will focus on investigating the effect of lean manufacturing on productivity changes and all other possible changes in the new normal.

- Automotive Lightweighting
  Vehicle lightweighting drives fundamental changes in how vehicles are to be designed and built. The following issue highlights the challenge & probable strategies involved in reducing vehicle weight and how the lightweighting strategies drive a shift towards considering the use of alternative materials for automakers to not only redesign vehicles, but also rethink their engineering processes, manufacturing methods and software technology.

- Shop Floor Management
  Companies require to develop their employees’ problem-solving competencies, especially post-pandemic, on the shop floor. The following edition features the understanding of shop floor management as well as its connections and differentiations to other managerial systems in order to fully grasp its potential for competency development.

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