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Taking the COVID-19 situation head on

EM - Interview

Sulajja Firodia Motwani,
Founder & CEO,
Kinetic Green Energy and Power Solutions (p. 20)

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PRESENTS

"VIRTUAL HANDSHAKE"

The future of business

In these tough times when on one hand we are all fighting against the Coronavirus pandemic, on the other hand we have to do business and keep our companies going. Which means ultimately we need to do sales and infuse monies into our business.

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Redefine, redeploy & reskill!!!

What started as a health crisis is now turning into a global economic disaster. With every industry, function and geography affected, the amount of potential change to think through can be daunting. For businesses, this means rapidly adjusting to the changing needs of their people, customers and suppliers, while navigating the financial and operational challenges. It calls for tangible actions from organisations to turn massive complexity into meaningful change. This in turn requires reshaping of the businesses to align with a new demand scenario and finding new growth pathways during this period of unpredictable and possibly muted economic recovery which will raise new competitive threats as well as opportunities at great speed. What follows will not be a return to the pre-pandemic business practices, but more likely a period of New Normal, a new era defined by social distancing norms.

So far, our governments, both the central and the state, have made significant interventions in response to the pandemic, through lockdown measures and the mega economic stimulus package to make the country more self-reliant.

For manufacturing organisations, now the question is how to preserve the integrity of their business and protect their people, while preparing for the ramping up of their operations and the future growth strategies, post COVID-19? Let's all consider this crisis as an opportunity to think both short and long term, and lets redefine the strategies, redeploy the technology, and reskill ourselves to ensure that a resilient economy emerges.

In the meantime, we join you all in reaffirming our resolve to come out of the present crisis at the earliest, stronger than ever as a nation!

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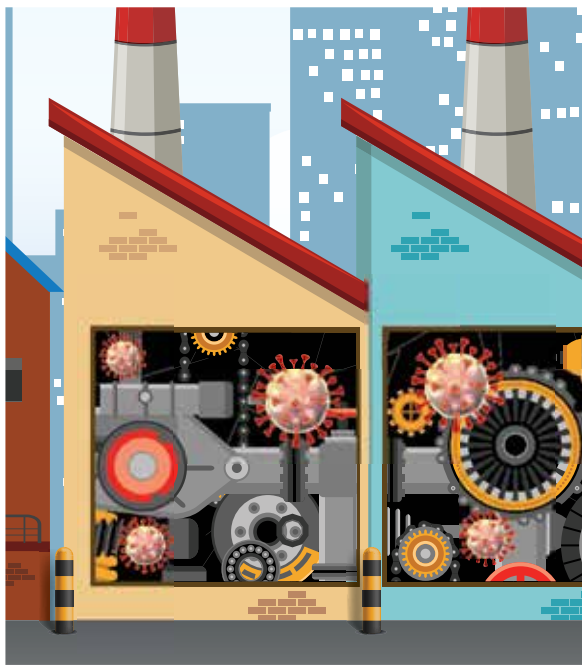

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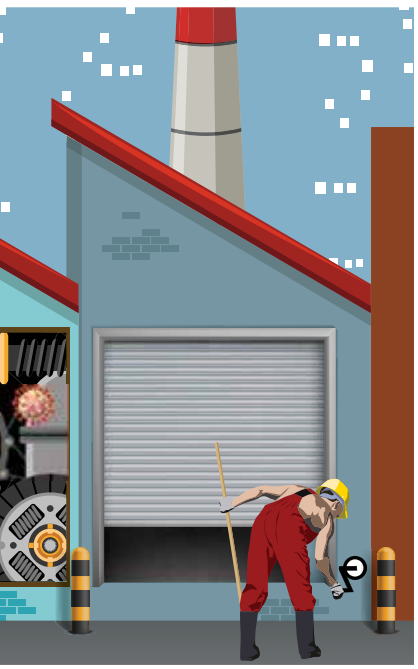

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COMMENTS & COMMENTARY

Dr Nagahanumaiah,
DIRECTOR,
CENTRAL MANUFACTURING
TECHNOLOGY INSTITUTE (CMTI)

COVID-19 has created shock waves in all fronts of human life. At the operational level, the focus is on two things – first is the healthcare emergency (how to contain the spread of coronavirus), and the second is how to sustain economically with resulting doubts on demands. This is true in an individual manufacturing setup, irrespective of its scale of operation. Survival, recovery and remaining a healthy business by reducing the damages have become a priority for manufacturing units. This is because of volatile product demand driven by the need for reducing total cost of ownership of a product and lack of real-time visibility in other business attributes.

In India, with unfettered market led globalisation, unfortunately, manufacturing industries operate with full dependency on import for technology, material and supply chain, that too with a single source. Moreover, many industries that solely depend on the China supply chain are in a supply crisis due to many governments shutting off their manufacturing industries. The idea of gated-globalisation is now realised, that ensures gaining currency by promoting creation and development of indigenous technology, multiple value chains and alternative supply chains. These must become their organisational culture for the long-term sustainability of Indian manufacturing.

"THE FOCUS MUST BE ON CONFIDENCE BUILDING OVER HOME GROWN TECHNOLOGY THROUGH EVERY CHANNEL"

The opportunities available before Indian industries for survival, recovery and sustainability include the following:

Cost of confidence

The focus must be on confidence building over home grown technology through every channel. This might change with what we regard as premium services. What is required is justifiable optimism, particularly on low hanging fruits which are demonstrated to a great extent.

Product-process technology in India

Product innovation i.e. engineering of original products/processes has not taken place in India to the expected level. It is a chain reaction – new product designs call for new process technologies, new machineries, new set of process data and controlling data. Moreover, first and the only supply chain always dominates the market. COVID-19 has created an opportunity for Indian manufacturing units, as several governments shut-off their companies, including the supply chain from China. Indian manufacturing units could fill the gap if one focuses on product-process innovation and becomes a supply chain to the global market.

Redefining business strategies

The change in mantra in the business believes that every business must be a healthy business. This belief will sell now and for some more time. Manufacturing industries need to be flexible enough to understand how they can be a part of a new health emergency that will continue to dominate in the minds of citizens.

Digital transformation and IIoT

Pre-COVID-19 crisis, the business objective of digital transformation and IIoT/Industry 4.0 was to make well-run manufacturing houses to run better as smart factories. Taking competitive advantage, increasing productivity and innovation were the drivers for digital transformation. However, post-COVID-19, the drivers have been changed as the survival and damage control aids – real-time visibility on several business attributes has become need of the day. The success of digital transformation doesn't depend on technology alone but on what is developed on collaboration & the reach. □

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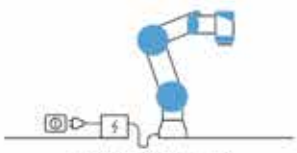
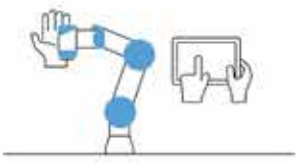
Use cobots to maintain social distancing and optimize productivity on the shop floor.



FAST SET UP



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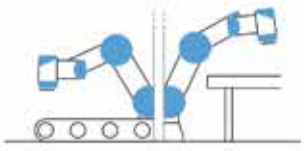
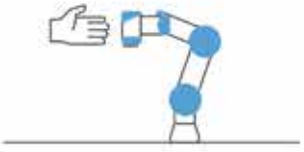


FLEXIBLE DEPLOYMENT



COLLABORATIVE AND SAFE

In times of uncertainty, being able to implement quick changes in production is key. Collaborative robots, or cobots, are one of the fastest automation solutions on the market to deploy and adjust to new operating principles such as Social Distancing on the factory floor. Accelerate recovery from the impact of COVID-19 with cobots and become future-proof, today!

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BHEL invites global OEMs to use its facilities, capabilities to 'Make in India'

BHEL recently invited an expression of interest from global OEM firms to leverage its facilities as well as capabilities and to shift their production base to India amid the COVID-19 pandemic. According to a statement from the company, the ongoing economic disruptions across the world, due to COVID-19, has highlighted the dangers of manufacturing activities being concentrated in a single location and the need for diversification of supply chains and manufacturing. The company has 16 manufacturing facilities, 16 Centres of Excellence (CoEs) in varied areas, five specialised research centres - welding research, ceramic research, electric traction, pollution control, etc and an extensive built-up industrial/commercial and residential space. Its manpower strength of about 34,000 includes 9000 engineers with qualifications and experience in cutting-edge technologies. These facilities & capabilities, along with the tie-ups, has put BHEL in a strong position to support any international company, in setting up a base in India and taking forward the vision under 'Make in India', said the company.

Continental receives two awards at the German Design Award 2020

Continental recently achieved a double success with two awards at the German Design Award 2020. The German Design Award was divided into three categories: 'Excellent Product Design', 'Excellent Communications Design' and 'Excellent Architecture'. The jury of the German Design Award consisted of design experts from business, education and science as well as the design industry. The German Design Council presented the awards on February 7, 2020 in Frankfurt. The company scored both the awards in the 'Excellent Product Design' category for the functional surfaces – Morphing Controls and the display solution – Curved Plastic Lens Display. Addressing after receiving the awards, Dr Frank Rabe, the head of the Human Machine Interface Business Unit, Continental, quoted, "We are very pleased that the German Design Council has recognised the quality of our design and development work. The awards encourage us to continuously develop our solutions to improve the user experience."

VDMA and VDW promote the use of umati

VDMA and VDW recently joined forces to promote the use and dissemination of OPC UA standards throughout the mechanical engineering sector under the umati label, which is a universal machine tool interface label launched by VDMA in 2018. Explaining the strategy at the associations' joint press conference, Dr Wilfried Schäfer, Executive Director, VDW (German Machine Tool Builders' Association), said, "Cross-industry and cross-technology marketing will take our customers a significant step forward. Manufacturing companies have not only machine tools but also their own individual mix of machines, equipment, robots and systems. If all these technologies can exist in a common ecosystem which is ideal for producing plug-and-play solutions, this will save end-users a lot of time and money."

Continuing the discussion, Hartmut Rauen, Deputy Executive Director, VDMA (German Engineering Federation), added, "Over 30 specialist groupings in more than 17 associations are working on technology-specific interfaces, the companion specifications. This high level of collaboration forms the basis of true, open interoperability between machines and software systems, from the shop floor to the cloud. Only VDMA has the means to unite the necessary integrative forces from the wide range of production domains." The umati showcases highlight the cross-industry use of various OPC UA standards in a practical way, aimed at demonstrating the suitability of OPC UA standards for everyday use in production to the diverse range of customers.

"We expect to see the first concrete products based on the OPC UA specification for machine tools providing connectivity to customers in the second half of this year," said Schäfer. "For our partners it is, therefore, all the more important that the development of the umati community also adheres to this roadmap in providing clear visibility and raising awareness levels," he continued. "The VDW and VDMA have decided to take care of this together in future. Production managers all over the world must be able to count on machines from any given manufacturer being able to speak the same language, thus turning the claim of umati - Connecting the World of Machinery, into reality," concluded Rauen.

TVS Motor Company acquires Norton

TVS Motor Company recently announced the successful acquisition of Britain's Norton, in an all-cash deal for a consideration of GBP 16 million by acquiring certain assets of Norton Motorcycles (UK) in administration through one of TVS Motor's overseas subsidiaries. Commenting on the acquisition, Sudarshan Venu, Joint MD, TVS Motor Company, said, "This transaction is in line with our effort to cater to the aspirations of discerning motorcycle customers. We will extend our full support for Norton to regain its full glory in the international motorcycle landscape." He further added, "Norton will continue to retain its distinctive identity with dedicated and specific business plans. TVS Motor will work closely with customers and employees in building the success and pre-eminence of the Norton Motorcycles brand, and we look forward to growing together globally in the years to come." The acquisition was undertaken under the guidance of financial advisors, Rothschild and Co, and legal advice for the transaction was provided by Khaitan & Co and Slaughter and May.

Covestro promotes innovation in electrochemistry

Covestro recently supported RWTH Aachen University with a donation, which will enable a new professorship for five years. Explaining the objective, Dr Markus Steilemann, CEO, Covestro, expounded, “The increasing use of alternative raw materials and the overall transformation from a linear to a circular economy are essential to achieve a future-proof, sustainable economy and society. This objective demands a high level of innovative strength and increased investment in research and development at universities.” To this end, RWTH Aachen University is expanding the research branch, ‘Electrochemical Reaction Engineering’, with a new professorship. The university appointed Dr Anna Mechler as Professor of Electrochemical Reaction Engineering on May 1, 2020. The professorship acts as a bridge between research activities in the field of industrial electrochemistry at RWTH Aachen University and the Forschungszentrum Jülich (Jülich Research Center), thus strengthening the Jülich Aachen Research Alliance (JARA). The integration of the professorship into the Competence Centre for Industrial Electrochemistry ELECTRA will further intensify the cooperation between the two institutions.

igus sets up a virtual trade show set

igus recently had a virtual trade show stand set-up where the customers could themselves discover the digital innovations. Informing that the company is currently receiving many enquiries and arranging numerous virtual visits, Frank Blase, MD, igus GmbH, asserted, “The interest of customers in solutions that improve technology and thereby reduce costs, is noticeably increasing. Based on more than 50 years of experience in research and practice, we are able to offer safe solutions made of plastics.” Maintaining the supply of tribo-polymer products in the current situation, Blase avowed, “igus is currently delivering without any restrictions. On average, small and medium-sized orders are on their way to the customer after 2.5 days.” Internationally, local supply is guaranteed due to 14 production sites.

Since neither trade shows nor personal visits to customers are currently possible, the company is relying entirely on the advantages of digitisation — the pivot here is the trade show stand that they have set up as part of the digital support package for customers. The real trade show stand is virtually accessible; personal tours, individual and group discussions at the stand can also be arranged with the experts from igus straightaway. With the motto ‘Tech up, cost down. It's our job.’, the company presented over 100 plastics innovations in an area of 400 sqm. The brand promise ‘igus 36-month chainflex cable guarantee and service life calculator based on 2 billion test cycles per year’ has now been successfully certified by the UL testing agency.

Even though igus is aware that planning is difficult at the moment, the company is still sticking to long-term investments, as Blase emphasised, “The losses in sales and costs needed to overcome because of the crisis being severe. A general change for the better is currently difficult to predict. However, we have saved a large amount of equity for such exceptional periods and we're tackling all the costs.” He further pointed out, “Both sample projects, new construction and digitisation, have a common focus – the customer should get his motion plastics solutions quickly, easily and reliably. This is an important goal particularly at this time, which we repeatedly emphasise in our daily crisis meetings.”

IMTMA bats for business continuity and converting crisis into opportunity

Indian Machine Tool Manufacturers' Association (IMTMA) has been working closely with the centre and state governments to alleviate the difficulties faced by the machine tool industry due to the hit of the novel coronavirus (COVID-19). Extraordinary times perhaps pave way for new opportunities that one needs to explore from different angles, and the outbreak of the coronavirus and the subsequent lockdown may have given an opportunity to restart afresh.

In this scenario, it is important for industries to remain connected with customers, vendors and peers through various communication channels. The association has been strenuously trying to keep the industry's morale and confidence level high by spearheading policy advocacy in a focused manner with the government and other stakeholders.

The association has requested the Government to fast track support for MSMEs, refunding of income tax and goods and services tax within April, to improve the cash flow, waive-off interest on working capital loans for a period of 12 months and granting a 9-12 month moratorium before resuming repayment, which will help reducing the operating cost of the industry.

Throwing more light on the initiatives taken up during the COVID-19 lockdown period, Indradev Babu, President, IMTMA, averred, "IMTMA has sought weighted deduction from income tax on expenditures incurred to combat COVID-19." Speaking further, he said that the government must desist from declaring firms with clean records as 'non-performing assets' if their accounts suffer financial distress post-February 2020. It has also been mooted that on all government purchases there must be no penalties or interest levied for any delay in deliveries. The association has also vouched for clearing outstanding payments and dues on supply of goods and services to government entities, non-cancellation/deferment of purchase orders placed by government entities and accommodate increase in input costs of imports arising from rupee depreciation.

Explaining further, V Anbu, Director General & CEO, IMTMA, said, "The association has simultaneously been engaging its member companies as well as exhibition industry stakeholders to keep them abreast, by reporting on the various government initiatives, creating a help desk for various stakeholders, publishing the best practices followed by different companies and putting up a resources page which provides insights into the health & economic responses to the pandemic. All this information is compiled into newsletters which are shared with member companies and exhibition industry stakeholders."
Additionally, IMTMA has also been conducting webinars with its member companies on topics such as:

1. Looking beyond domestic markets and aggressively focusing on exports.
2. Deliberating on the various relief & stimulus measures provided by the Government of India for income tax, GST, company law, banking and finance, etc.
3. Achieving breakthrough results in machine tools and accessories manufacturing through six sigma approach.
4. How to design, engineer and build high performance machine tools.
5. Maintaining business continuity during the lockdown.
6. Understanding Force Majeure clause in the context COVID-19 and beyond.
7. Special session for MSME member companies to apprise them on the various stimulus measures offered by the government.

As an advisory service, IMTMA has prepared a general guideline, 'Protocol for resumption of activities', which will help member companies to work out a plan to suit their individual organisations. The association has also advised members to build an element of assurance, within the plan, of strict adherence to safety norms as required for prevention of the pandemic disease, specifically social distancing, screening and sanitisation.

A new normal awaits all of us as industries get back to work with social distancing and temperature screening to keep infections at bay. Organisations are still doing R&D to find a vaccine. Until then, businesses have to take precautions to safeguard themselves and keep the show running.

It is also an opportune time for the machine tool industry to move forward with the three Rs: resolve, rebound and reimagine. The industry must explore opportunities in manufacturing equipment for sectors such as healthcare, telecommunications, aerospace, electronics and other sunrise sectors. The industry needs to work more closely with these sectors in the post-COVID era than ever before, by ramping up their R&D and serving efficiently and in a customer-centric manner, which will give rich dividends.

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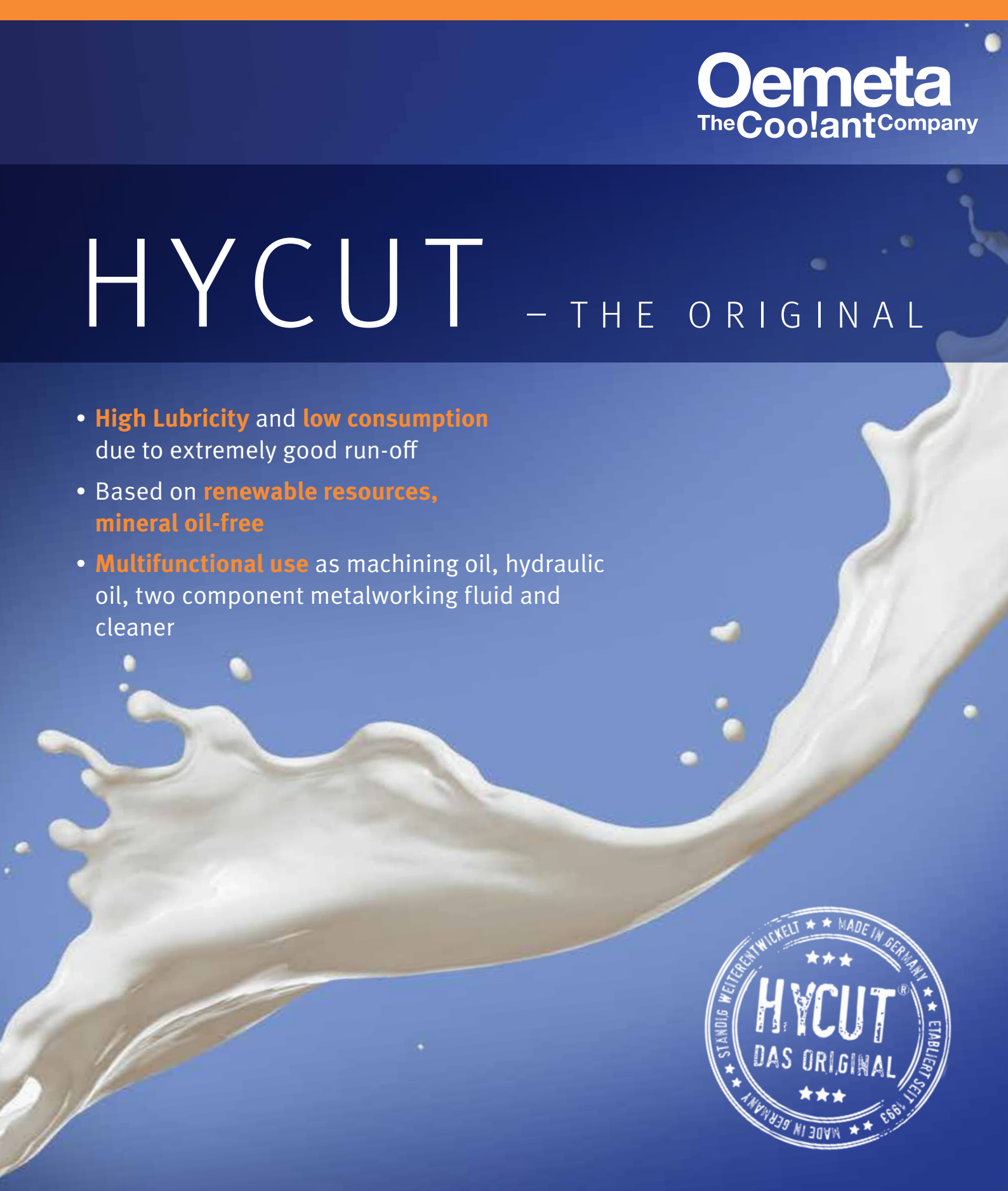

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"Aesthetics purely depend on the sensibilities of the designer"

… says **Aditya Kumar,** Managing Director, Marco Polo Products, in this interview with Juili Eklahare. He throws light on the myth that 'any prototyping technique is suitable for all needs', how rapidly the company can create a working prototype for a client and how it has evolved over the years. Excerpts…

The manufacturing businesses all over the world have been affected by COVID-19. How do you think 3D Printing & rapid prototyping technologies help manufacturers in the current situation?

Manufacturing has been adversely affected world over, primarily because it is connected to non-essential products. 3D Printing technology has helped to rapidly prototype new designs and offer solutions for countering the COVID-19 situation – they have been used as a bridge supply method till the development of final tooling for mass manufacturing.

Can you highlight the current trends in 3D Printing & rapid prototyping? How rapidly can the company create a working prototype for a client and what techniques make this possible?

3D Printing and prototyping technologies have evolved over the years and are currently in the fourth generation, in my opinion. We began using these technologies and offering services in 1999. Using the available technology and depending on size/complexity, prototyping for products can be completed within 24 hours to seven days. However, the product development timeline has got compressed from six months in the earlier days to as low as four to six weeks today.

Do you think the manufacturing industry is evolving towards better industrial designs? What do you think are some of the myths surrounding it?

Because of the availability of prototyping techniques, it is becoming possible to iterate more on designs till they are perfected. That is why we are for sure getting better industrial designs in place than before. However, a design cannot get aesthetically better just because it can be prototyped and improved. Functionality of a product has improved, but aesthetics purely depend on the sensibilities of the designer. There are further thoughts in the minds of people that 'any prototyping technique is suitable for all needs'. It needs to be understood that 3D Printing consists of several different technologies using different processes and materials and they cater to different needs of the industry.

Do you plan on working in any collaborative teams? Can you tell us about the projects coming up from your company?

We are collaborating with our customers and supporting the development of electric vehicles, medical devices, IoT devices and home appliances. We are extensively working towards getting out our own products for industrial safety & higher level medical devices.

How has Marco Polo Products evolved over the years?

Our company began operations 20 years ago, trying to offer prototyping services using the latest technologies available at that time. Around seven years ago, we moved further up the value chain and took up making of soft tools and injection moulding to be able to provide functional prototypes in production intent material. We have gradually developed experience & expertise in precision injection moulding and a robust customer base in Europe and the USA.

"Premium, performance-oriented vehicle is the right start to mass electrification"

… mentions **Narayan Subramanian,** Founder, Ultraviolette Automotive, in his interview with Anvita Pillai. Here, he offers a dossier on electric vehicles in the Indian market, developments done by them in battery technology, their Ultraviolette F77 bike and how they are sailing through this period of COVID-19 crisis. Excerpts…

Every automotive company in the market today is working on electrifying their two-wheeler models. What, according to you, sets apart the electric motorcycles produced by your company in the market?

Ultraviolette is developing high-powered, high-performance, electric two-wheelers. There are two main aspects that set us apart – firstly, the technology associated with the development of high-performance vehicle and secondly, electric two-wheeler markets and their perception. Which is why we believe a premium, performance-oriented vehicle is the right start to lead the way towards mass electrification.

Making vehicles 'smart' is a core factor taken into consideration before presenting a vehicle in the market. How do you bring in the 'smart' factor in your two-wheelers?

Smart is a philosophy that translates across our entire product and user experience. Right from the core battery technology to features on the vehicles to the connected experience. Our Ultraviolette F77's full suite of electronic rider, connected interface, sensor fusion technology, real-time preventive maintenance technology, 5-inch high-brightness colour TFT touchscreen and smart battery packs are some of the early decisions we have for us to be future ready.

What have been the certain challenges for you till date in the Indian market?

The main challenges lie in breaking established notions when it comes to EVs around vehicle desirability, high performance, reliability, robustness, battery life, etc. It is for this reason that we had to start from scratch and develop technology capable of meeting all the Indian use case conditions, right from the entire vehicle architecture to the underlying battery technology.

Electric vehicles still lack a supporting infrastructure hindering it from becoming a widely adopted mode of transportation. How is your company bringing in ease of charging to its customers?

We realised very early on that a good product alone will not accelerate the transition towards electric mobility. We have built a lot of IP around the development of batteries and various forms of charging technology. The core technologies are: modular battery technology – portable batteries that can be carried to home/office; on board chargers – a standard on board charger to charge the vehicle overnight (six hours) and a portable fast charger that fits in a backpack and can charge the vehicle in 90 minutes.

How has the present COVID-19 situation affected your company? What are the plans put in place to gain momentum once business starts?

Most businesses worldwide are affected in various ways due to this COVID-19 crisis. We started preparing for this when the initial news started emerging and were able to facilitate work from home for most teams. The main activity that had been put on hold was the assembly of our pre-production vehicles, which as we speak, has resumed. As a company, we have taken strict measures to maintain adequate physical distancing between team members and high levels of hygiene. Moving forward, we will continue to operate with a combination of work from home and being on site.

The 'crude' consequences for India!

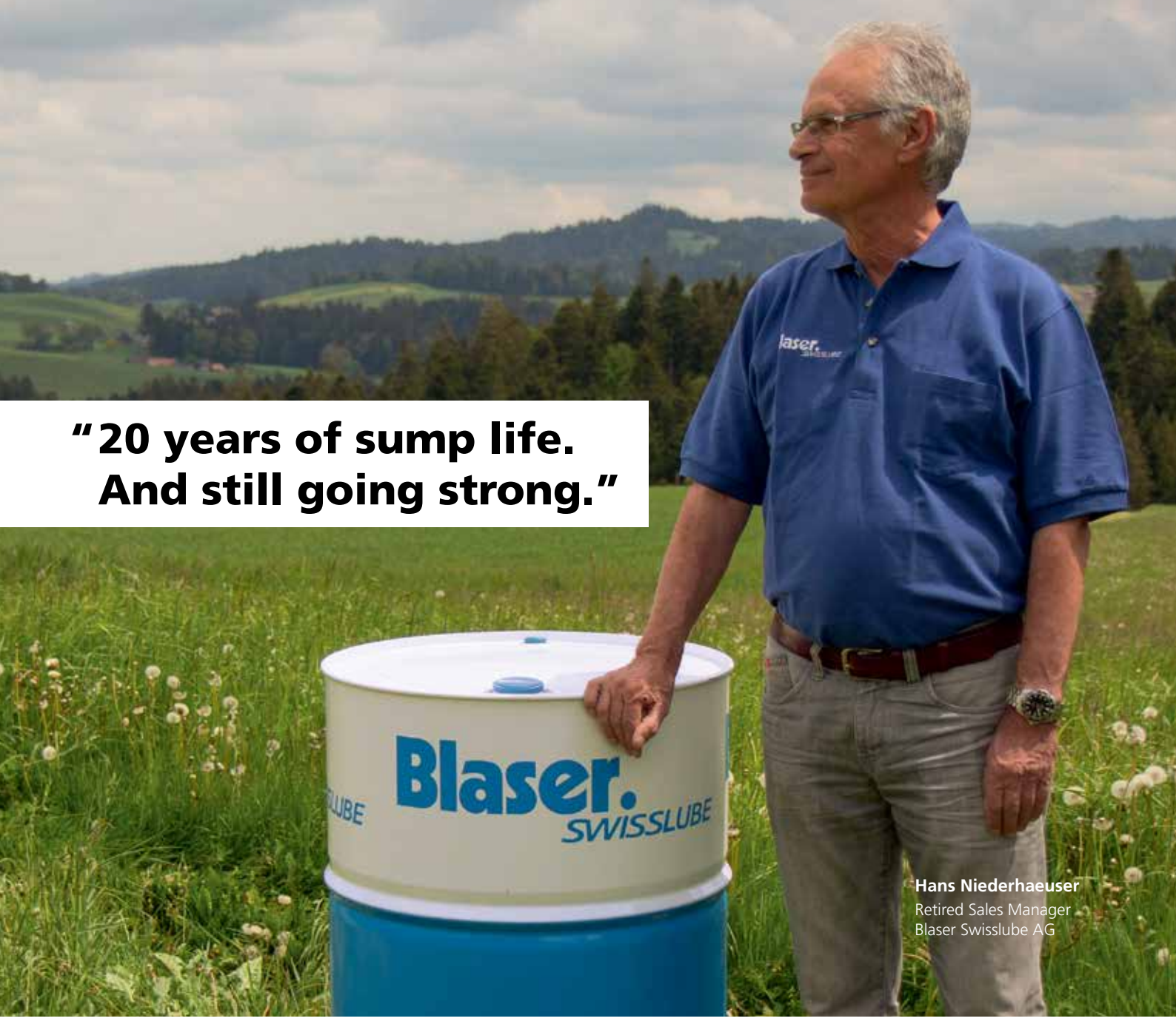
– Anvita Pillai, Sub-editor & Correspondent

While the global economy is witnessing a recession worse than 2008, India is working towards moving off that trajectory. India, in its Union Budget analysis of 2020-2021, had the fiscal deficit targeted at 3.5% of GDP. With the 20-lakh crore economic stimulus package (10% of GDP) being announced, the country's fiscal deficit is likely to shoot up to 7.9% in the current financial year, according to an SBI research report.

It is obvious that these stimulus packages cannot be offered with declining reserves. With the lockdown and businesses hitting absolute lows, the government has to think of alternatives to fill up its reserves. Also, an additional pressure of diminishing reserves means an increasing threat of inflation for the country. In the present situation, where the country doesn't have a source to generate revenue, the crude price fall is positive news for the country. India, the third-largest crude importer, spent an estimated ₹8.81 lakh crore to import crude in 2018-2019. But the current price fall may leave the country with a positive current account balance. The increase in export and timely fall in the import bills can act as a significant pillar to revive the economy.

While the oil and gas sector contributed to around 3.8% of the global GDP in 2019, the year 2020 doesn't seem to bode well for the industry. A fallout between the three largest oil shareholders of the world, the US (19%), Saudi Arabia (12%) and Russia (11%), is what resulted in a dip in the oil prices. Despite the countries reaching an agreement to produce 9.7 million barrels per day, the low demand due to the lockdown couldn't prevent the futures of Western Texas Intermediate (WTI) hitting negative $37.63 and Brent crude declining to $25.57 a barrel on April 21, 2020. While major oil-producing countries can sustain through the period of low demand & price fall, smaller oil-producing countries like Iran, Iraq, Azerbaijan, etc will be the worst hit. The same would be the case for the US oil syndicates. While giants like Chevron, Exxon Mobil, BP, etc have enough financial reserves to navigate through this price crash, smaller oil drilling companies there might suffer unless government assistance is offered.

The present situation could act as a cushion for oil-importing countries, like India's dying economy. Despite the low price of crude, the central government hasn't passed on its benefits to the citizen. In fact, there has been an increase in excise duty on petrol by ₹10 & diesel by ₹13 (retail unaffected). This is done with an intent to fill up the otherwise emaciated reserves. Also, Atanu Chakraborty, the Economics Affair Secretary of India, has expressed that India has no liquidity issue and enough foreign exchange reserves. So, India should use this opportunity to improve its oil storage facilities and buy in oil during the present price crash. In the long-term, it could help the country in containing its fiscal deficit and adjusting of the RBI monetary policies. India should focus on making the best out of this incentive fall to curb the falling GDP growth. This could also help set a growth pedestal helping the country become more 'self-reliant', like the agenda mentioned by the PMO.



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Hans Niederhaeuser
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INDIAN MANUFACTURING:
Taking the COVID-19 situation head on

The COVID-19 pandemic has taken the world by storm and the manufacturing industries around the globe are no stranger to it. On top of it all, to bring the spread of the virus under control, the government declared a lockdown in the country, further slowing down businesses. Some manufacturing facilities have already started partially functioning again. Businesses must get back to work and the industry must function again. So, how do they do so in the best possible way? The Cover Story talks about how the manufacturing industry can respond with vigour to function stably, what needs to be made a priority, how Industry 4.0 should be used diligently and how companies need to make employees' health of importance now, more than ever.

Srinivas Rao K,
CEO Coach,
Indian Manufacturing Academy

When reopened, production should not be the first priority. The priority should be the safety of the team.

There's no denying that the coronavirus has harshly affected all manufacturing industries across the world, including India, disturbing both, the demand as well as supply and ability of companies to deliver to the market. Manufacturing has restarted, but one will not be able to deploy all of one's manpower in the current situation. To avoid crowding at the work place, the government is not allowing full manpower and this may continue for some time to come. Let us look at how Indian manufacturing companies can respond with vigour.

Safety is first priority

When reopened, production should not be the first priority. The priority should be the safety of the team. How does one ensure safe working of employees without infecting them? Already, there are a few examples of factories contributing to the spread of the virus and we need to ensure we take maximum precautions.

Demand may bounce back

From what we can see, the demand is already there in certain segments. It may bounce back in other segments once the coronavirus situation comes under control. Companies need to find ways and means of handling 100% production.

Low productivity

Indian manufacturing companies have been sitting on huge productivity improvement opportunities. The manpower is used in excess in both, the shop floor and in offices. Both, blue collar and white collar productivity opportunities have been existing for a long time.

Double productivity

This is the time to double productivity at factories and one needs to quickly put teams together for this purpose. If demand is not back, one can use this time for implementing lean principles. One should form a core team and start with a model line. But there's not too much time – this urgency should be used to implement lean in eight weeks across the company.

The other day, a company was allowed to start production as it serves the medical fraternity. They had 140 people in place of the normal 275. The team started production and the motivation of the team was high as it felt it is serving the nation in these troubled times. In five days, it started giving 95% of its normal output. In its words, it cut down on 'non-essential' work (NVAs in lean language). Their high motivation must have certainly helped. We need to study it and ensure it is more sustainable. Some more work is definitely needed, but the team has shown how a calamity can be turned into an opportunity. This team was not trained in lean principles at all, but it proved that necessity is the mother of invention.

We would recommend that companies do not go for high investment in robots and so on immediately. We need to arrive at a situation where only robots can add further value. But many companies can improve productivity in a big way just by looking at their work methods and maybe some small investments. We recommend that one put a very small budget for each line. This will ensure that the team will come up with the most frugal engineering ideas. We do not want to encourage temporary and flimsy work, but we should not throw away big money when it is not needed, either.

Using Industry 4.0 diligently

If companies can use Industry 4.0 elements diligently, they can improve the efficiency in a big way. For example, a machine shop will be able to use its machines much more effectively if it can schedule them with the help of software that connects all the machines and monitors their loading. For instance, a task assigner software can be developed to drive all the routine work in a

A team has to adapt itself to the new environment of fewer people and the need for higher productivity

factory like process quality monitoring/machine monitoring/ production monitoring and so on. This software may work on smart phones. The time of the executives can be used much more effectively with the help of this software as it can schedule activities dynamically and ensure there is less unproductive time.

Digitalisation of office activities

This is the time to go for digitalisation in a big way in terms of office activities. If one has not been acting on this agenda, now one has enough motivation to do it. The white collar productivity can be addressed with this. Each department should work on re-engineering its work and reworking the SOPs. If one does not have SOPs, then this is the time to write them – with all the team members sitting at home, they have all the time to write them. Every team should take the target of managing its work with 50% of the man hours that are available.

Companies like Siemens and Wipro are supporting companies in Industry 4.0 and the digitalisation agenda. There are already a good number of projects happening in the country. But I would suggest that one should not look for examples – one needs to be a trail blazer and create examples.

Investment payback

Indian companies have a unique opportunity to implement Industry 4.0, digitalisation agenda, along with basic lean practices. The improvement in productivities can be phenomenal. The investment will pay back very easily.

People element

A team has to adapt itself to the new environment of fewer people and the need for higher productivity. It also has to take care of the heightened hygiene requirements and adopt new behaviours. The cost of indiscipline in the new situation can be very high. One needs to train the team and the change has to start from the top.

Senior management awareness and commitment

The senior management has to educate itself on the higher productivity possibilities and ensure they motivate their teams to take up this agenda. We notice that many senior management members may not be aware of these opportunities. Their conviction is important for this agenda to come even on to the table.

Let us look at the new behaviours that will be in demand in the new situation –

- **Planning**

  Planning is one element that is not given its due in the manufacturing industry. We will require a lot of planning in the new environment. A sales manager needs to plan his/her priorities more carefully. Changing the production plan and re-arranging them will be much tougher in the new environment as the procurement team may be working from home & they will not be able to visit the vendor partners as frequently as they may want. Plus, an HR manager has to plan the recruitment and induction training more carefully and also ensure he/she trains all the new recruits in the 'heightened safety/hygiene practices'.
- **Standard Operating Procedures (SOPs) for every activity**

  In the new situation, the team is not going to be very close by. It will have to learn how to manage work with fewer interventions from other team members and the boss. Employees will follow the rules if the overall environment is that of a structured one. Take the example of an MRT and MRT station – the whole structure of an MRT station and metro trains is very well defined. The trains come and stop exactly at the same place. There are automatic gates controlling the movement of people. The security team nudges the passengers to behave in a certain

We may have to slow down to speed up

way while getting down and getting in. Every person going into the MRT station follows the rules; one very rarely sees someone violating them. Hence, if the overall environment is well-defined and the whole system is well thought of, then the discipline will improve in the whole area.

- **Regular exercise and managing health**
  Many of the working people are not very health conscious – they do not regularly exercise and are all focused only on work & nothing else. The health of employees has always been a matter of importance for a company, but now it is so much the more. Companies have to encourage employees to take care of themselves and stay healthy & strong. They can also introduce regular exercise activities for them.
- **Clear KPIs for everyone**
  When the team is going to be away from each other and when it will have less opportunities to make mistakes due to multiple restrictions that are going to be there, it is important for employees to be clear about what they need to do and what targets they have to achieve. Clear KPIs and targets can be very useful to the team to just focus on what it has to achieve and plan its activities towards that. All bosses have to review the KPIs regularly.
- **Online training**
  The days of having many people in a hotel room for training are behind us now. At least for a few more months, we can't hope to train our employees in such a way. We now have to train them on microskills and the training has to happen online & more often. We should probably also ask our employees to allot a few hours to learning every week. We need to ensure their skill levels on all the functional skills are improved and they are made more effective. We will have to address the microskill/ practices that the employees have to learn in the new environment and the training has to be re-engineered.
- **Become slow and steady**
  The normal way of working of our teams is to go all out and to try to do everything in a very fast manner. The quality takes a back seat. For example, if we are setting up a factory, we pride ourselves in saying that we have built the factory and started it in three months flat/six months flat and so on. But after starting the factory, the people working in it will suffer every day due to bad layouts, bad material handling arrangements, badly planned canteens and so on. In the current situation, companies have to find ways and means of becoming more efficient immediately. Hence, we should act after considering all angles of an issue and we may have to slow down to speed up.
- **Tech-savvy**
  Employees, now, have to become more tech-savvy. They need to identify the ways and means of using the Industry 4.0 technology. For example, one may use a video analytics app for identifying the violations of physical distancing rules. Much better, the employees may be warned of possible violation. It is not enough if only the IT department is thinking of technology. The users will be able to suggest much better applications. The overall guiding factor is to become more efficient and avoid the violation of physical distancing rules.
- **Deep dives by leaders**
  The leaders in this situation have to be on the shop floor/ market as needed. The new ways of working have to be formulated by the team and the leaders should participate in all the new 'ways of working' to understand the problems that the teams will face. They should help the teams to solve problems in the new way of working.

Rediscovering oneself using the calamity

With a reformed action plan in place, factories and companies need to take steps that ensure the well-being and safety of their employees and not just focus on production and output. We are good at responding to a crisis and Indian manufacturing companies can rediscover themselves using this calamity. □

"With swappable battery, one has unlimited range, removing range anxiety"

….says **Sulajja Firodia Motwani,** Founder & CEO, Kinetic Green Energy and Power Solutions, in this tête-à-tête with Juili Eklahare. In this conversation, she explains the effectiveness of battery swapping, how the company has expanded its portfolio from one e-rickshaw to a range of them and its long-term goals. Excerpts…

Can you please brief us about your journey in the automotive sector so far?

I am the third generation entrepreneur in my family. I went to the US to study, but in my heart, I always wanted to come back and be a part of the business. I came back after getting my degree and working there for a while. So, I have been involved in the automotive business in the country for the past 23 years, where I have worked in all the areas, from sales to finance.

Can you tell us more about the current operations, the key business segments and business model of Kinetic Green?

We would like to work on the small vehicles – 80-90% of Indians use two-wheelers or three-wheelers. Since these vehicles are intracity vehicles, the amount of battery required on them is also limited. So, electric vehicles become very much affordable at the moment as the battery size is reduced. Kinetic has always appealed to the middle-class Indian, being a mass-product brand. So, we have been using our strength & brand and applying it in this segment.

Golf-carts are also a segment you are working towards in terms of EVs, as a joint venture with Lamborghini. How big is the market for this segment in India?

Interestingly, we will be manufacturing the golf-cart vehicles in India, which will give us a fairly attractive manufacturing cost and export them around the world. In India, the market for golf-carts will soon become about 4000-5000 golf-carts produced a year in the next five to seven years.

In FY 2021, Kinetic Green is targeting a ₹300-400 crore turnover and a sales target of 23,000 e-three wheelers. What is your action plan for this?

I chair the Federation of Indian Chambers of Commerce & Industry (FICCI) and also Society of Manufacturers of Electric Vehicles' (SMEV) electric three-wheeler's committee. Also, in 2019, we had a new model called 'Safar Smart' – a next generation vehicle that we have launched – which has more than 90-95% local components only. Besides this, we have expanded our portfolio from one e-rickshaw to a range of them, including cargo vehicles. So, based on all this, we are confident of achieving these numbers.

Loalisation of auto components is something that's quite talked about, which your company has achieved. What are the activities undertaken by your company that helped achieve this?

We are now giving clear warranty to our customers on our

Sulajja Firodia Motwani is an industry nominee on the Development Council for Electrical Mobility of India from the Ministry of Heavy Industries. The World Economic Forum selected her as a 'Young Global Leader' & she was voted among the top 25 business leaders of the next century in a poll of industrialists conducted by Fortune India.

electric three-wheelers. So, we also need a supply chain that will back it up because critical components need back-to-back warranty. Besides this, we began working on the possible partnerships and approached reputed automotive supply chain companies for most of our mechanical parts, giving them our specifications from our product design. For some of the proprietary components, like the gearbox or controllers, we have tried to develop the technology within our group companies itself.

Kinetic Green & Bharat Petroleum Corporation have signed an agreement for the launch of 'e-Drive', an electric vehicle mobility solution based on swappable battery technology. How will this solution help in intracity vehicles? How do you think it will revolutionise the EV industry in India?

Within a range of about 100 km, the cost of an electric three-wheeler is higher than that of a CNG auto. That's because in the latter, one is not buying the fuel along with it. But if one buys an electric three-wheeler with a battery, one is buying the fuel upfront. Plus, there's the dilemma of range anxiety. So, battery swapping is a very effective way of addressing these issues – the moment one removes the battery from the electric three-wheeler, the cost of the vehicle comes down by 50%. Coupled with government subsidies, it can come down below ₹1 lakh, so more people can afford it. Also, with swappable battery, one has unlimited range, removing range anxiety. Thus, in this partnership, Bharat Petroleum Corporation will put up the battery swapping stations at their petrol stations and we will provide the vehicle to the driver. We're starting with Kochi metro. This will be a revolutionary concept because it makes electric three-wheelers mainstream.

> "THE INDIAN GOLF-CARTS MARKET WILL SOON BECOME 4000-5000 GOLF-CARTS A YEAR IN THE NEXT FIVE TO SEVEN YEARS

Your three focus areas at the moment are retail, institutions and government. Can you tell us the work you are doing in each of these areas and the separate challenges each of them bring?

In terms of our EVs, when retail customers were not coming forward because they didn't want to take the risk or loans were not available, we did a lot of interesting work with government departments to popularise electric vehicles. For instance, we worked with the UP government and provided 8000 e-rickshaws to cycle-rickshaw pullers. The challenges in retail include creating the network from scratch, getting approvals in local RTOs and banks not coming forward to give loans. In institutions, we are currently doing a scheme in Andhra Pradesh, where we are providing 8000 electric three-wheelers for waste collection. In the institution market, we have to create opportunities, go with the stakeholders and convince them how this vehicle will be a different solution. And the challenge here is creating the demand by showing the customer the cost & sustainability advantage. With the government, we have to talk to the chief ministers of the states, various stakeholders, etc, telling them how they can bring EVs on the street. Here, there are issues like government buying being very complicated, sometimes there being the issues of collections & payments, etc.

What are your company's long-term goals?

We would like to be India's number one electric three-wheeler company and make a major mark in the golf-cart market globally. We would also like to enter the electric-two wheeler sector and find our place in it. Plus, we look to work with a lot of passion and develop an innovative set of products and technology that would give us an edge in the market. □

Images courtesy: shutterstock

Skill requirements for the world of smart manufacturing

The current COVID-19 pandemic has thrown up significant and unexpected challenges for every industry, including manufacturing. This is the time to accept the challenges and embrace new opportunities. The pandemic has introduced us to a 'new normal' which involves:

- Social distancing
- Sanitised parts
- Working in local geographies

Most of these will hasten the adoption of the Industry 4.0 principle of cyber-physical systems and local availability of parts with limited transportation. Smart manufacturing is expected to gain ground. Smart manufacturing is where manufacturers utilise cloud technology to store and access vast amounts of data that can be used in manufacturing applications within a factory or across an entire supply chain. Some benefits of smart manufacturing include:

1. Improved productivity

Smart manufacturing processes provide greater access to data across an entire supply chain network. Real-time data outlines what a manufacturer needs and when. They supply what's needed, thereby reducing waste and any downtime associated with missing parts.

Arindam Lahiri,
CEO,
Automotive Skills Development Council – India

2. Innovation and higher quality products

When productivity is improved, it saves money. It could then be invested in product development. Smart manufacturing data shows where customer needs are and businesses can find opportunities for new products or re-imagined products of a higher quality.

3. Increased manufacturing jobs

Smart manufacturing is a way to attract the younger, tech-savvy, skilled workforce since more technology-based manufacturing jobs will become available. By utilising smart manufacturing data and apps, employees can recognise new opportunities and increase productivity.

4. Energy efficiency

Manufacturers can reduce their carbon footprint by reducing waste. Energy intensive industries have the most to gain in terms of energy savings that will not only reduce energy waste but also make products more affordable.

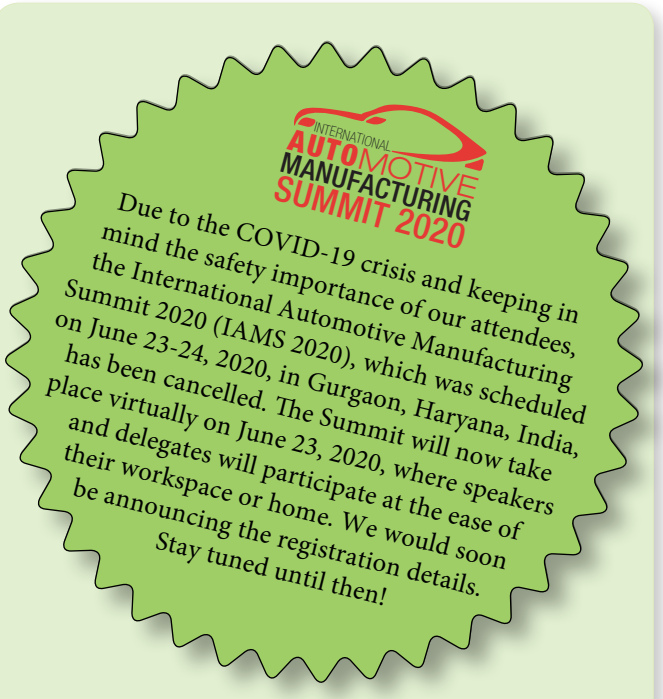
The skills that could be required to bring about an Industry 4.0 transformation is to think about IIoT in context of an autonomous assembly line. It could include 3D printers and other Additive Manufacturing techniques running alongside Computer Numerical Controlled (CNC) lathes and newer machines capable of executing highly variable, multi-step processes using robotic vision and Artificial Intelligence. In addition to this, we may have collaborative robots that work alongside humans. This calls for not only multiple skills sets but, in many instances, the blending of those skills. These skills will cut across silos and specialisations to create a whole new category of technology professionals – ones who understand the convergence of operational technologies and information technologies.

The five most important skills required will include:

1. Cybersecurity – Cybersecurity is already a major concern for companies that, to date, probably have not had to think much about it. When few of the older machines have been turned into data-generating network endpoints and linked together with new equipment, which in turn is tied into backend ERP systems and supply chains, a company's attack surface expands exponentially.

2. Data scientists – The IoT deployments fuelling Industry 4.0 will generate vast quantities of data. All that data will need to be captured and analysed so it can be used to improve machine performance, reduce resource consumption, assist in quality control, make supply chains more efficient and introduce new products and services.

3. Networking – Connecting machines to each other and to the command & control systems that will oversee them will require the skills of a highly-skilled network engineer. They will have to be up to date on WANs, edge networking and fog computing as well as next-gen 5G networking technologies, Wi-Fi and the low-power LAN protocols that IoT devices often run on.



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Summit Co-Chairman: *Ramashankar Pandey, Managing Director, Hella India Lighting*
Skill Development Partner: *Automotive Skills Development Council (ASDC)*

4. Software engineers, application developers & programmers – These jobs will be required in various forms from one end of the Industry 4.0 ecosystem to the other. Manufacturers will need skilled manpower to write and modify programs for machines as well as develop new interfaces for their human counterparts to interact with them.

5. Architects – IT architects will have a role to help systems engineers on the operational side meld the physical and logical worlds. People in this role will be required to understand the full dimensions of a company's existing business, its processes and its digital transformation goals and then figure out how to tie it all together using technology.

It is imperative now that we utilise this opportunity to prepare skilled manpower for the future of the manufacturing industry. The world belongs to the workforce which has the skills to survive through multi-skilling and skills for integrating specialised skills. ☐

Re-strategising businesses for survival & revival post COVID-19

The year 2019 was quite hard-hitting for the automotive & manufacturing industry. Plus, with the present COVID-19 crisis, many businesses are experiencing a diminished consumer demand and are opting for new methods and strategies to tackle the sales slowdown that one is expecting to happen once businesses resume. With the present Viewpoint, EM seeks to explain how auto industry & manufacturers can re-strategise for growth, the government support that could help post-COVID-19, and the certain key interventions required for revival, when businesses resume this year.

Anvita Pillai
Sub-Editor & Correspondent
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Sunil Laroiya,
President,
Jamna Auto Industries

"We will see a lot of consolidations taking place once the crisis is over"

I think the current financial year is going to be extremely unstable; we have almost lost Q1 of FY 2020-21 without any sales and there would be hardly anything happening in the next few days. It will probably be towards Q2 of FY 2021-22 when we will see things to start settling down for good. Companies will have to fend the ways to reduce fixed costs in order to survive this unprecedented crisis and to sail through. However, those who are able to survive will have ample opportunities in the post-COVID-19 world.

We will see a lot of consolidations taking place once the crisis is over; companies that are able to control cash in the current crisis will be leaders in their fields. The commercial vehicle industry may turn around quicker in case there is a reduction in GST rates (from 28% to 18%) along with smart scrappage policy; wherein, all vehicles older than 10 years are compulsorily scrapped and owners are given incentives/discounts to buy new BS VI vehicles. This will have two major advantages – firstly, quick revival of the auto sector and secondly, we will be able to maintain the current level of clean air (as during the lockdown period) by taking away (scrapping) the polluting vehicles.

Dr Sandeep Chandna,
GM - Production,
SML Isuzu

"Every industry should have sustainable industrial policies for lasting recovery"

The economic growth was slow in FY 2019-20 due to various reasons. Now, COVID-19 has jammed the wheels of the industry to a standstill for a longer period, which has never happened since the industrial revolution. Since the requirement itself is low and the industry would be running at 30-40% manpower initially, the capacity would not be calculated more than 40%. The expected period to run the industry seamlessly will be about a year and to breakeven would be more than a year over normalcy.

To revive sales in different sectors, strategies would obviously be different. The government should announce some special packages so that the breakeven period could be lowered down. In the present situation, for the first time, almost all organisations experienced work from home. Everyone must have experienced this culture is making teams stronger and people are coming closer to join hands as a team. New technologies, which were still far away from India, are being turned into reality by manufacturing innovations. In-house manufacturing of medical ventilators in automobile industries is a recent example in this series.

Manufacturing must act to pressure the integrity of operations & protect the workforce along with ramping up the production. It should build up trust amongst service allies and other partners of the manufacturing industry, which will make supply chain a robust system, although everyone does not have 'one size fit' solutions. Moreover, every industry should have sustainable industrial policies and targeted support systems for lasting recovery. Just In Time material feeding would be another catalyst in this system. Other measures can be rationalisation of investments from essential to non-essential, implementation of long-term & short-term cost saving initiatives, re-assuring business models whether they are operating as per the business plan, considering all the scenarios formed for fixed & variable cost control for the next 6-12 months and maintaining transparency with customers pertaining to the business conditions.

Dr Wilfried Aulbur,
Senior Partner,
Member Supervisory Board,
Roland Berger

"Flexibility is one of the key assets that a company can leverage"

Limited liquidity and an overall slow economic growth have been detractors for the growth of the Indian automotive industry in 2019. Reduction in sales for passenger vehicles and two-wheelers clearly reflect low consumer sentiment. Reduced sales in the commercial vehicle sector reflect a significant downturn in the overall business environment. These challenges are structural and need focused measures by the government, which so far have not been forthcoming. With the challenge of the COVID-19 hitting India, the outlook for 2020 looks difficult.

In a highly volatile environment, flexibility is one of the key assets that a company can leverage. Companies must keep overheads low, make production-related costs as much as possible variable, manage innovation pipelines carefully, etc. Unfortunately, the market downturn and the coronavirus hit companies at a time when investment requirements for emission and other technologies (BS VI, electrification, etc) are high. This complicates the challenges for Indian businesses. The need of the hour for OEMs and suppliers is to leverage all cost-reduction tools at their disposal along their value chain.

The German government has put a reasonable plan in place that ensures that the vulnerable elements of society get support during this crisis. In addition, access to liquidity, especially for small and medium-sized businesses, is ensured, while support for large companies may lead to temporary government ownership of these players. These types of interventions are necessary to help Indian consumers, too, especially those at the bottom of the pyramid, and hopefully, Indian businesses will tide over the challenges that the corona crisis is throwing at them.

Snehal Pawar,
Head – CMF,
Design & Strategy,
Hyundai Design India

"Disruptive partnerships are the future of businesses"

2019 was quite a ride for the industry. The current market situations with an unstable GDP has had an adverse impact on per capita. This in turn has raised concerns over the maturing customer base that could have moved from an older product to a newer one. Talking about boost from the government – it has been very shallow. The tax relaxations could have been more offered at the bottom of the pyramid, which comprises larger volume of automotive sales. On the other side, NFBCs couldn't offer a significant hand in influencing industry sales, despite the active efforts from established players. It is important to understand, that the industry is at a juncture of seeing unprecedented changes in the way it makes products, offers its services and at large, what it operates. If we specifically talk about automakers, it is inevitable to see connected/shared mobility steering the growth-wheel in the near future. Looking at commercial vehicles, connected mobility could also find its first adapters in local delivery vehicles, school buses and from large cargo hubs to last mile trucking.

One could say that we need to look at the industry from a bird's eye view. The world post-COVID-19 is going to be very different. Product developers, like myself, need to rethink the automotive user scenarios. Manufacturing needs to adapt to quicker ways to seek proof of concepts and bring virtual technology & Artificial Intelligence to give that extra hand. Marketers can no longer rely on celebrity faces, unless one has the real juice in the bucket. Disruptive partnerships are the future of businesses and the auto industry is no exception. As Socrates said, "The secret of change is to focus all your energy not on fighting the old but on building the new."

Niraj Mittal,
Chief Operating Officer -
Auto Component Business,
Supreme Treon

"Everyone needs to be a turnaround & value creation specialist"

I am expecting another six months to recover partially since demand is going to be driven by market constraints. Operational costs will be high, which will make breaking even difficult for the next one year. The manufacturing industry's concepts need to be changed now with more automation & flexible manufacturing systems rather than specific products & machines. Companies need to build up their product, marketing & operational strategies on their own. We cannot work in the same era of before the COVID-19 situation anymore. Labour law reforms certainly will help or attract the industries to be set-up in India. We cannot sit idle on age-old processes or be governed by the bureaucracy systems anymore. We need to have an industry-friendly culture in the country for localisation of the products as well as to win export opportunities.

The present situation can bring in a lot of opportunities for India. The government needs to reform many labour laws & make the business environment friendly so that it becomes a headache-free scenario to run an organisation. China has 17% GDP of the world, and if we are able to acquire 4% of the market share, then it will be great for the next two years. We need to skill our workforce and make their mindset growth-oriented. Quality excellence can make us the leaders. We need to spend money on Capex, infrastructure & ease of business (end-to-end solutions). The efficiency of the industry will go down and operating expenses will go up marginally for the next one year, but we need to live with it. Everyone needs to be a 'turnaround & value creation specialist' since every INR saving will bring the culture of wastage elimination in organisations.

Pankaj Dubey,
Auto Industry Expert &
Former MD, Polaris India

"Flexible manufacturing is the need of the hour"

The auto industry has faced a major impact in 2019. The main reason behind it is tighter control on financing after so many scams in the banking sector and government endeavours to clean the sector. This also includes the high GST blocked funds of dealers, which took away the spending power from most of the large scale as well as small scale business owners, resulting in lowering consumer demand.

As far as the re-strategising is concerned, manufacturers are adopting digital platforms for their important announcements and shifting their focus on retail sales, as opposed to the traditional method of pushing wholesale. Given the current situation of the industry, manufacturers have to divert its focus more towards new product development, prepare for future technology and work on cost-efficiency. Lean manufacturing set-up and flexible manufacturing is the need of the hour to be prepared to meet future changing demand positions. The whole world has shifted to the digital era, and thus, the marketing strategies are all mostly at the edge of going totally digital, which in turn needs rationalisation of physical/offline marketing. In the current situation, most players are opting for digital launches to maintain the safety of the individuals. Introducing new strategies for efficient manufacturing will play a major role in the revival of the industry. I recommend all to stay calm and get over the coronavirus scare by following government guidelines strictly. Once the situation improves, the economy revival will take time. But be patient and we can find out a win-win for all.

Navid Talib,
Manufacturing Operations Head,
Honda Cars India

"India will emerge as the preferred centre for manufactured products"

First it was coming to terms with the GST regime and then came the conflicts and confusion over the policies in pushing the electrification agenda; it started with 100% EVs by 2025, then by 2030, 100% commercial EVs and now by 2047, the uncertainty still prevails. Then came the transition from BS IV to BS VI vehicles, which forced manufacturers to adjust the stocks and production. This multiplied the woes of the manufacturers, as the market experienced a huge dip in customer buying sentiments due to uncertainty over the future, resulting in the biggest economic slump of recent times. With COVID-19, the entire country has come to a standstill. From the end-customer demand to supply chain disruptions and closure of plant operations, the revival to normalcy is going to be a monumental task and will have some casualties as well. To adjust to this normal, recovery time would definitely be beyond 2020 end.

Right now, the priority of companies must be to ensure the most resilient supply chain possible whilst protecting their workforce. India's role post-COVID-19, particularly in the industrial sector, is a subject of great interest, hope and speculation to the rest of the world. I do believe that India will emerge as one of the preferred centres for manufactured products, provided we re-strategise the way we have done localisation in the past. The most appropriate strategy for India would be to take self-control over the national value chain, utilise the local skills and do domestic value addition to move towards self-reliance. The key interventions required for growth and revival now would be: securing safety of all employees by making social distancing the new normal, from getting workers back to securing factories – there is a need to draw up business continuity blueprints & digitalisation/automation should take the front seat and due to slump in demand, capacity would be in abundance. So, look at partnerships to have a win-win arrangement in the areas of resource sharing, marketing, manufacturing, etc.

Images courtesy: shutterstock

Getting closer to the reality of low emission mobility

Due the collateral effects of combustion vehicles, the world has now started becoming more vigilant towards the outwardly effects of pollution. The automotive industry has now started measuring the effects it has on the environment and is slowly shifting towards building more environment-friendly two-wheeler and four-wheeler models. The present article analyses how hybridisation, lightweighting, smart technologies, etc can lead to a greener future.

Pankaj Khare,
Business Unit Head - High Performance Materials (HPM),
LANXESS India

The environmental impact caused by transportation has come under the spotlight in recent years resulting into a buzz around embedding sustainable mobility solutions. As the necessity to reduce carbon emission is the need of the hour, manufacturers are reshaping their businesses models, adopting eco-friendly practices and striving to gain consumer approval. In the current scenario, manufacturers that can provide vehicles at an affordable price, greater performance, better comfort & style plus superior fuel economy are gaining an edge over competition.

In the past decade, automakers have done an impressive job of making cars that are more efficient than ever, without sacrificing power and performance. Technological innovations have allowed automakers to pump up the horsepower and fuel economy at the same time. Those innovations include the increased use of lightweight materials, tyres with lower resistance, fuel efficient engines, additives to stabilise biodiesel and penetration of hybrid & connected vehicles. Literally, there are hundreds of new technologies available in the market which can improve fuel efficiency, but it all begins with lightweight materials.

Weight reduction with lightweight materials

Advance lightweight materials are widely used for boosting the fuel economy of modern automobiles while maintaining safety and performance. Lighter objects, such as high performing plastic, are highly energy efficient as they consume less power and fuel during the acceleration process compared to the heavier

The lightweight plastic created through a process that combines plastic with metal, without compromising on its stability, offering weight reduction up to 20%

objects. Plastic astonishingly makes 50% of today's cars, resulting into less strain on the engine and lower tailpipe emissions. The lightweight plastic is created through a process that combines plastic with metal, without compromising on its stability properties. The combination offers weight reduction of up to 20%, with higher stiffness and strength. The solutions are mainly applied to the car body, chassis, drivetrain, interior and electronics. For instance, the material can be used in thermo-plastic engine oil pans, CNG gas tank liners, cross car beams, front-end structures, brake pedals, steering rods, airbags & airbag housings, battery system carriers, car body inserts and structural body frames. Compared to the traditional steel material, hybrid plastic metal technology is cost-efficient and is already used by well-known automakers in today's date.

Taking a step further in development of hybrid technology, manufacturers have innovated 'Hollow Profile Hybrid (HPH) technology', which uses hollow metal profiles with round or square cross-sections instead of sheet metal. Due to the dimensional stability, hollow profiles enable hybrid parts with significantly higher torsional stiffness and strength. There is an enormous potential for structural components, such as cross car beams, which were not resilient enough using the conventional hybrid technology. Apart from the four-wheeler segment, the two-wheeler vehicle segment is also utilising lightweight materials to achieve better fuel efficiency. Two-wheeler manufacturers are also converting many metal parts, like grab handle, footrest, air intake manifold, fenders, cylinder head cover, etc to plastics.

Utilisation of fuel-efficient tyres

In addition to hybrid plastic metal technology, another emerging trend in achieving fuel efficiency is utilisation of tyres with better fuel efficiency. For decades, tyre designers have sought to reduce rolling resistance as a way to improve fuel economy. However, there is a trade-off. If the rolling resistance of the tyre is reduced, it will also reduce the tyre's ability to grip a wet road. Better rolling resistance has also typically translated to a tyre with lower durability. But things are changing today, thanks to materials science, which has facilitated the emergence of fuel-efficient tires. Additives, such as Nanoprene (made for tire treads), lower rolling resistance without sacrificing wet grip or durability. Also, new and improved rubber materials, such as polybutadiene rubber, for tyre manufacturers, substantially reduce a tyre's rolling resistance, which is the friction it encounters as it grips the road. As a consequence, fuel consumption is lower, which translates to less emission of carbon dioxide. It is not only about utilisation of green tyres that contributes towards sustainable development, but also about utilising green production methods while creating these tyres. The specialty chemical company LANXESS has already facilitated cleaner production of tyres by removing silicone from washable and permanent release agents and innovated versatile solutions for manufacturing of tyres.

Penetration of hybrid vehicles

Growing influence of electric, shared and autonomous mobility will reshape the future of the automotive industry. Stakeholders, cities, automakers, suppliers, fleet owners and more will see profound benefits, opportunities and challenges as the technology will evolve in the coming years. Autonomous vehicles will revolutionise the urban landscape by allowing machines to take over driving. Electric cars will soon contribute towards reducing the carbon emission and decarbonising the transport sector. Shared use of mobility services will further offer tailored mobility services, which can possibly replace the need for privately owned modes of transport. Key advancements in electric & hybrid vehicles will certainly include improved and matured battery technology to solve the current limitation in operating ranges. Also, infrastructure and urban planning will play its role; for example, an adequate station network for fast charging of batteries and for supply of alternative fuels for hybrid

The consumer will be able to closely understand the fuel consumption patterns of vehicles at one touch and take appropriate actions to improve efficiency

vehicles, like using natural gas, will be developed.

Emergence of smart technologies

The future of the automotive industry will witness wider adoption of connected technologies, allowing users to get valuable insights about their vehicle. For instance, now the consumer will be able to closely understand the fuel consumption patterns of vehicles at one touch and take appropriate actions to improve efficiency. The wave of digital disruptive technology also facilitates vehicle-to-vehicle communication that essentially can decrease traffic, vehicle accidents and fatalities. The concept of smart technologies is evolving beyond integration of digital equipment and is emphasising on utilisation of cleaner fuels, like solar energy, biodiesel and hydrogen gas. Building an eco-friendly infrastructure that has solar roads, alternate charging & refuelling station and green space is essential to make our cities sustainable in the long run.

Biodiesel

Biodiesel is an alternative fuel similar to conventional or 'fossil' diesel created to reduce dependency on traditional fuel options and decreasing emission. This can be described as a carbon neutral fuel which produces no net output of carbon in the form of carbon dioxide after the fuel is combusted. The issue associated with this fuel alternative is its storage, as biodiesel is vulnerable to environmental factors, such as air, moisture, light, etc. As we are progressing, now there are ways to improve the storing process of diesel with the help of additives. If the additives are rightly used, they can increase the resistance of biodiesel to oxidation process and increase the shelf life. These additives ensure that elements obtained from natural raw materials remain stable and can, therefore, be used for a longer duration. The stabilisers do not impair the fuel's chemical or technical properties in any way and there is no need to worry about impermissible interactions with other fuel components. Biodiesel stabilisers, in the coming years, will play a pivotal role in mainstreaming the biodiesel usage.

The Indian OEMs are opting for better technical support in their endeavour to reduce weight, offer better quality, improve fuel efficiency and reduce CO_2 emissions. With this increase in demand for quality products, there is a huge potential for quality engineering plastics & related services in the Indian market. There is a need to support auto OEMs with expertise and knowledge to enable them to convert metal parts to plastics, without diluting the specifications. It is important to closely work with vehicle manufacturers to create a difference in the existing scenario through conscious efforts. In India, the passenger car segment is rapidly growing, which will further create immense opportunity for utilisation of technologies, such as plastic, fuel efficient tires, alternative fuel options, EVs and digital solutions.

Manufacturing the new age of transportation

As we progress in this evolving business landscape, a booming segment like EVs will gain huge advantages by integrating a lighter and strong frame, as it will increase the car's capacity to carry heavy batteries. The scope for reducing CO_2 emissions by tyre manufacturers, by optimising energy consumption and by usage of green/biomaterial is unlimited, meaning our tyres will become greener and greener in the coming future. The automotive industry, in the future, will witness influx of more autonomous vehicles and digital technologies, where lightweight materials will be a key factor in manufacturing of these new age transportation solutions. There always will be a need for space and weight reduction to incorporate latest technologies, while maintaining quality and cost efficiency makes it prerequisite for manufacturers to use lightweight materials. Amidst widespread change in vehicle systems and architecture, get ready for a revolution in the automotive industry. The new age vehicle eco-system is closer than we imagine. □

Applying lean manufacturing to the job shop

Lean manufacturing, undoubtedly, is an operative method to bring down costs and function more resourcefully. One space that can positively apply lean is the job shop. Although lean has its roots in high-volume, low-mix factory environments, implementing lean in the Douglas Electrical job shop has produced a range of both, company and customer benefits. This article digs into those benefits, as well as the lessons the company learnt by applying lean in a job shop environment.

Lean production is one of the most important manufacturing strategies to emerge in the last century. By minimising waste, which is considered anything that doesn't provide value in the manufacturing process, lean improves efficiency without sacrificing productivity, enabling manufacturers to deliver higher quality products to their customers at lower costs.

A perceived issue with lean, however, is that it's typically thought to work best in high-volume, low-mix settings — or in manufacturing lines that churn out the same product day in and day out. While it's true that lean does have its roots in these kinds of operations, the idea that it can't be applied to other types of processes is a misconception. With the right strategy and planning, lean can be used in other manufacturing environments, including job shops that have a high-mix of products at relatively lower volumes. Beginning in 2008, we have applied lean to our manufacturing operation, and it is now a pervasive force in improving the efficiency of our factory. Lean provides our customers with several benefits, including gains in safety, quality, productivity and capacity.

Lean and the nature of job shops

Lean manufacturing is a systematic method for minimising waste in manufacturing. Lean breaks down processes as being

value added or non-value added tasks. In other words, does a particular process physically transform a material or product into something the customer wants, which qualifies it as a value added task? Or does the process eat up time, materials, labour and floor space, without physically transforming the material or product into something the customer wants, which would be a non-value added task? The purpose of lean is to eliminate those non-value added processes.

Traditionally, lean has not been applied to job shop operations, which often rely on batch operations and have frequent manufacturing changeovers. But that doesn't mean it can't be done. In fact, we've applied lean manufacturing techniques to our entire line of hermetically sealed electrical components, which use proprietary epoxy formulations to create robust seals around connectors, wires, circuit boards, flex circuits and other electrical components. Our products are used in extreme applications and routinely encounter pressures above 5000 psi, vacuum to 1x10-10 Torr and voltages in excess of 30 kV. And whatever the environment, these products have to provide true hermetic performance with leak rates as low as 1x10-9 cc-He/sec.

While we produce many standard products at high volumes for the automotive and industrial markets, we also produce a steady stream of shorter-run, custom products for military, aerospace, energy exploration and emerging technologies.

Before implementing lean, we employed more typical batch-and-queue operations to assemble the connectors, wires and circuit boards that go into our products. We likewise had batch operations to mix, cast and cure our epoxy encapsulants. Batching all these operations meant our lead times were longer, our Work-In-Process (WIP) inventory was greater and because QC was a separate department with batch processing, any quality issues remained virtually hidden until the end of the manufacturing process. But by implementing lean and modifying it slightly to match the demands of our job shop, we were able to successfully move away from this less efficient model and unlock a range of benefits for both, our company and customers.

Achieving single-piece flow

Our first step in implementing lean was to transform our batch operations to a more lean-friendly manufacturing style. That's where single-piece flow comes in. This centerpiece of lean production essentially eliminates all non-value added tasks and sources of WIP between steps, such as the time wasted if a product needs to be set down, for example. In a single-piece flow system, production of individual products takes place in manufacturing

In a single-piece flow system, production of individual products takes place in manufacturing cells

cells. Using Standardized Work Instructions (SWI), we're able to design detailed production flows on paper, keeping in mind the quality and consistency of the finished product, process throughput, operator safety and customer needs. We then make the design a reality on our shop floor and begin manufacturing the product — all within the span of a few days.

The only exceptions to single-piece flow in our factory has to do with our ovens, which we use to cure the epoxy in our components. This process is one of the only compromises we've had to make in adopting a true lean factory model. In addition to a few material preparation processes — wire cutting, for example — it is one of the only remaining batch operations in place in our factory.

The power of team-based kaizen

In addition to maximising single-piece flow, we have also embraced other traditional lean principles, such as kaizen, an organisational philosophy based on continual improvement. To help us brainstorm, design and implement single-piece flow systems, we organised kaizen events, in which we tasked teams of people from across the organisation with solving specific problems related to leaning out specific manufacturing cells.

Our first kaizen, for example, focused on our largest single product line. By the end of the week, after implementing our new strategies, we were able to reduce labour costs on this particular component from $140 per piece to less than $50. Through this event and all subsequent events like it, we are able to identify and eliminate non-value added labour wherever possible. Each time we go back, we find more, making kaizen-related improvement a never ending process.

The benefits don't end there. Thanks to lean, since 2008, we were able to reduce:

- Labour content by 50%
- Indirect labour costs by 20%
- Our WIP inventory from $650,000 on a daily basis to under $200,000
- Our finished goods inventory by 70%

How a lean model benefits our customers

Lean has enabled us to achieve a just-in-time delivery system, and our customers have seen a dramatic improvement in our ability to deliver parts to them as needed. Because our manufacturing processes are faster and more efficient, our customers have experienced improvements in the following areas:

- **Speed to market:** Using SWI, we can design and deploy manufacturing cells for individual products within a few days of receiving a customer order. As a result of our faster manufacturing process, our customers get to market more quickly.
- **Manufacturing at scale:** Lean makes it cost-efficient to produce goods at relatively low volumes. As products scale to higher volumes, we can then seamlessly scale the size of our manufacturing lines. Moving from product prototype to low-volume production to high-volume production therefore, becomes a cost-efficient and friction-free process.
- **Higher product quality and yields:** Thanks to single-piece flow, quality issues that arise on the production line are no longer hidden; once a problem is identified, steps are taken to strengthen the process and prevent the mishap from occurring again. As a result, higher quality products can be manufactured in higher quantities and at faster speeds — while at the same time, reducing rework costs.

Opening up a plethora of benefits

Lean has made it possible for Douglas Electrical Components to accomplish a just-in-time delivery system, and by applying lean and altering it to some extent to be on the same lines as the demands of its job shop, the company triumphed in opening up a plethora of benefits & advantages for both, itself and the customers. □

Courtesy: Douglas Electrical Components

INCREASING RANGE OF ELECTRIC VEHICLES THROUGH LIGHTWEIGHTING

Increasing range and reducing strain on battery life has been a focus since the resurgence of electric vehicles and will continue as long as there is room to improve. Also, for a long time, dropping vehicle weight has been of high importance for automobile manufacturers globally and electric vehicle manufacturers are pushing for lightweight vehicles. The article discourses how the future of lightweighting will extend beyond the battery and look at areas in the frame of the body, challenges of lightweighting and how NVH performance often goes hand-in-hand with automobile lightweighting.

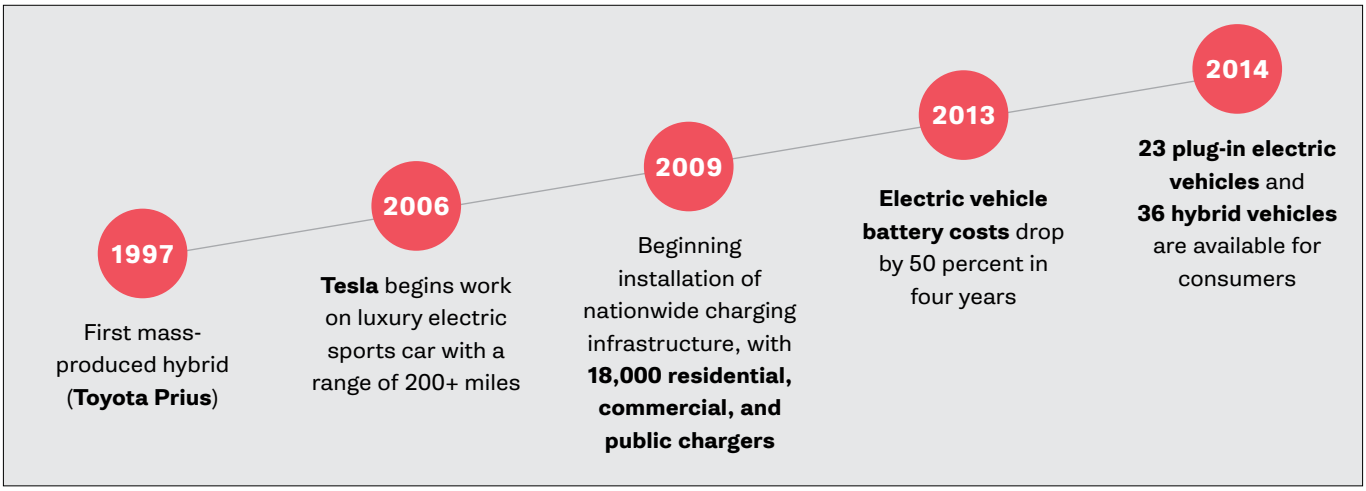
Though they come at a cost, electric vehicles present an appealing alternative for consumers to fuel-consuming vehicles. Being able to harness that appeal and present an electric vehicle that is lightweight yet sturdy, efficient and aesthetically pleasing is crucial in providing the driving experience that consumers expect. For automobile manufacturers, transitioning from using metals to non-metallic composite materials provides opportunities to make the marginal gains that will lead to overall more efficient electric vehicles.

Resurgence of electric vehicle

The renewed interest in electric vehicles began 15 to 20 years ago. While the first electric vehicle was developed in the late 19th century, the access to cheap crude oil contributed to their decline. It wasn't until the 1990s, when new federal and state regulations renewed interest in electric vehicles, that automakers began adapting their models into hybrid and electric vehicles with capabilities that aimed to match those of their gas-powered vehicles. The electric cars in production today make use of lightweighting materials, such as carbon fiber-reinforced plastic to achieve lightweighting, so they can run entirely on electricity and not be classified as hybrid.

Problem-solving through lightweighting

Lightweighting in the automobile industry can serve to solve many problems. Weight is a significant concern in the design of automobiles — it can affect speed, driver experience and range. The heavier the car is, the more power it takes to move down the road, and the more power it takes to move, the less fuel-efficient it will be. This is especially problematic for electric vehicles, as they are not as physically fuel-efficient



The resurgence of electric vehicles

as combustion engine vehicles. In order to make electric vehicles more functional and energy-efficient, they must have less mass, since the power delivered from a battery is not as efficient as the power one can deliver by burning a fuel.

As battery-powered vehicles are not as efficient and electric vehicle batteries can be heavy, automobile manufacturers need to take weight out of the remainder of the vehicle in order to increase battery lifespan and range. Historically, automobile manufacturers looking to include lightweighting in their manufacturing processes have looked to the battery — creating the most efficient battery per unit dollar or mass. The future of lightweighting will extend beyond the battery and look at areas in the frame of the body. It's important to find a balance, however — while certain elements of the car's frame are going to stay metallic, optimising the areas in which lightweight materials can be used will in turn help optimise electric vehicles' performance.

Apart from lightweighting, an advantage of using non-metallic composite materials to achieve lightweighting goals is that they can still be moulded into aesthetically-pleasing shapes. It's difficult to create an ideal shape using a traditional metallic material but still keep it lightweight — using composite materials allows vehicles to keep the aerodynamic aesthetic while still providing the weight reduction and range improvements desired.

Lightweighting and NVH performance

NVH performance often goes hand-in-hand with automobile lightweighting. Consumers expect NVH performance to be at its best — which means expecting the range and benefits of an electric vehicle without compromising the look, feel and sound of a traditional gas-powered vehicle. While the range is the main drawing factor for consumers, the conditions of driving the car have to present a comfortable environment or they won't consider buying it.

Challenges of lightweighting

While there are benefits to lightweighting automobiles, this practice does not come without its challenges — materials are more expensive, the equipment to produce non-metallic parts is more expensive than stamping steel and the time it takes to produce parts out of the composite is greater than stamping steel. These are all major challenges, but automotive manufacturers are finding ways to work around those constraints, including outsourcing to niche manufacturers for each component and assembling as a whole on their own.

More efficient electric vehicles

With increasing the range of electric vehicles as the ultimate goal, using lightweight materials, such as non-metallic composite materials, can help reduce weight, which in turn increases the battery life while keeping the structural and aesthetic integrity automobile manufacturers and consumers look for. For automobile manufacturers, transitioning from using metals to non-metallic composite materials provides opportunities to make the marginal gains that will lead to overall more efficient electric vehicles. □

Courtesy: Countervail Products, LLC

Images courtesy: shutterstock

Transitioning towards better sustainability in the manufacturing industry

It is vital for manufacturing companies to identify the essentials of sustainability in their processes. Where new technologies are transforming the manufacturing industry, the previous edition explained a framework to help manufacturers navigate the transformation, with alterations in the methods in which manufacturing companies are producing and functioning. In this edition, this article explores navigating through the sustainable manufacturing transformation, how the transformational wave framework helps companies to understand the impacts of a transformational wave scenario in a systematic way and how digital blockchain-enabled platforms will have the ability to provide deep supply chain transparency.

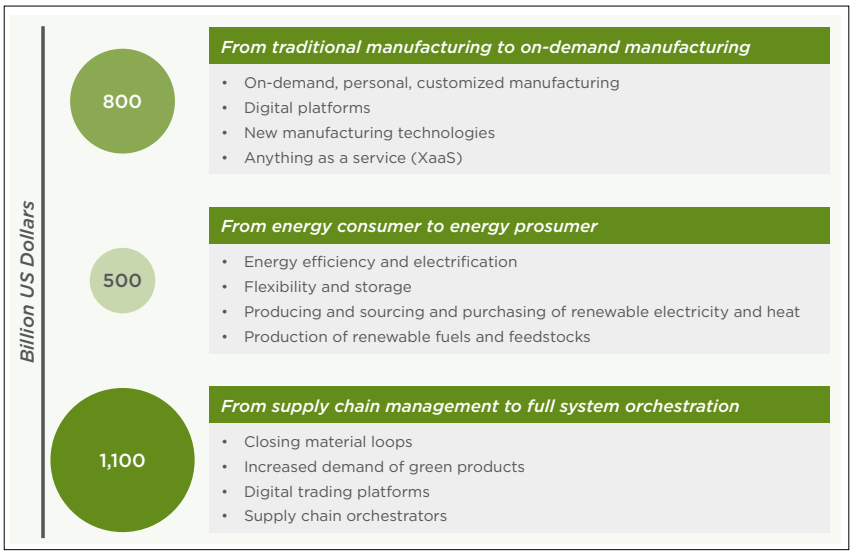
Next generation manufacturing solutions are making supply chains smarter and more sustainable. Many businesses across the world have already started to take significant steps towards green growth, guaranteeing their progress is economically and environmentally sustainable. As the demand for green products increases, deep supply chain transparency is becoming crucial. With deep supply chain transparency, manufacturers will be able to identify suppliers far upstream in the value chains, trace back the origin of each component in their products and fully measure the product's environmental performance. It will allow manufacturers to choose the best-performing components, not only based on the impact of the component manufacturing, but also their design suitability for greener end of life options. This will give manufacturers the opportunity to optimise product environmental performance by supplier engagement.

Digital trading platforms

With the increased number of material and product streams in a circular economy, digital blockchain-enabled platforms will be used for product and material trading. The platforms will showcase the exact composition and costs of the products and materials traded (for virgin, bio-based and recovered materials), and optimally match supply with demand. Additionally, these platforms will have the ability to track the environmental performance of the traded goods, thus providing deep supply chain transparency and revolutionising compliance in the manufacturing sector.

Supply chain network orchestrators

The heightened complexity of the material system, the push for better environmental performance of all actors in the supply chain and the emergence of digital trading platforms will highlight the need of advanced supply chain orchestration. This orchestration involves the execution and optimisation of end-to-end planning for the client. With the evolution of technology, software providers & cloud computing, real-time visibility of all supply chain steps — manufacturing, warehousing, customs and logistics — is enabled. For example, interconnected and digitalised cargo



Sustainable manufacturing transformation market valuation in the medium term

fleets will optimise load, timing, route and cost at any given time using algorithms, leading to leaner, cleaner and more cost-efficient logistics services.

Navigating the sustainable manufacturing transformation

The sustainable manufacturing transformation will create new value for consumers and have an effect on the bottom line of manufacturing businesses, affecting shareholder value. Companies that have an outlook on the transformation of their business environment and build robust, long-term strategies will be successful. In the short-term, they should execute no-regret actions to pursue opportunities. The following sections detail the specific steps Guidehouse recommends for manufacturing companies that want to navigate the sustainable manufacturing transformation successfully.

- **Explore scenarios to develop robust long & medium-term strategies**

Unique combinations of transformational waves and how they influence a company's business environment can be assessed with scenario analysis. The transformational waves are not mutually exclusive; a business can undergo these transformations simultaneously and at varying speeds. Furthermore, transformational waves affect companies differently depending on the sector, market demand, environmental factors and other external drivers. Therefore, a scenario consisting of a unique combination of transformational waves plays out differently for different companies.

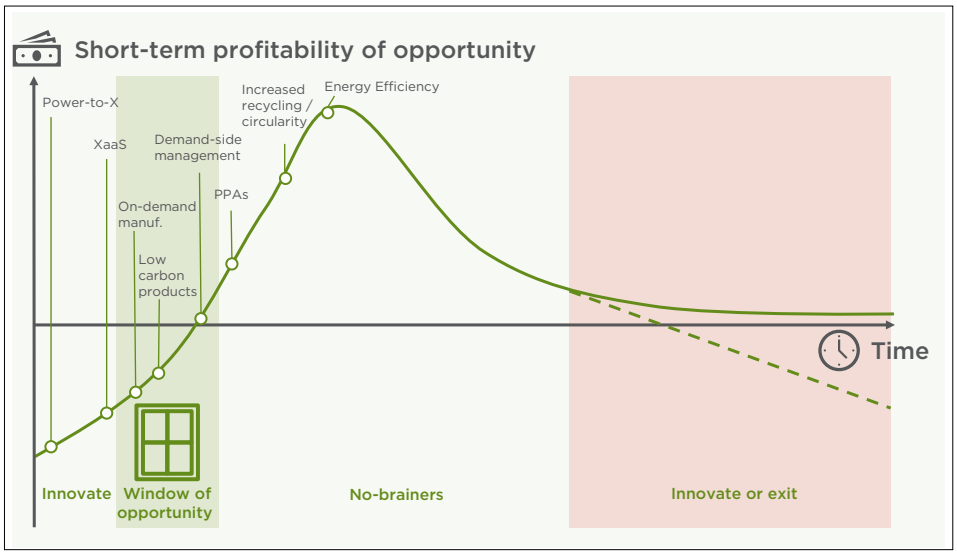
Guidehouse applies the transformational wave framework to help manufacturing companies design long and medium-term scenario-based strategies. The transformational wave framework helps companies to understand the impacts of a transformational wave scenario in a systematic way, factoring in the transformation of their value chains and broader industrial ecosystem. In the framework, an initial explorative phase is followed by several deep dives.

In the explorative phase, companies explore the transformations that have the greatest potential for their business. During this phase, the following steps need to be taken:

1. Map the impact and uncertainty of the transformational waves on selected company value chains. Based on this mapping, define an extreme, 'sky is the limit' scenario, in which the most uncertain and impactful transformational waves occur in their most extreme form.
2. Describe the future industrial ecosystem in this extreme scenario by mapping the effects of the transformation on the company, its value chain and the energy system. This exercise highlights the most disruptive changes.
3. Determine the implications on the business and revenue models to get a sense for how the transformation might disrupt the company's business.

After the explorative phase, a company can perform deep dives following a three-step approach:

1. Develop a range of feasible, internally consistent transformation scenarios building onto the outcomes of the explorative phase and the mapping of developments. These scenarios are potentially less extreme than in the explorative phase, as they are a combination of the company's expectations about the future and the outcomes of the explorative phase.
2. Translate the changes to the company's industrial ecosystem. Scenario developments are translated to the company and its surrounding industrial ecosystem. This is



The opportunity curve

done on a granular level, exploring changes to the value chain and to individual assets.

3. Perform a gap analysis. With this, the company can assess which business models would work best in a given scenario and identifies which assets, capabilities and value chain partnerships it can leverage and which are needed.

• **Respond rapidly to emerging opportunities to create short-term value**

Developing a robust medium and long-term strategy alone is not enough. To avoid missing short-term opportunities for value creation, companies should have a structured process for monitoring the market for opportunities and assessing when to act on them.

Transformation opportunities mature over time. The transformations in the industrial space threaten existing products, services and business models and offer opportunities for incumbents to enter. The numerous opportunities are at different stages of development and are continuously evolving.

Companies should continuously monitor a pipeline of opportunities. The given figure maps a range of industry opportunities, but relevant opportunities will differ for each sector or company. The speed at which opportunities progress along the curve differs depending on the opportunity type and can be affected by changing consumer preferences and regulatory landscapes. Companies that are successful in the transition will be those that have a good understanding of the various opportunities, where they are on the curve and how they are expected to progress along the curve in the next few years.

Companies must be agile and enter the market at the right time to gain first mover advantage. Doing so enables them to appropriate most of the value that lies in the opportunity. To gain momentum quickly and create immediate value, they should look for quick wins and build additional initiatives on top of these early successes. Some of the return should be reinvested in the transformation program. Strong governance and top executive support are required. Additionally, rapid action requires a set of organisational assets & capabilities and a network of strategic partners.

• **Use market intelligence to support decision-making**

Market intelligence can clarify investment and expansion opportunities. This can help companies, both in short-term decision-making and long-term strategy building. Market-sizing and forecasting can be a crucial element in building plausible scenarios for the deep dives and can add support in solidifying long-term strategies. Trend-monitoring and analysis helps companies understand the size and timeline of emerging market trends as well as use this as inputs for monitoring the opportunity curves to capture short-term value.

Creating new value for customers

The sustainable manufacturing transformation is underway. It is affecting manufacturing businesses globally across industries and is changing the competitive landscape. Although the transformation is threatening companies and existing business models, it also presents an opportunity worth over $2 trillion. Companies will be forced to move towards more sustainable, circular and low carbon manufacturing and complex industrial ecosystems will emerge to make this possible. The winners will be the companies that are able to adapt and create new value for their customers and shareholders. □

Courtesy: Guidehouse

Laser texturing as an investment in the future

Technologie für Metallbearbeitung GmbH (TFM), one of the leading metal machining companies in Austria, to cater efficiently to its customer base, ranging from the toy industry to automotive construction, brought in the LASERTEC 75 Shape from DMG Mori, which enables individual laser texturing of 3D free-form surfaces. The case study explores the limitless designing freedom the DMG Mori's LASERTEC 75 Shape brought in and how it has changed TFM's business for the better.

Expert personnel and innovative manufacturing technologies have been the pillar of Technologie für Metallbearbeitung GmbH's (TFM) success since it was founded in 1996. The service provider, which operates in the field of metal machining, employs 30 members of staff at its head office in Traun and since 2009, an additional 40-strong workforce at its subsidiary, TFM Slovakia. With an integrated spectrum of services, ranging from design to final acceptance of sophisticated dies and moulds, TFM is always up to help their customers in any way they can. Their customers come from a wide range of industries, from the toy industry, over consumer electronics and the packaging industry, to automotive construction. The company has taken a step towards the future of manufacturing technology with the LASERTEC 75 Shape from DMG Mori. This latest addition to TFM's machinery enables individual laser texturing of 3D free-form surfaces and thus, offers almost limitless freedom when designing dies and moulds.

The rising demands, with respect to quality and short delivery times, dictate the day-to-day business in the die and mould construction. "We respond to these developments by constantly optimising processes," explained Corinna Lindinger, Managing Director, TFM. She went on to add that this is why the company is putting the existing technologies

to the test and is on the lookout for new machining methods. "This was also the case with the LASERTEC 75 Shape," remembered Michael Reitberger, who is responsible for Sales and Technical Plant Management at TFM.

Optimising processes through laser texturing

For TFM, laser texturing was a key step in optimising its processes and expanding its spectrum of services. "We, as one of the leading companies in Austria, have this technology in our portfolio and believe it has a huge potential for the future," stated Lindinger, in an optimistic tone. Compared to the conventional processes, she believes that laser texturing is far superior in many cases.

To name a few examples, conventional processes include conventional cutting, electrode production and eroding, expensive and environmentally harmful etching. "Electrode production and eroding are process steps which we no longer need to deal with, owing to the LASERTEC 75 Shape, which substantially shortens our throughput times," clarified Reitberger, before going on to add that this increases flexibility in production operations and enables quicker delivery. Another argument in favour of the DMG Mori machine is the large work area. With travel paths of 750x650x560 mm (X/Y/Z) and a table loading capacity of up to 1000 kg, TFM is capable of efficiently texturing even large workpieces.

Individual designs and absolute reproducibility

The surface texture in the moulds give the finished products their unique appearance and a one-of-a-kind feel. This is where laser texturing scores top marks over conventional etching in two ways – on the one hand, design engineers have a high degree of design-related freedom and can create individual textures on their PCs, and on the other hand, these textures can be reproduced at any time with absolute repeat accuracy. "All of this is based on a continuous, digital process chain – from the idea to the finished plastic part," continued Reitberger. He also explained that the benefits include the high contour definition during laser machining.

The textures can be created with both, CAD programs and graphics programs. It is also possible to scan a 3D object. In the end, the basis is always a bitmap file in which the texture is illustrated using greyscales. "The defined texture is created in such a way that the laser removes more material from the dark surfaces than it does from the light surfaces – with five axes and even in 3D free-form surfaces," stated Christian Redtenbacher, who has spent 15 years in milling. While describing how the process works, he also mentioned, "The training at DMG Mori provided all the necessary basic information. We have become familiar with the LASERTEC 75 Shape's potential in practice since then."

Safeguarding competitiveness

Lindinger believes that advanced training sessions, like those held in the case of laser texturing and the training courses for new talent, are significantly helping to strengthen the company. "On the one hand, a great deal of know-how is required to fully exploit the potential of modern manufacturing technologies and, on the other hand, it is becoming increasingly difficult to find good specialists," commented Lindinger. This is precisely why investments were made in staff and in TFM's interests, which includes expanding its machinery.

The LASERTEC 75 Shape showed where its strengths are within the first few months. According to Reitberger, TFM will build on these strengths, "Both, existing and new customers will benefit from the more efficient processes and the brand-new design possibilities – particularly in Austria, where the market is still young, but internationally too." □

Courtesy: DMG Mori


Images courtesy: shutterstock

Improving risk management efforts proactively for shop floor

Often, there are many risks on the shop floor that are left unattended due to various reasons. These risks can convert to hazardous situations for the company as well as its employees really quick. To refrain the situation from turning disruptive, the present article offers four key ways in which one can reduce the likelihood of hazards in automotive operations by focusing on the areas where those risks originate: safety, quality, obsolescence and security.

In automotive manufacturing operations, unaddressed risks can lead to missed production targets, safety incidents and vehicle recalls. Safety hazards, aging assets and security threats can impact many areas of ones business negatively, including ones employees, revenue, plants, intellectual property, vehicle quality and customers. They also risk tarnishing his/her company's brand and reputation — potentially to the point at which they erode customer trust or loyalty. To prevent hazards from reaching this point, ones risk-management efforts should focus on what can be controlled: ones industrial automation infrastructure. One can help improve risk management by setting their sights on four key areas: safety, quality, obsolescence and security.

Safety: Focus on the three Cs

While industrial safety is vital in any automotive operation, it is often viewed as a costly burden, at odds with productivity. But that doesn't need to be the case. Best-in-class manufacturers, defined as the top 20% of aggregate performance scorers, have been found to achieve higher Overall Equipment Effectiveness (OEE) and less unscheduled downtime while experiencing less than half the injury rate of average performers, according to Aberdeen Group research. Top performers also experience far fewer workplace accidents than average performers — to the tune of one in 2000 employees versus one in 111 employees.

Genealogy and track-and-trace applications in an MES can give one new insights into their processes, production events and quality information

So, what are best-in-class manufacturers doing to excel in operational excellence and safety? They share a common set of best practices that can be grouped into three core pillars — or the three Cs of an industrial safety program:

- Culture (behavioural)
- Compliance (procedural)
- Capital (technical)

Of course, it is not enough to merely focus on these pillars. One should strive for peak performance in each of them. From a capital standpoint, for example, too many automakers are forced to shut down machines for safety reasons if a problem occurs on the line. But in certain instances, safety technologies can be used to keep a machine running at a designated safe speed even when the safety door is open.

To see where ones automotive manufacturing operations stand in each of the three safety pillars, consider taking a self-guided assessment using the free Safety Maturity Index™ tool from Rockwell Automation. It measures ones current performance and provides recommendations for improvement, if needed.

Quality: Get better visibility with MES

Quality can never be sacrificed, even as production targets increase and workforces turn over. Amid these changes, real-time information visibility is one of the best ways to maintain quality. Modern Manufacturing Execution System (MES) software can harness the data that has long been buried in ones operations to help one improve quality management and reduce process variability. For example, it can capture data on process results, defects and attributes to help one support key requirements, such as visual defect tracking, statistical process control and root cause analysis.

Genealogy and track-and-trace applications in an MES also can give one new insights into their processes, production events and quality information. The applications offer forward and backward traceability to identify upstream or downstream quality issues. And they can provide product-location and as-built data to help limit the scope of recalls.

Beyond data collection, an MES with an error-proofing application allows one to create enforceable workflows. This can help verify workers to consistently build vehicle assemblies and subassemblies to the specification and help improve ones first-pass quality.

Should errors occur on the production line, MES hold-and-quarantine capabilities can be used to manage affected vehicles. This supports the ISO 9001 and TS 16949 automotive quality initiatives. Ultimately, it could help prevent defective and potentially dangerous vehicles from leaving ones production facilities and reaching customers. Manufacturing process quality control was a priority for Guangzhou Automobile Group, one of China's leading automakers, when it implemented a modern MES. The company uses its MES to perform defect control and to carry out inspections & verification of quality issues. The MES also collects key component numbers and binds them with vehicle numbers, forming a genealogy record for all vehicles to help confirm they are produced up to standard.

Safety technologies can be used to keep a machine running at a designated safe speed even when the safety door is open

Obsolescence: Assess assets and identify risks

Equipment and software obsolescence can result in downtime and lost productivity. The best way to tackle obsolescence is with proactive life cycle management. This includes working to identify existing obsolescence risks and planning to facilitate easier maintainability of legacy equipment and access to spare parts.

The best place to begin is with an asset assessment. Many companies attempt to do this on their own, only to discover the cost. They sacrifice an experienced engineer for several months simply to collect a baseline of hardware and software information for a single plant. An Installed Base Evaluation (IBE) service often is more efficient. It can collect and aggregate hardware and software data across multiple plants in just a few weeks. IBE services also provide reports that offer guidance on where critical risks exist. A software inventory, for example, could help uncover potential compatibility risks between firmware and software versions as one connects systems or updates devices.

The findings from these activities then can be shared across multiple functions. Maintenance personnel, for example, could receive a report comparing installed equipment versus storeroom inventory to improve spare-parts management.

Security: Go in-depth

Being more connected requires the ability to get data to and from machines and people — at every level, in any location and in the right context — in a secure manner. One can achieve this with three key steps:

1. Conduct a security assessment to understand the risks and vulnerabilities and to identify the mitigation techniques needed to help bring ones operations to an acceptable risk state.
2. Adopt a Defence-in-Depth (DiD) security approach. DiD security establishes multiple layers of protection by addressing security at six levels: policy, physical, network, computer, application and device.
3. One should work with trusted vendors that share ones security goals. Before selecting vendors, one should request disclosure of their security policies and practices. Vendors should be taking steps to address security within their own operations, such as providing security training to employees and in the products they supply.

As one goes through these steps, one should not forget to tap into the industry resources for help. Daimler Trucks North America, for example, used aspects of the Converged Plantwide Ethernet (CPwE) validated design guides from Rockwell Automation and its strategic alliance partner, Cisco®, for its network architecture design and deployment. This helped the company create a converged, plant-to-business network that provides secure and reliable connectivity across the shop floor and in office areas.

The power of prevention

One may not be able to stop every problem in their automotive operations, but one can reduce the likelihood of it occurring and disrupting the automotive operations by focusing the risk-management efforts to where those risks originate. Proactively leveraging existing investments and infrastructure will help one better protect their people, brand and business performance. □

Courtesy: Rockwell Automation

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2 QUALIFY YOURSELF

1. Select a title that is most appropriate for your position

- ❑ 01. Corporate / General Management
- ❑ 02. Director, Supervisor
- ❑ 03. Group Leader, Project Leader
- ❑ 04. Manager, Specialist
- ❑ 05. Engineer, Technocrat
- ❑ 06. Other

2. Select a title that describes your principle job function

- ❑ 01. Management
- ❑ 02. IT
- ❑ 03. Safety & Security
- ❑ 04. Risk Management, Accident Management
- ❑ 05. R&D
- ❑ 06. Design Engineering (Plant Engineering)
- ❑ 07. Project Planning, Production Planning
- ❑ 08. Laboratory, Test, Field Service
- ❑ 09. Explosion Protection, Fire Prevention
- ❑ 10. Manufacturing, Production
- ❑ 11. Quality Assurance
- ❑ 12. Reliability, Evaluation, Services
- ❑ 13. Energy & Environment Technology
- ❑ 14. Facility Management
- ❑ 15. Sales, Marketing
- ❑ 16. Purchasing
- ❑ 17. Warehouse, Transportation, Logistics
- ❑ 18. Consulting / Advisory
- ❑ 19. Education
- ❑ 20. Other

3. Select the industry which best descibes your company's primary business activity

- ❑ 01. Industrial Machinery
- ❑ 02. Electrical & Electronics equipment
- ❑ 03. Communication & Information Technology
- ❑ 04. Power & Energy
- ❑ 05. Automotive Manufacturing
- ❑ 06. Steel / Metal
- ❑ 07. Optics & Precision Mechanics
- ❑ 08. Chemical & Pharmaceutical Industry
- ❑ 09. Bio-& Environmental Technology
- ❑ 10. Mining, Oil, Gas
- ❑ 11. Wood, Paper, Printing
- ❑ 12. Food & Beverage
- ❑ 13. Textile, Leather
- ❑ 14. Building Automation
- ❑ 15. Technical Consulting, Engg. & related services
- ❑ 16. Machine Tools
- ❑ 17. Plastics & Polymers
- ❑ 18. Construction
- ❑ 19. University, Education
- ❑ 20. Other

4. What is the approximate number of employees in your company?

- ❑ 1 to 9
- ❑ 10 to 19
- ❑ 20 to 49
- ❑ 50 to 99
- ❑ 100 to 199
- ❑ 200 to 499
- ❑ 500 to 999
- ❑ 1,000 to 2,999
- ❑ 3,000 & more

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Smart condition monitoring system

iwis engine systems India recently developed an in-house CCM-S (Chain Condition Monitoring – Smart) system, which continuously measures the wear elongation of chains during operation and gives maintenance staff a timely warning that a chain needs to be replaced. This system measures the elongation of the following pitch sizes:

CCM-S system

- British Standard: Pitch sizes 08B to 32B
- ANSI Standard: Pitch sizes 40 to 160

Other properties of the smart monitoring system include the ambient temperature from 0°C to 70°C; the minimum permitted speed is lesser than 0.1 m/s while the maximum permitted speed is 5 m/s. The material of the chain is either carbon steel or stainless steel with IP67 protection and it uses IO-Link and USB for interfacing. The new monitoring system provides constant monitoring of the live system. Also, the productivity and utilisation of the customer equipment is improved. The module can be easily retrofitted in a variety of chain applications without the use of special attachments on the chains. The CCM-S system can also measure the elongation of each individual chain segment and displays the results clearly.

iwis engine systems India | Pune
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Grinding machine with linear motor

Junker recently expanded the 6L grinding machine series with the help of new linear motors and well-proven hydrostatic guides to open new potential, which is known as JUMAT 6L 40-30 grinding machine. It works on complex workpiece geometries for rotor pairs in profile and QUICKPOINT grinding in a single clamping process. The complete grinding on the new machine shortens the auxiliary process time, reduces the operating workload, improves quality and increases the efficiency of the end product. Air and gas compressors, expanders, vacuum and fluid pumps use the rotor pairs. It grinds rotors with a length from 200 to 650 mm and a swing diameter of up to 190 mm. Thanks to the fully automatic tool changer with up to 20 different tools & inclusive and independent data management, the machine operator no longer needs to manually fit and remove the tools for profile grinding (including the associated cooling and rinsing nozzles) during the retooling process. The JUMAT 6L 40-30 delivers cost-effective complete grinding with highest accuracy.

JUMAT 6L 40-30 grinding machine

Erwin Junker Maschinenfabrik GmbH | Pune
Email: sanika.ingale@junker.in | Tel: +91-20-25533896

Pyrometer for automatic hotspot detection

Micro-Epsilon recently introduced the thermoMETER TIM 8 pyrometer, which offers automatic hot and cold spot detection in industrial applications that enables effective and reliable temperature control. Designed for standalone operation without a PC, it combines the advantages of a robust pyrometer with those of an infrared camera. It stands out due to its optical resolution with a state-of-the-art motorised focus, which enables remote focusing of the lens. When the predefined threshold is reached, an alert signal can be output via the integrated process interface. It is, among other things, used for monitoring of control cabinets, process control or for detection of overheated baked goods in a temperature range between -20 to +900 °C. Due to its compact design, this modern pyrometer is also suitable for restricted installation spaces. Operation is intuitive without configuration software, while data output is via an analogue output, which means the measuring system is ideally suited to OEM serial applications. An industrial interface with galvanic isolation, three relay and analogue outputs each, as well as comprehensive accessories, such as air purge collars, protective windows and cooling housings are available as optional extras.

thermoMETER TIM 8

Micro-Epsilon | Pune
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Drive solution for intralogistics applications

Nord Drivesystems recently created individually tailored drive solutions for intralogistics applications based on the LogiDrive concept – an energy-efficient, service friendly and standardised modular system. LogiDrive's drive units consist of an IE4 synchronous motor with rated powers of up to 5.5 kW, a two-stage helical bevel gear unit and a NORDAC LINK frequency inverter, which is installed close to the motor. The entire system has a modular design, so that all components of the drive technology can be individually serviced. While planning a system with drives that are designed for the most energy-efficient operating points, it leads to optimal investment costs, motors operate comparatively energy-efficiently, independent of their efficiency class. For this purpose, many different drive variants must be managed and serviced during the system's entire life cycle. Variants may be reduced by using only one geared motor and frequency inverter size for a specific speed and load range. Controlled via the frequency inverter, this drive unit may then cover all required operating points for lower performance requirements or other speed ranges. This is easily possible with LogiDrive concept synchronous motors as they operate independently of load and speed.

LogiDrive drive units

Nord Drivesystems | Pune
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Hybrid roller bearing

igus recently developed two new hybrid linear systems, namely, WJRM-41-10 and WJRM-31-10, which enable the linear guides to absorb the lateral forces, which are required in order to move doors, monitors or panels better. In the packaging industry, furniture technology or even in machine tools — drylin linear guides can be found wherever the movement is required. On tribologically optimised liners, the linear carriages slide on the rail, ensuring precise and long-lasting adjustment. If a low driving force is required for manual adjustments, rollers are used in the bearing element. Especially for a lateral installation, the position of the rollers for the force absorption is crucial. As a solution for such applications, the newly developed hybrid roller bearings, which offer smooth adjustment with low drive forces and maximum support at the same time, can be used. The WJRM-41-10 has two offset polymer rollers with optimised alignment for better force absorption and easier rolling, while the hybrid roller bearing WJRM-31-10 with single roller is in turn the matching, supporting bearing on the opposite side. By using the two roller bearings, the user can minimise the coefficient of friction by half and increase the service life of the application. In both bearings, in addition to the rollers, there are sliding elements made of low-friction tribo-polymer iglidur J. The lubrication-free & maintenance-free material is characterised primarily by its low coefficient of friction in dry operation. Both bearings can be positioned at the desired bearing clearance. These are very cost-effective if the bearings are produced in the zinc die-casting process.

WJRM-41-10 and WJRM-31-10

Using a top plate, the two new roller bearings can be expanded to a linear carriage. To ensure that the bearings can also be used on the appropriate guide, the company has developed a low-profile hybrid roller rail. This has a special geometry optimised for the hybrid roller bearing. The rail has a simple design without visible holes and is able to attach from the back with sliding blocks. This makes the new rail, in combination with the hybrid roller bearing, ideal for lateral installation. For example, in kitchen and furniture construction as well as in machine tools or in jig construction.

igus India | Bengaluru
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Clamping force tester

Schunk Intec recently designed a new versatile clamping force tester, IFT, to regularly check the clamping force of a lathe chuck. It can be used on 2, 3 and 6-jaw chucks up to 6000 RPM, regardless of the chuck manufacturer and at a maximum clamping force of 90 kN per jaw. The adjustable measuring extensions allow variations in clamping diameters between 72 mm, 88 mm and 108 mm, while the data evaluation is done with wireless data transfer with an app on a tablet computer or with other terminals. The battery life of the measuring head is more than 90 minutes, and it takes less than three minutes to recharge. The clamping force tester can be used for static measurement, such as determining loss in clamping force under speed or for individual adjustment of the required initial clamping force for individual machining operations. The regular checking of clamping force at the beginning of a serial operation and also between maintenance intervals again and again, is recommended. If possible, the clamping force should be measured in a state similar to how the lathe chuck is used in an individual clamping situation.

IFT

Schunk Intec India | Bengaluru
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Grinding machine for PCD tools

Walter Ewag – a company brand of United Grinding GmbH, recently extended its grinding machine portfolio by introducing Helitronic Raptor Diamond, which is targeted at the re-sharpening sector of PCD tools, in which one usually does not require a large variety of automatic tool support systems, an automatic change of electrodes and grinding wheels, but still requires a high degree of flexibility in the working area for large and diverse types of tools. For this reason, the Helitronic Raptor Diamond is not configured for optional wheel/electrode changer, robot loader or hydraulic tool support systems. Tools with a maximum diameter of 400 mm and a maximum length of 270 mm, including end-face operation, can be eroded or grounded with the Helitronic Raptor Diamond. For automatic loading of up to 500 tools, an optional top loader integrated in the working area is available. In addition to a low vibration, solid grey cast iron, gantry type construction with 11.5 kW spindle motor and Helitronic Tool Studio, the machine offers many options, like glass scales, torque drive for the A-axis, probe for measuring the grinding wheels and more.

Helitronic Raptor Diamond

United Grinding GmbH | Bengaluru
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Highlights - June 2020

» **Aerospace Manufacturing**
Foreseeing the benefits in the aviation industry, several market forces are directing their work towards the aviation market, signifying an important and viable growth opportunity for machine tool builders. These forces comprise strong global progress of both, passenger and freight air transport demand, followed by a demand for new aircraft. The upcoming issue finds out the latest developments, opportunities and challenges in aerospace manufacturing.

» **Digital Manufacturing**
Today, digital manufacturing is being considered as an extremely favourable set of technologies for decreasing product development times and cost as well as for addressing the requirement for customisation, bigger product quality and quicker response to the market. The next issue explores the development of the latest trends in digital manufacturing.

» **Solid Carbide Tools**
Solid carbide tools are essential and required in multiple industries. For resisting early failures, they must have properties, such as high hardness, increased stiffness, manufacturability, accessibility and reduced cost. The subsequent issue discusses the challenges of solid carbide tools and how to overcome them.

» **Industrial Safety**
Industrial workplaces can be dangerous, with manufacturing facilities having machines with moving parts and different kinds of tools. Good safety practices should become the basis of a modern manufacturers' culture. The following edition finds out about the safety risks known in the manufacturing industry and how to solve them.

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