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LIVING IN THE QUESTION MARK

It's a strange world that we live in. We know what we are required to do. But even after we do that, we do not know for sure that if the consequence of our action will be a desirable one! And the simple reason for this uncertainty and unpredictability about our world is because we are connected with various external factors, and many (or most?) of these external factors are beyond our control. Is there an antidote to this uncertainty? Absolutely not! Well, allow me to be a little philosophical today. I think I am entitled to, given the current scenario. Corona virus is having a field day, stock markets are spiralling down, economies have started to wobble, and the world is seemingly turning upside down. But then, by being philosophical, I don't intend to be pessimistic. No way. I think the beauty of

"IF YOU HAVE DELIVERED THE BEST, THEN ONLY THE BEST WILL COME OUT OF IT!"

life is actually about not knowing and yet giving our best to it. It is about having to change and yet not complaining about it. It is about making the best of it while not waiting for what's going to happen next. When you live in the question mark, the answers don't come from the outside. They come from within! Because, if you have delivered the best, then only the best will come out of it!

Editor & Chief Community Officer

THE MACHINIST
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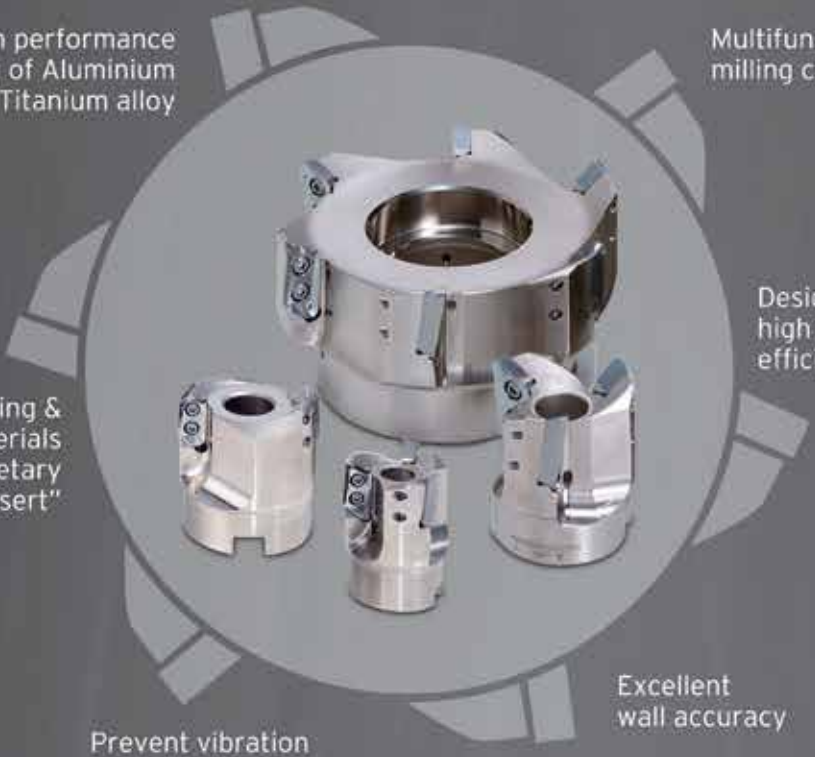

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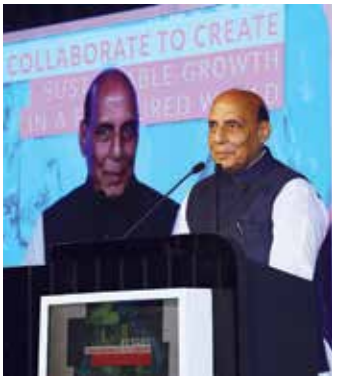
YOUR GLOBAL CRAFTSMAN STUDIO

US$5 trillion economy possible through defence manufacturing: Raksha Mantri

RAKSHA MANTRI RAJNATH SINGH has called for an increased participation of the private sector in defence manufacturing to realise the Government's vision of making India a $5 trillion economy by 2024. In his address at the ET Global Business Summit, Raksha Mantri said, the manufacturing sector has the potential to reach $1 trillion by 2025 and the Government is striving to achieve the goal by implementing key flagship programmes like 'Make in India', besides building policies relevant to the digital-economy and fostering human-capital.



Urging the defence industry to make best use of the emerging opportunities, Raksha Mantri said, a slew of structural reforms has been taken by the Government to create increased synergy between the industry and the public sector to overcome the challenges of private investment in defence. "In our envisaged Defence Production Policy, we have clearly spelt out our goal to achieve a turnover of $26 billion in aerospace and defence goods & services by 2025. This will have huge implications for India's endeavours to promote R&D, innovation and its efforts to secure a place in global supply chains," the Defence Minister said. He added that the necessity of becoming internationally competitive, globally innovative and structurally efficient demands that the private sector plays a crucial role in defence production. Raksha Mantri also mentioned about the opportunities being provided by the Government for the manufacture of mega defence programmes including fighter aircraft, helicopters, tanks and submarines. He voiced the Government's aim to double the size of Aeronautics Industry from Rs 30,000 crore to Rs 60,000 crore by 2024 and provide increased opportunities to global aerospace industry to become supplier of Aero-components.

Piramal Glass to expand Jambusar Plant in Gujarat, India; to invest Rs 300 crore

PIRAMAL GLASS LTD (PGL) has announced an investment of Rs.300 crore (US$42 Million) in its greenfield project in Jambusar, Gujarat, India. The expansion plan includes one new furnace with seven new manufacturing lines across ~300,000 sq.ft. plant, catering primarily to high-end specialty spirit, food & beverage and pharmaceutical markets primarily for exports to countries in Asia, Europe and the US. Piramal Glass is already catering to the high-end Specialty Spirits from its plant in the US. This top-of-the-line facility will be one-of-its-kind in Asia as there is a growing need for high-end water bottles, spirits bottles and food packaging. The Jambusar plant already houses three furnaces with 23 manufacturing lines and produces 540 tonnes per day of glass. It currently employs 2130 people and with this expansion it will create an additional direct employment to ~ 700 people.

Commenting on the investment, Vijay Shah, Vice Chairman, Piramal Glass said, "We are delighted to announce the expansion of our Jambusar plant in Gujarat, India. This will enable us to offer our premium customers in Asia, Europe and the US, innovative value-added glass packaging across high-end Specialty Spirits and Food & Beverage Industries."

Mahindra Heavy Engines double its energy productivity from a 2016 baseline

MAHINDRA HEAVY ENGINES LTD (MHEL) has announced that the company is India's first and the world's third manufacturing unit to double its energy productivity from a 2016 baseline, in a record time of four years, much ahead of its target. This is aligned to the company's The Climate Group EP 100 program commitment in alliance with The Climate Group. MHEL has achieved this feat through its membership to The Climate Group's EP100 initiative, a growing group of energy-smart companies committed to improving their energy productivity and doing more with less. The key steps in enhancing energy productivity at MHEL included

adoption of technology for: Energy efficient lighting, Energy efficient air-conditioning, Energy efficient motors and appliances, Usage of Alternate fuels, and Smart Metering for Real time monitoring of energy consumption along with other natural resources. The company also ensured manufacturing efficiency improvement through cycle time reduction, production shift optimization, resource optimization and built flexibility in the process to avoid addition of equipment. Vijay Kalra, CEO - Mahindra Vehicle Manufacturers Ltd. & Chief Manufacturing Operation, Automotive Sector, M&M Ltd. added, "Energy productivity improvement can bring about an array of direct and indirect impacts that collectively help in ensuring the sustainability quotient of a business."

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Maruti Suzuki launches diploma in tool & die design at its COE in Manesar

MARUTI SUZUKI Training Academy has launched a new three-year course - Diploma in Mechanical Engineering with specialization in Tool and Die Design at its Centre of Excellence at Government Polytechnic, Manesar. The course will be conducted in collaboration with Haryana State Board of Technical Education (HSBTE) and is approved by All India Council for Technical Education (AICTE). A memorandum of understanding (MoU) was signed between Maruti Suzuki India Limited and Haryana Government. Speaking at the launch of new course, Kenichi

Ayukawa, MD and CEO, Maruti Suzuki India Limited said, "Maruti Suzuki believes in preparing a talent pool for automobile manufacturing. The diploma course in Tool and Die Design is another such initiative. The course will enhance employability prospects of local youth. It will also help us create a talent pool for specific areas like Tool and Die shops so that such technical functions are performed smoothly." MSIL will make a one-time capital investment towards procurement, installation and commissioning of machinery required for the course. MSIL and its vendor partners will be benefitted by getting skilled manpower for Tool & Die function. After completion of this course, students will be equipped with specialized skill set like die design, die fitting and maintenance related skills.

Hindware Appliances forays into the ceiling fan category

SOMANY HOME INNOVATION LIMITED, makers of 'Hindware Appliances' has forayed into the ceiling fans category under its popular brand 'Hindware Snowcrest' to further strengthen its presence in the consumer appliances segment.

After witnessing acceptability and success in Air Purification and Air-Cooling category, Hindware Appliances is expanding its product portfolio in the air treatment business through Ceiling fans. Speaking on the launch, Rakesh Kaul, CEO and Whole Time Director, Somany Home Innova-

tion Limited said, "Our entry into fans category segment is backed by consumer insights, our wide established distribution channel, R&D and product development to cater to our growing customer base. We have joined hands with the finest manufacturing and design facilities in the country and aim to bring products which are well engineered to deliver optimized performances while retaining competitive cost." He further added, "We believe in giving 'power in the hands' of consumers, and therefore recently have launched Smart (IoT enabled) kitchen chimney, water purifier and water heater. In due time, we will be bringing internet connectivity to our other range of products."

Jindal Stainless exits Corporate Debt Restructuring

JINDAL STAINLESS LIMITED (JSL) announced its successful exit from the Corporate Debt Restructuring (CDR) framework with effect from March 31, 2019. JSL yesterday received a letter from the consortium of CDR Lenders to this effect. Pursuant to this, existing CDR lenders have realized the full recompense of about Rs. 275 crore in cash, which will add to their income in the current fiscal itself. Additionally, JSL has fully redeemed the outstanding Optionally Convertible Redeemable Preference Shares (OCRPS), which were issued to the lenders in June 2017, and has paid around Rs. 558 crore, taking the aggregate realization of lenders to around Rs. 833 crore. Earlier, promoter group entity infused equity and subsequently JSL issued Non-convertible Debentures (NCDs) worth Rs 400 crore to Kotak Special Situations Fund (KSSF). These funds assisted JSL in redeeming the OCRPS. KSSF has also acquired approximately five percent equity stake in JSL through the secondary market, which demonstrates increased investors' confidence in the company's operations and growth outlook.

HAL hands over 50th Set of L-40 Stage of GSLV-MKII to ISRO

HAL handed over the 50th L-40 stage of Geo Synchronous Launch Vehicle (GSLV-MKII) to ISRO at a program here recently. This L-40 stage is meant for GSLV MKII- F12 Flight planned by ISRO in August 2020.The Aerospace Division of HAL has so far integrated and supplied L-40 stages for 12 flights of GSLV MKII including the GSLV MKII -F10 flight planned in the first week of March-2020. Apart from the Integrated L-40 stages, HAL is manufacturing the riveted structures, propellant tanks, feedlines of PSLV, GSLV MKII and GSLV MKIII launch vehicles and structures of various satellites for ISRO. HAL is one of the most reliable partners of ISRO for the past three decades and has contributed and participated in almost all of ISRO's ambitious projects namely Chandrayaan-I, Chandrayaan-II, Mangalyaan and upcoming projects like Gaganyaan.

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GROWTH CONTINUES

The strong manufacturing sector expansion seen in India at the start of the year was maintained in February

"Factories in India continued to benefit from strong order flows in February, from both the domestic and international markets. The pick-up in demand meant that companies were able to further lift production and input buying at historically-elevated rates."

Pollyanna de Lima, Principal Economist at IHS Markit

The strong manufacturing sector expansion seen in India at the start of the year was maintained in February, with rates of growth for factory orders, exports and output holding close to January's recent highs. That said, while firms were willing to step up input buying, hiring activity increased only fractionally. Meanwhile, business sentiment faded on the back of concerns regarding the impact of the COVID-19 outbreak on exports and supply chains. At the same time, the rate of input cost inflation remained negligible in the context of historical data.

At 54.5 in February, the headline seasonally adjusted IHS Markit India Manufacturing PMI® held close to January's near eight-year high of 55.3. This signalled another robust improvement in operating conditions across the sector.

Manufacturing production increased at a similar pace to January's 91-month high, as firms reacted positively to new business gains and favourable market conditions. Growth was led by consumer goods makers, followed closely by intermediate goods producers.

Aggregate new orders increased sharply in February, with growth little-changed from January's recent high. Firms that reported higher sales commented on successful marketing campaigns, strengthening demand and supportive economic conditions.

February data showed that exports contributed to the expansion in total sales, with Indian companies noting the second strongest improvement in international demand for their goods since November 2018. There was a notable rise in new orders from abroad at consumer goods producers and modest gains in the intermediate and capital goods sectors. Although manufacturers expect further increases in demand to support output growth in the year ahead, the degree of optimism weakened from January and was below its long-run average.

Survey members were particularly worried about the negative impacts of the coronavirus epidemic on exports and supply chains. The subdued mood restricted hiring activity in February, with the latest rise in jobs the weakest in three months and only fractional overall.

On the other hand, the solid expansion in input buying was maintained in February. Anecdotal evidence suggested that quantities of purchases increased due to a combination of robust sales growth and higher production needs. In turn, stocks of purchases continued to expand in February, with the pace of accumulation the quickest in close to three-and-a-half years. Conversely, holdings of finished goods declined as firms reportedly used their inventories to meet sales requirements. The rate of stock depletion remained sharp. On the price front, there was only a moderate increase in input costs, one that was negligible by historical standards. Subsequently, selling prices rose modestly. Finally, February data pointed to a lack of pressure on the capacity of manufacturers and their suppliers, with vendor performance and backlogs increasing only fractionally.

Commenting on the latest survey results, Pollyanna de Lima, Principal Economist at IHS Markit, said: "Factories in India continued to benefit from strong order flows in February, from both the domestic and international markets. The pick-up in demand meant that companies were able to further lift production and input buying at historically-elevated rates."

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A list of key events happening between July 2020 to January 2021, both nationally and internationally.

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JULY 13-17, 2020

Hannover Messe
Hannover, Germany
https://www.hannovermesse.de/en/

AUGUST 26-28, 2020

Coat India 2020
New Delhi, India
http://www.coatindia.in/

AUGUST 27-29, 2020

Bus World India
Bengaluru
india.busworld.org

AUGUST 27-29, 2020

IMEX 2020
New Delhi, India
https://imexonline.com/Home

SEPTEMBER 14 –19, 2020

IMTS
Chicago, USA
www.imts.com

OCTOBER 5-9, 2020

SIMTOS
Seoul, South Korea
www.simtos.org

OCTOBER 8-10, 2020

India Chem 2020
Mumbai
www.indiachem.in

NOVEMBER 23-25, 2020

Wire & Cable India 2020
Mumbai, India
https://www.wire-india.com/

DECEMBER 3-5, 2020

Alucast 2020
Chennai, India
http://www.alucastexpo.com/home

AUGUST 24-27, 2020

Die & Mould India
Mumbai, India
https://www.diemouldindia.org/

JANUARY 21-27, 2021

IMTEX 2021
Bengaluru, India
https://www.imtex.in/imtex2021/

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Manoj Jain takes charge as Chairman & Managing Director, GAIL

Manoj Jain has assumed charge as Chairman & Managing Director of GAIL (India) Limited. A Mechanical Engineer with an MBA in Operations Management, Jain joined GAIL as a Graduate Engineer Trainee in 1985 and rose through the ranks to his current position. Before his appointment as CMD, Jain was Director (Business Development) of the company.

Jain possesses rich and diverse experience in the areas of Business Development, Projects, O&M, Petrochemicals, Pipeline Integrity Management and Gas Marketing which has allowed him to gain insight and knowledge across multiple business units and functional areas.

As Director (Business Development), he was responsible for building GAIL's business portfolio in India and abroad, Merger and Acquisition, Petrochemical O&M and Expansion, Exploration & Production, R&D, Start–Up, Health Safety & Environment management, Quality Management, Project Development including feasibility study and investment approval for new pipelines, process plants, renewables, etc. Jain is also currently Chairman of GAIL Global (USA) Inc. (GGUI), GAIL Global (USA) LNG LLC (GGULL) and Konkan LNG Pvt. Ltd (KLPL).

Markus Keicher to head Merc's Ludwigsfelde plant

Dr Markus Keicher (51) will take over as the new Head of Production and Site at the Mercedes-Benz Ludwigsfelde plant as of April 1, 2020. Currently Keicher is Head of Production and Site at the Mercedes-Benz Bremen plant. He will take over from Sebastian Streuff (45), who is responsible for the transformation process of Mercedes-Benz Vans as of February 1, 2020. Markus Keicher studied mechanical engineering at the University of Stuttgart and he was doing his doctorate at Imperial College in London. In 1998 he joined the trainee programme of the then DaimlerChrysler AG. After a number of management and project jobs at the Mercedes-Benz Berlin site and in passenger car production, maintenance, technical service and production planning, Keicher switched to the BBAC Joint Venture in Beijing, China in 2011. From summer 2017, Keicher headed engine production at the Mercedes-Benz Untertürkheim site and acted as the speaker for the entire worldwide engine production network, before taking over as Head of Production and Site Management at the Mercedes-Benz Bremen site in September 2018. Keicher's successor in Bremen will be decided soon.

Nitin Thakur joins Jindal Stainless as Head of Learning and Development

To foster an improved learning culture and employee growth, Jindal Stainless has recently brought on board, Learning and Development (L&D) expert, Nitin Thakur to head the function in the company. A Harvard alumnus with over 19 years of diverse experience in Leadership Development and Talent Management, Thakur will lead and drive the implementation of leadership development in the Company. He will work closely with Chief Human Resources Officer, Jindal Stainless, S K Jain.

Commenting on his appointment, Jain said, "Building a learning culture is pivotal to any organization's growth in today's time. We are glad to bring Nitin on board to lead this important function". A US $3.2 billion company with ~15,000 employees across the globe, Jindal Stainless is India's largest stainless steel manufacturer.

Hideki Fujiwara appointed new MD of YMRI

In order to strengthen Yamaha Motor's research wing in India, Hideki Fujiwara has taken up the responsibility of the Managing Director of YMRI from Feb 1st, 2020. Fujiwara began his professional journey with Yamaha Motor Co., Ltd. (YMC), Japan in the year 1989. In his 30 years of experience at Yamaha, Fujiwara has played a significant role in developing a strong R&D structure and driving Yamaha's long-term growth strategy. His major accomplishments in Yamaha include Project Chief of Engine Design of YZF-R1 (2004, 2007 &2009) and Project Leader of YZF-R1(2015).

Fujiwara has made exemplary contributions in the designing of 4 stroke Engine Parts, New Engine Layout for production models like YZF-R1 in 2004, YZF-R1 in 2007 and YZF-R1 in 2009. The other key projects handled by him at YMC, Japan are the Cost Innovation project (2009-2012) and Advanced Development of Engine and Vehicle Control (2014-2019).

Fujiwara has also played the role of a mentor as a Part-time lecturer at Tokyo Institute of Technology (2015-2019) teaching Mechanical Systems Science. He has been a Lecturer of "Motorcycle Basics course" at the Society of Automotive Engineers of Japan Inc., as well.

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Sridhar Balakrishnan appointed MD & CEO of ACC

Neeraj Akhoury, Managing Director & Chief Executive Officer of the Company has tendered his resignation from the post of MD&CEO with effect from close of business hours of February 20, 2020 to pursue other career opportunities. However, Akhoury will continue on the Board of the Company as a Non-Executive Non-Independent Director.

Christof W. Hassig has tendered his resignation from the directorship of the Company with immediate effect, i.e. February 20, 2020 due to his pre-occupation in LH Group and also due to his other personal commitments. Based on the recommendation of the Nomination and Remuneration Committee and given the demonstrated track record of Sridhar Balakrishnan, Chief Commercial Officer of the Company has been appointed as an Additional Director on the Board of the Company with immediate effect, i.e. February 20, 2020.

In view of the Akhoury's resignation from the post of MD & CEO, the Board of Directors has appointed Balakrishnan as the Managing Director & Chief Executive Officer of the Company for the period of five years with effect from February 21, 2020. The appointment of Balakrishnan will be subject to the approval of shareholders at the ensuing Annual General Meeting of the Company.

Zoomcar appoints Markish Arun as VP of Engineering

Zoomcar has announced the appointment of Markish Arun as its Vice President (VP) of Engineering. In his new role, Markish will be responsible for all engineering initiatives and will also build respective teams with high levels of motivation and competency.

Zoomcar's primary target is to have over 1,00,000 vehicles on road in 18-24 months and to continue to empower its customers with better mobility alternatives at scale. With a B.Tech in Information Technology from Anna University, Markish is extremely passionate about start-ups and technology and is always looking to solve real-life business problems at scale with the help of innovative technology. A fitness enthusiast, Markish enjoys swimming, playing basketball and video games in his leisure time.

"We're thrilled to welcome Markish on board," said Greg Moran, CEO and Co-Founder Zoomcar. "Cutting edge technology has always been our priority and Markish's appointment will further our already dominant lead on the technical platform side as we are doubling down on investing for 100k + cars on the platform. Markish brings a wealth of relevant industry knowledge to the company that is highly valued."

Markish Arun, VP of Engineering, Zoomcar added "I am very pleased to start this new phase of my career with Zoomcar and excited to see what urban mobility has in the store for me. The kind of market, demand, and value proposition that Zoomcar has created across the country is commendable. I look forward to further enhance the brand's market trajectory with my contributions."

DSM appoints new EVP Materials and member of the Executive Committee

Royal DSM has announced that Helen Mets, currently Business Group Director DSM Resins & Functional Materials, is appointed as Executive Vice President Materials per 1 March 2020. Helen Mets will succeed Dimitri de Vreeze who was appointed Co-CEO of DSM together with Geraldine Matchett, as of 15 February 2020. Helen will become member of the Executive Committee of DSM. Helen, a British and Dutch national, holds a Master's degree in Marketing and a Bachelor's degree in Business & Finance from the University of Northumbria, Newcastle. She is also a graduate of the Harvard Advanced Management Program. She joined DSM in August 2017 in her current role of Business Group Director DSM Resins & Functional Materials. In this role, Helen was instrumental in developing and executing a growth transformation for the Resins business, and strengthening the portfolio and innovation pipeline, as well as shaping the digital journey within DSM Resins & Functional Materials. Helen has a proven record in business transformations and developing business in emerging countries. In her new role, Helen will report to Dimitri de Vreeze, Co-CEO of DSM. Helen will continue her role as Business Group Director DSM Resins & Functional Materials ad interim.

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By Kaustubh Shukla

THE SHOT IN THE ARM

Despite India's current level performance in defence exports, much optimism prevails within industry-watchers who are eyeing the massive opportunity that lies ahead of them.

"Currently, the defence market is growing in double-digits, and the country is enjoying enhanced FDI limits for defence investments -- up to 49 percent under the automatic route and 100 percent through MoD's approval."

India's defence sector is experiencing an upturn. Over the last decade, the defence budget has grown more than four folds. In fact, in 2018, it was the fourth-largest globally, standing at $67 billion. Currently, the defence market is growing in double-digits, and the country is enjoying enhanced FDI (Foreign Direct Investment) limits for defence investments -- up to 49 percent under the automatic route and 100 percent through MoD's (Ministry of Defence) approval. The turnaround time taken for authorisation of defence exports too, has fallen drastically to less than 50 percent in comparison to earlier. While there is no denying that we have indeed come a long way, we must also acknowledge the fact that we still have a long way to go.

LOOKING BEYOND THE CLOUD COVER

Although our defence exports have risen from ₹4,000 crore to ₹17,000 crore (as a share of the global pie) in the last two years, it is still at only at 2.1 percent thus suggesting ample scope and opportunity for growth. For such growth to take place, our domestic defence manufacturing capabilities must see an all-round improvement. Increasing the share of indigenous development that results into better self-reliance and import substitution followed up by continuous advancement in technology is the need of the hour.

While domestic defence manufacturers have invested in building capacity, they face the challenge of underutilisation due to infrequent and uncertain demand. With most projects following a tender led approach, in order to qualify for bidding, one must have capacity and capability. This leads to excess of manufacturing capacity over demand. This coupled with having tenders as the only means of price discovery, leads to minuscule margins for the manufacturers. Additionally, the 'winner given all' approach leads to gross under-utilization for all except the winner! Despite such challenges, it is the passion and commitment to the higher order cause of bolstering the nation's defence that drives the business decisions of domestic defence manufacturers and keeps them engaged with the sector.

A peculiar challenge that domestic manufacturers face with buyers or users is that the latter expect to acquire a system that is contemporary or even futuristic and that it should ideally be tried, tested and proven. This, however, is not entirely feasible as the nascent domestic industry is yet to reach such a stage of development. Such an imbroglio, however, can be aptly resolved by developing the right kinds of partnerships. It would imply that we would have to move away from the traditional models of price discovery and as a step forward, build long term relationships with partners investing in developing and maturing the technology in consultation with the user. This should ideally be a national mission and endeavour.

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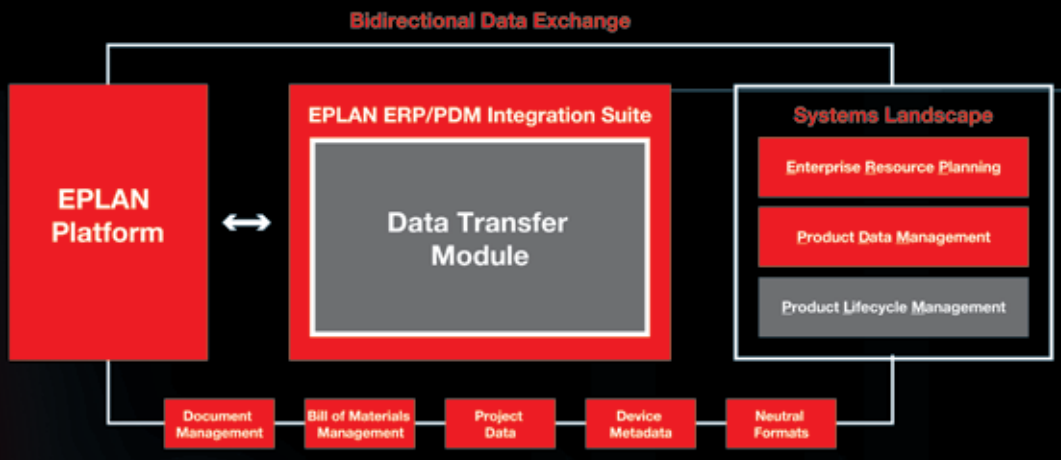

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DefExpo 2020 offered an excellent opportunity to the Indian defence industry to showcase its capabilities and also promote its export potential.

Haven't we done so in the past? Well, we have to assume this as special circumstances and try new models with a bit of risk taking by each side.

Should we adopt this approach for at least five years, we will see domestic manufacturing flourishing in all aspects and the vision of self-reliance come to fruition. The choice is either to realise the vision of self-reliance, take strategic bets to accelerate the process and thus catapult into the new regime; OR to continue to be circumspect and use traditional means thus realizing the vision of self-reliance at a later date.

> "The government also has announced its plans for the defence sector which include - expanding defence exports by up to $5 billion in the next five years and building a strong base for the defence corridor along with making India a defence manufacturing and export hub.

This is easier said than done, but there is general agreement that partnerships are indeed the way forward. The route to making this a reality is strategic designing of the policy framework and its timely roll-out.

THE SILVER LINING

DefExpo 2020, the 11th and the largest-ever edition of the Expo recently held in Lucknow, has offered an excellent opportunity to the Indian defence industry to showcase its capabilities and also promote its export potential. The government also has announced its plans for the defence sector which include - expanding defence exports by up to $5 billion in the next five years and building a strong base for the defence corridor along with making India a defence manufacturing and export hub. Given this changing landscape, the time seems ripe for industry players to seize the opportunity and contribute to the nation in a meaningful way.

Strategically too, it is important that we have a thriving domestic defence manufacturing ecosystem in order to cut imports. The rapidly evolving geopolitical environment along India's borders calls for continuous improvement in India's defence equipment and substantive indigenisation in the faculties of design, development and production of equipment, weapon systems as well as the platforms required for defence. Challenging as it may seem, the silver lining will come in the form of opportunities that present themselves in the face of constraints. Domestic manufacturers would want to take on these challenges and get their systems qualified, processes approved, and reliability established before expecting the business to grow. As the bolts of robustness of systems, productivity, skilling and competitiveness are strengthened, there would emerge a sense of triumph of overcoming challenges and building an unshakable foundation for local defence manufacturing, in sync with the government's 'Make in India' initiative.

WRAP-UP

Despite India's current level performance in defence exports, much optimism prevails within industry-watchers who are eyeing the massive opportunity that lies ahead of them. The Indian private sector is believed to have matured in terms of size, scale and technological competencies, and is ready to brace itself to meet these challenges. The government forecasts the aerospace, defence goods and services market to grow to $26 billion, and defence exports to grow to $5 billion by 2025, while generating employment for 2-3 million people. The government's facilitating policy framework along with preparedness from domestic manufacturers could be the driving force in putting India on the global map of defence-ready, self-reliant nations.

The author is COO Industrial Products Group and Business Head, Godrej Precision Engineering

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Brose invests in new campus in Pune, India

Automotive supplier Brose officially opened its new campus in Hinjewadi, Pune recently. The location, which has a footprint of around 175,000 square feet, is home to 480 employees. Brose is investing 3.2 million euros in a new headquarters building, development and IT center as well as the manufacturing plant. "This investment is not only a commitment to the Indian market; it is also a strategic move for the Brose Group. To improve competitiveness and efficiency we are further expanding the global engineering and IT service center in Pune and shortening the paths between development and manufacturing. Speed is a success factor for our company. The market trends in the global automotive business rely on extremely fast and consequent decisions," emphasized Ulrich Schrickel, CEO Brose Group. This is why the supplier must expand its software expertise. In the last year alone, the family-owned company hired 100 experts in digital development, embedded software and IT in Pune. "The current plan is to grow to around 500 employees in total. They will work on cost-effective products for the domestic market and also support other Brose locations," summarized Vasanth Kamath, President Brose India. The company plans to develop twice as fast as the domestic market with an average growth rate of 20 percent per year until 2025.

Volkswagen India launches its first SUV of 2020

Early this year, Volkswagen India announced 'Four SUVs for the Indian market in the next two years'. Accordingly, the brand has launched the globally acclaimed Tiguan Allspace for the Indian market. The seven seater is available with a power-mill of 2.0l TSI engine mated to a 7-speed DSG 4MOTION transmission. Delivering a peak power of 190PS@4200 rpm and a torque of 320Nm@1500-4100rpm (as per EU specifications) while being fuel efficient.

With all the seven seats occupied, the Tiguan Allspace provides a luggage compartment volume of 340 litres that can be extended up to 1,274 litres. Speaking on the launch of the Tiguan Allspace, Steffen Knapp, Director, Volkswagen Passenger Cars India, "The Tiguan Allspace is one of our most successful carlines globally and we're extremely delighted to launch the car for our Indian customers. It is the first SUV that is being launched under Volkswagen's SUV offensive strategy and suits the needs of every Indian customer. We're extremely confident that the sophisticated 7-seater Tiguan Allspace will be a winner among many Indian customers."

JLR India & Tata Power join hands for charging infra

Jaguar Land Rover India has entered into a partnership with Tata Power to offer end-to-end EV charging solutions. Tata Power will provide charging solutions for Jaguar Land Rover in India, across its retail network of 27 outlets in 24 cities and at customer's residence and/or office. India's largest integrated Power Company, Tata Power will be responsible for providing a range of AC and DC chargers, starting from 7 kW to 50 kW capacity. Tata Power will be the preferred partner to facilitate the installation and management of chargers at the designated premises and other after-sales related support services. Rohit Suri, President & Managing Director, Jaguar Land Rover India said: "This tie-up is one step forward in creating the right ecosystem enabling a simple and hassle free charging experience for owners of our first Electric Vehicle, the Jaguar I-PACE, which makes its debut in India later this year." Ramesh Subramanyam, CFO & President - New Business, Tata Power Company Limited said: "This partnership is also an endorsement of their faith in us and our ability to deal with the electrified range of vehicles that Jaguar Land Rover will bring into India."

Tata Motors sells 38,002 units in February 2020; braces for COVID-19 impact

Tata Motors Limited sales for the month of February 2020 stood at 40,634 vehicles, compared to 60,151 units during February 2019. Girish Wagh, President, Commercial Vehicles Business Unit, said, "We are on track for the BSVI migration, with BSIV stocks being consumed as per plan and BSVI production initiated. The supply disruptions from the COVID-19 outbreak in China could have some impact and all efforts are underway to mitigate it." Mayank Pareek, President, Passenger Vehicles Business Unit, said, "Our new Altroz received an overwhelming response. However, the outbreak of COVID-19 in China and a recent fire incident at one of our strategic vendors affected the vehicle production and wholesale volume. Multiple actions are being taken to reduce the impact."

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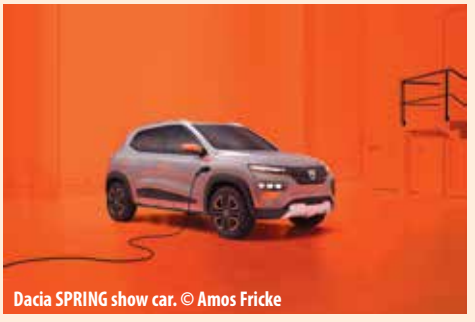
Hyundai ramps production of All New Creta

Hyundai Motor India Ltd. has ramped up the production of the All New Creta for faster deliveries. Commenting on the occasion, Ganesh Mani S, Director – Production, Hyundai Motor India Ltd., said, "Our DNA is ingrained with Commitment towards Quality, Stylish Design, Speed and Accuracy. All New Creta is the end product of this DNA that delivers the Ultimate Science of Human Engineering." Featuring an extensive application of 74.3 percent advanced figh-strength steel, Hyundai has created what it calls 'the Ultimate Superstructure demonstrating the Masculine and Futuristic stance'. The Science behind this Superstructure is displayed in the Press Shop at Hyundai's Manufacturing facility in Sriperumbudur where 5,400 Tons stamping is conducted with the facility boasting of Globally Monitored Die Management System and Online Vibration Analysis.

Dacia shows glimpses of its all-electric car



Dacia SPRING show car. © Amos Fricke

Dacia recently launched its Spring electric showcar. This showcar foreshadows Dacia's first all-electric model. With Dacia Spring, the company is calling it 'the affordable electric revolution'! The Spring electric showcar prefigures a 100 percent all-electric 4 seats city car offering easier access for the greatest number of people to easier and more virtuous mobility with a 5-door city car that combines simplicity, reliability, and accessibility, the company said in a statement. Light and compact, the Dacia Spring factory-standard model will have a top range of over 200 km in WLTP guaranteeing versatility for stress free urban and suburban use. It will be available in 2021. To succeed with this new revolution, Dacia is capitalising on Groupe Renault's 10-year experience as pioneer and leader in electric mobility.

Mahindra's Auto Sector sells 32,476 vehicles in Feb 2020

Mahindra & Mahindra Ltd. (M&M Ltd.) recently announced its auto sales performance for February 2020. In the Passenger Vehicles segment (which includes UVs, Cars and Vans), Mahindra sold 10,938 vehicles in February 2020, compared to 26,109 vehicles in February 2019. In the Commercial Vehicles segment, the company sold 15,856 vehicles in February 2020, as against 21,154 vehicles in February 2019. In the Medium and Heavy Commercial Vehicles segment, Mahindra sold 436 vehicles for the month. Exports for February 2020 stood at 1,839 vehicles. The company's overall automotive sales (Domestic + Exports) stood at 32,476 vehicles in February 2020, compared to 56,005 vehicles during February 2019. Veejay Ram Nakra, Chief of Sales and Marketing, Automotive Division, M&M Ltd. said, "The ramp-down of BS IV vehicle production has been in line with our plan for February. However, because of the unforeseeable challenges on the parts-supply from China, our BS VI ramp-up has been affected. This has resulted in a high de-growth in our billing volume for February and our dealer inventory is, now, under 10 days. Going into March, we anticipate the challenge on parts-supply to continue for another few weeks, before we get back to normalcy."

Continental achieves adjusted annual targets in 2019

Continental achieved its adjusted targets for fiscal 2019, as the technology company announced at its annual press conference in Hanover recently. According to preliminary figures, the DAX company's sales in the past fiscal year were €44.5 billion (2018: €44.4 billion), while the adjusted EBIT margin was 7.4 percent (2018: 9.3 percent). That corresponded to an adjusted operating result of €3.2 billion (2018: €4.1 billion). While global automotive production declined by about 6 percent in 2019 according to the latest estimates, Continental's organic sales development in the same period was down 2.6 percent, thus outperforming its markets. At the same time – as reported at the end of October 2019 – diminished market expectations in particular required non-cash write-downs in the amount of €2.5 billion. The impairment testing of recognized goodwill as required by accounting standards led to a reported operating result of -€268 million (2018: €4.0 billion) and net income of -€1.2 billion (2018: €2.9 billion).

Continental's chairman of the Executive Board, Dr. Elmar Degenhart, said: "Continental continues to outperform its markets even in challenging times. Last year the entire auto industry suffered a clear downturn. In operational terms we put in a respectable performance overall, but ultimately the 2019 result, particularly in the auto business, was not satisfactory." Also, he pointed out that, in a challenging situation, the dividend proposed to shareholders is only slightly lower than last year's.

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Kalyani Group & Arsenal JSCo form a strategic alliance

Kalyani Strategic Systems Ltd. (KSSL), The Defense Arm of Kalyani Group and Arsenal Joint Stock Company, Bulgaria signed a Memorandum of Understanding (MOU) to form a strategic alliance in India for manufacturing small arms and ammunition. KSSL and Arsenal will be aggressively developing a manufacturing capability in India for the "AR" 7.62 x 39mm Assault Rifle and "MG" 7.62 x 51mm Machine Gun series. The Strategic Alliance is also actively participating in the projects for meeting the Army's requirement of certain types of ammunition over a ten-year program. Arsenal small arms have been in active operations in India for decades and have a proven

record of performance. Rajinder Singh Bhatia, Chairman KSSL said "We are very excited to enter the Small Arms segment. This Strategic Alliance will combine Arsenal's Proven technology, knowledge and experience as an OEM with world class design, development and manufacturing capabilities of the Kalyani Group. The Strategic Alliance will provide indigenously manufactured, desired high performance and economic solutions for the Armed Forces, thereby furthering the 'Make in India' initiative of the Government." Hristo Ibouchev Executive Director, Arsenal 2000 JSCo said "Arsenal is proud to be the first Defence OEM in Bulgaria to become an active participant in the Make in India program with Kalyani Group as its partner for Assault Rifle, Machine Gun and Ammunition for Ministry of Defence, India."

HAL's LCH production hangar inaugurated

Defence Minister Rajnath Singh inaugurated the new LCH Production Hangar at Helicopter Division recently in the presence of HAL CMD R. Madhavan and other senior officials. LCH is completely ready for operational induction and Helicopter Complex is fully geared up for the production of LCH, said R. Madhavan CMD, HAL. The new production hangar will augment the LCH production capacity to reach a peak production of 30 helicopters per year, adds Mr. GVS Bhaskar, CEO, Helicopter Complex. The techno Commercial Proposal for 15 Limited Series Production (LSP) helicopters has already been submitted by HAL in March 2018 and the order is awaited. The total projected requirement is for around 160 helicopters.

HAL also apprised Defence Minister on the progress of new design and development program of indigenous Indian Multi Role Helicopter (IMRH). The full-scale mock-up was showcased to the Minister. The IMRH (for IAF, Navy and Army) is proposed as a replacement to the existing medium lift helicopters such as Mi17s, Kamovs and Seakings which will phase out in the next eight to ten years and HAL is keen to complete the development of IMRH during this time. Induction of indigenous IMRH will result in considerable savings of foreign exchange. Preliminary Project Report (PPR) for Development has been submitted to MoD for sanction of funds by CCS.

Bharat Forge signs an MOU with Dastan, Kyrgyzstan

Bharat Forge Ltd has signed a Memorandum of Understanding with Dastan Corp., Kyrgyzstan, engaged in development of Torpedoes with advanced homing heads for Shipborne & Submarine platforms, used by Indian Navy. Both firms are coming together for joint upgradation of CET-65E Torpedoes and to participate in jointly identified and mutually agreeable opportunities and programs related to the underwater weapon systems/ Product in India and other territories. Baba Kalyani, Chairman, Kalyani Group said, "We are very excited to enter the marine

business segment. This collaboration brings together the manufacturing and technology excellence of two leading companies. We are looking forward to spread our foot print in this segment while working under the policy of 'Make in India'".

Talaybek Temiraliev, President, Dastan Corp. said, "In September 2019, Dastan Corp., and Bharat Forge Ltd. decided to collaborate for joint naval trials of new homing systems for CET65 and TEST71 torpedoes that are presently in use by the Indian Navy. The Stage-I of this project has been successfully completed at Dastan Corp. and in February to March 2020 we plan to proceed to the Stage-II that is to carry out environmental naval field tests in the Indian Ocean. We are hoping that successful results of these trials will enable us to carry out upgradation of all CET65 and TEST71 articles in operation with Indian Navy."

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FMV selects GKN Aerospace for technical support

GKN Aerospace has been selected for the technical product support and MRO for the Gripen E RM16 Engines of the Swedish Air Force by FMV (Swedish Defence Material Administration). The RM16 is the Swedish name for the aero-engine of the new Gripen E aircraft and GKN Aerospace's continued support to the platform was confirmed by FMV, in January. The engine is based on the General Electric F414 aero-engine which powers F-18 Super Hornet. GKN Aerospace will closely collaborate with Saab and GE to build up the necessary infrastructure and competence for the new engine type.

The selection reinforces GKN Aerospace's unique position and extensive experience in aero-engine support. It effectively means that technical support and maintenance for all versions of the Gripen aero-engines will be available in Trollhättan,Sweden. GKN Aerospace is also the OEM and type certificate holder of the Gripen C/D RM12 aero-engine and has been supporting the RM12 aero-engines since the first Gripen aircraft went into service in 1997. GKN Aerospace employs 2200 people in Trollhättan, Sweden, of which about 200 work in its military engines design and support business.

Joakim Andersson President Engines, GKN Aerospace said: "GKN Aerospace is proud to further expand our relationship with FMV, GE and Saab to the new RM16 aero-engine support. GKN Aerospace is committed to provide safe and affordable operation of aero-engines with high availability. Our unique and efficient engine maintenance and support capabilities have served the Air Force operations since 1930. It is great that we can further develop these skills and knowledge in Sweden. We thank FMV for the confidence and we look forward to continuing our partnership."

Paramount Group announces strategic collaboration with BFL

Paramount Group and Bharat Forge (BFL) have announced the signing of a strategic, high level collaboration agreement to set up a joint venture to join the technologies, capabilities and expertise of both groups in the industrialisation and indigenisation of defence and aerospace systems, in response to emerging opportunities in the Indian market, such as 'Make in India' and globally. The companies have also signed two Memorandums of Understanding (MoUs) during DefExpo 2020 held in Lucknow, covering immediate opportunities in the aerospace and special protected vehicle sectors. The MoUs will enable Paramount Group and Bharat Forge to engage in joint efforts to seize the global opportunities for the design, development, industrialisation and indigenization of defence and aerospace products, services and systems. Rajinder Bhatia, President & CEO, Defence and Aerospace, BFL, commented, "Paramount Group and Bharat Forge share a lot of complimentary capabilities and products, with this cooperation both groups are well positioned to cater to the varied requirement to address the defence situation in conventional and assymetric warfare." Ivor Ichikowitz, Group Chairman of Paramount Group, said: "Building defence industrial eco-systems through strategic alliances have been the cornerstone of Paramount's portable manufacturing model and we are excited to develop our defence and aerospace systems technologies and solutions through strong and long-term partnerships. We are pleased to partner with Bharat Forge, a company that shares our philosophy of enabling local manufacturing through technology and skills transfer, the indigenisation of defence and aerospace technologies, and the creation of high value jobs that bolster economic growth. There are excellent synergies between our respective organisations laying the foundation for innovation, technology development and the indigenisation of defence capabilities."

DefMin hails HAL's contribution to India

The Defence Minister Rajnath Singh has hailed HAL's contribution in the nation building calling it as the backbone of the Indian Defence Forces. "While there is every reason to be happy about its performance especially in the last five years, the Company should prepare itself to take up the challenges in the emerging market. HAL should see the competition as an opportunity", he said at Kannada Naada Habba, a cultural event organized at

HAL here today. The Minister inaugurated the program in the presence of HAL officers, employees, Kannada luminaries and others.

The Defence Minister complemented HAL for celebrating the rich heritage and the language of Karnataka which he said has contributed immensely in enriching India's diverse culture. The state is a beautiful mix of modernity and tradition with great history, he said.

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What started off as a magazine story (article) in December 2014 has now become a movement of excellence in manufacturing! Having completed five consecutive editions so far, The Machinist Super Shopfloor Awards platform is now all set for the milestone sixth edition in 2020. Instituted in 2015, The Machinist Super Shopfloor Awards platform recognises the excellence and success of Indian manufacturing units in the large as well as the SME segment. Winning shopfloors take home the Machie trophy. The Machie trophy is conferred upon plants that excel in various categories like Safety, Productivity, Machining Excellence, Digital Manufacturing, Innovation, Green Manufacturing and so on. The category of 'Maintenance', which was added recently has also received tremendous response from the industry.

> The Machinist Super Shopfloor Awards platform recognises the excellence and success of Indian manufacturing units in the large as well as the SME segment.

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TOTAL RECALL – WINNERS FROM 2019!

Duravit India Pvt. Ltd.'s Tarapur plant won the Machie trophy for The Machinist Super Shopfloor of the Year 2019 in SME – MNC category while Precision Camshafts Limited's Chincholi, Solapur was bestowed upon The Machinist Super Shopfloor 2019 in SME –Indian category. In large enterprise segment, Honda Cars India Ltd's Tapukara plant bagged the title. There were many more shopfloor winners in the other categories.

Apart from awarding the plants, The Machinist also recognised individual's contribution to the industry. Ranga Brothers of N R Group were recognised as the Super Family Leaders while Udit Sheth, Vice Chairman, Setco Automotive Limited was declared as The Machinist Super Next Generation Leader. Aravind Melligeri, Chairman and CEO, Aequs Inc. was named as Super Entrepreneur of the year and Shekar Viswanathan, Vice Chairman and Whole-Time Director, Toyota Kirloskar Motor was bestowed upon with the Super CEO of the Year title. Kamal Bali, President & Managing Director, Volvo Group India received the prestigious Lifetime Achievement Award 2019.

SUPER PARTNERS

The Machinist Super Shopfloor Awards 2019 was presented by Ace Micromatic Group and MotulTech India was the Powered by partner. Forbes & Company with its brand Totem Tools was the Cutting Tools partner while SIL was the Laser Partner. The others who supported the events were – Marposs India as Metrology Partner, Expo Partner for Automotive Manufacturing was Automotive Engineering Show Chennai and Automation Partner was Leuze Electronic. The Machinist Super Shopfloor Awards 2019 was also supported by Associate Partners – igus India, Tyrolit and Warrier Electronics with its brand WEFire.

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By Niranjan Mudholkar

THE POWER OF GREEN

Sulajja Firodia Motwani, Founder and CEO, Kinetic Green Energy and Power Solutions Ltd. tells The Machinist that while her company is a pureplay EV start-up, it also has the ability to scale up in terms of experience, manufacturing, brand and linkages in the ecosystem.

How easy or difficult is it for you as a woman to work, sustain and succeed in this industry?

It sounds cliched, but women are making a mark in all sorts of industries and at different levels of organisation. I think with more education, more conviction in themselves and more clarity on a purpose, women are going to pursue all kinds of possibilities.

That being said, in my particular case, I think I have had an unfair advantage because I had a legacy which I could, sort of leverage.

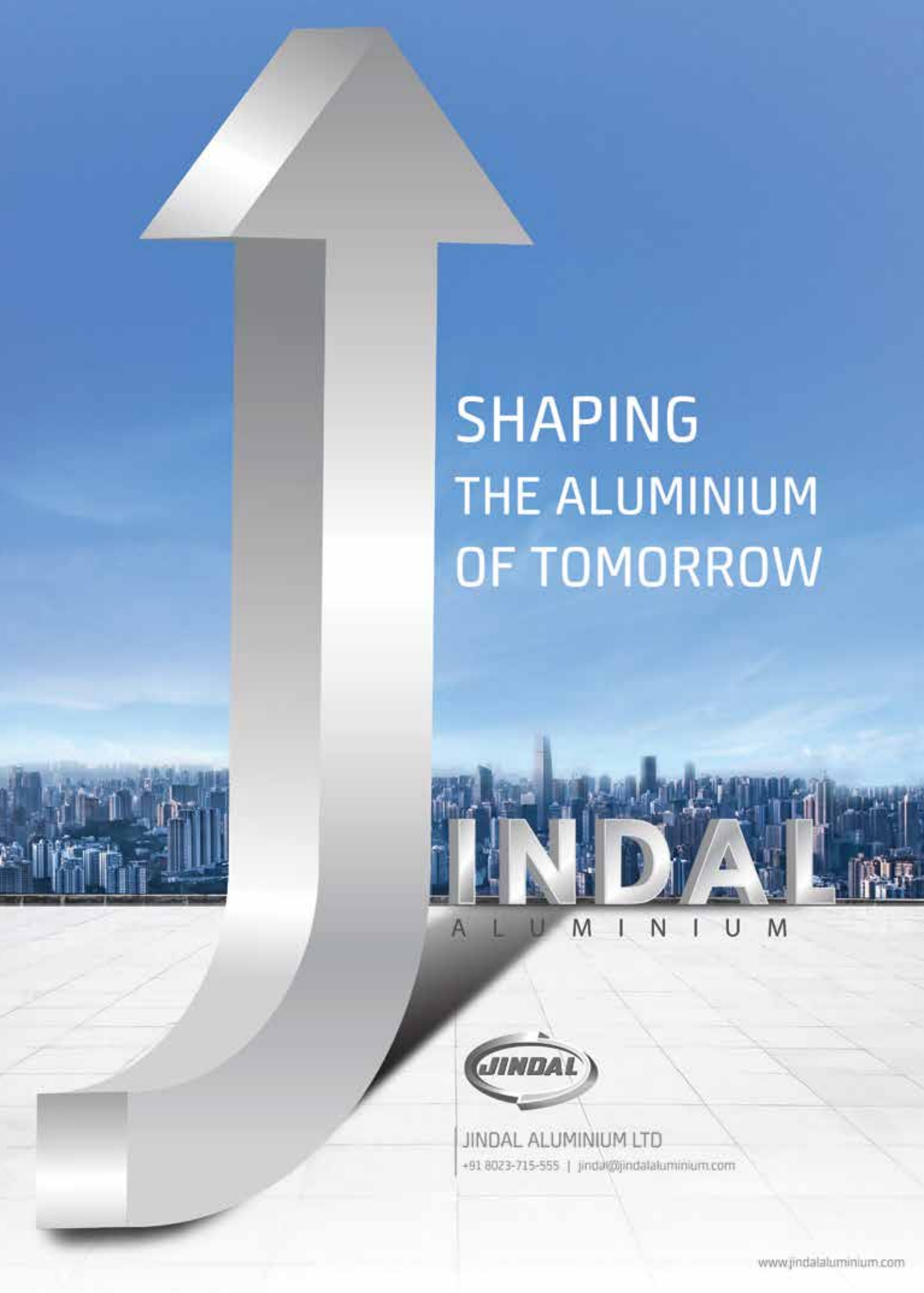
For me, coming into Kinetic had always been my dream. I grew up with that kind of vision for myself because of my family. In fact, I was very close to my grandfather and was his favourite granddaughter. There was this atmosphere of enterprise and entrepreneurship at home. My father and grandfather discussed business; the dinner table conversations were a lot about business and economy. I grew up with the culture of entrepreneurship, but more in terms of service to the nation.

A family platform does give you a better platform, but it cannot take you beyond a point unless you are putting the required efforts. Isn't it?

True, once you have a platform, then of course it is your hard work, the ability to sustain and your personal commitment that makes the difference for you. I took complete responsibility after joining the business and worked really hard.

Having said that, I have never let the fact that I am a woman or the fact that I am a family member cloud my thinking. I always have and continue to work with a lot of integrity, with a lot of enthusiasm and with a lot of commitment. And I think when you are applying yourself to the job wholeheartedly, you are not bothered about such things. Importantly, people around you start realising that you are taking responsibility and that you mean business. Then, they also respond positively and respect you. I have never shied away from responsibility, accountability, hard work, commitment

"We have set up an electric vehicle company grounds up. It is not part of any OEM and does not have any legacies of existing machines, workers, cost structures, dealer mindsets, and so on. That's because we knew that we needed a different kind of a mindset that is different manner for this business."



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While designing the vehicle, we have focussed on some key areas like light-weighting, aerodynamics, better efficiency, suitability to Indian road and weather conditions, as well as passenger capacity.

and sincerity. When I had my baby, I was back to work on the fourth day. Yeah, so I didn't take liberties because I am the owner or because I am a woman. I have worked as hard as anybody else.

Why did you choose this segment?

We started Kinetic Green with a dream to bring green mobility solution for masses in India. So, Kinetic Green is all about green mobility. The current focus is on electric vehicles and the idea is to provide green mobility to the masses. We selected this sector because when you were coming out of the two-wheeler JV, we were looking for new areas which would become the future of automotive technology. And electric technology is what we have zeroed in on as the future of automotive. Today, we provide mechanically superior and technologically smart product portfolio.

Changing the battery game

Kinetic Green Energy and Power Solutions Limited and Bharat Petroleum Corporation Limited (BPCL) have launched the "e-Drive" initiative. Accordingly, a range of electric three wheelers, specially designed for facilitating swappable battery and a 2-minute battery swap will be deployed by Kinetic Green and BPCL. The solution has already been implemented on a fleet of Kinetic Green E3W at Kochi and Lucknow. Due to separation of battery from the EV, initial EV cost is halved and brought below price of ICE counterparts. Range Anxiety is eliminated as drivers need not worry about range anymore, and they can always swap their battery for a new one, if they need to go longer distance. Re-charging time is eliminated as battery swapping takes only two minutes. The alliance facilitates a convenient battery network as BPCL can leverage its existing 12,000 gas stations to erect the battery swapping stations. According to Sulajja Firodia Motwani, Founder and CEO, Kinetic Green Energy and Power Solutions Ltd.: "This solution reduces upfront cost of EV by 50%, and customers never have to worry about battery charging and replacement. Kinetic and BPCL have developed the solution in association with IIT Chennai for a comprehensive IOT based system, a lock smart battery with VBCC protocol for charging, and host of safety features. The system monitors the battery and station, which are IoT enabled and linked to an app.

Currently emobility is the buzzword. While the OEMs are also getting onto this bandwagon, many non-automotive players are also jumping into the fray? How is Kinetic Green differentiating itself in this crowd?

When we came into this business in 2014, it was hardly a buzzword. So, we were amongst the few pioneering companies. We have worked hard over the last five years in terms of setting up the business, setting up the manufacturing base and creating a supply chain, setting up a government recognised R&D centre and developing products which are advanced in terms of technology but are yet affordable for the common man.

We have also played a role in policy formation if the country. I have been working very closely with the government as opinion makers. We have been contributing substantially to the EV ecosystem that is evolving in the country. While we have played a pioneering role, others are still getting off the ground. We have already made a lot of progress in this industry through our work. For example, we have sold thousands of vehicles in the market.

We need to understand that electric vehicles technology is a new technology. In fact, it is a disruptive technology. And when a disruptive technology comes to the market, a lot of things change. Business models change, and new players are born. Sometimes existing players are not able to make the transition for the new disruption and the related business model, and new companies become leaders. We can look at the mobile phone's transition from feature phones to smart phones as an example.

So, I think we are sort of leading this curve of disruption. For example, we have set up an electric vehicle company grounds up. It is not part of any OEM and does not have any legacies of existing machines, workers, cost structures, dealer mindsets, and so on. That's because we knew that we needed a different kind of a mindset that is different manner for this business.

So, Kinetic Green is a purely EV company. You can say that it is a EV start-up but within an established business group (Kinetic Group). We are a start up in a sense that we don't have the legacies and the baggage. We have the mindset of a new company. But at the same time, we have the strength of being an established player and we have a very strong brand. We have the experience of scaling up an automotive business. Sometimes start-ups start off well, but they are unable to scale up and sustain because it's finally an automobile. Ultimately, people are using it to commute every day. They're risking their lives by entering the vehicle. It has to meet the government standards. You have to provide

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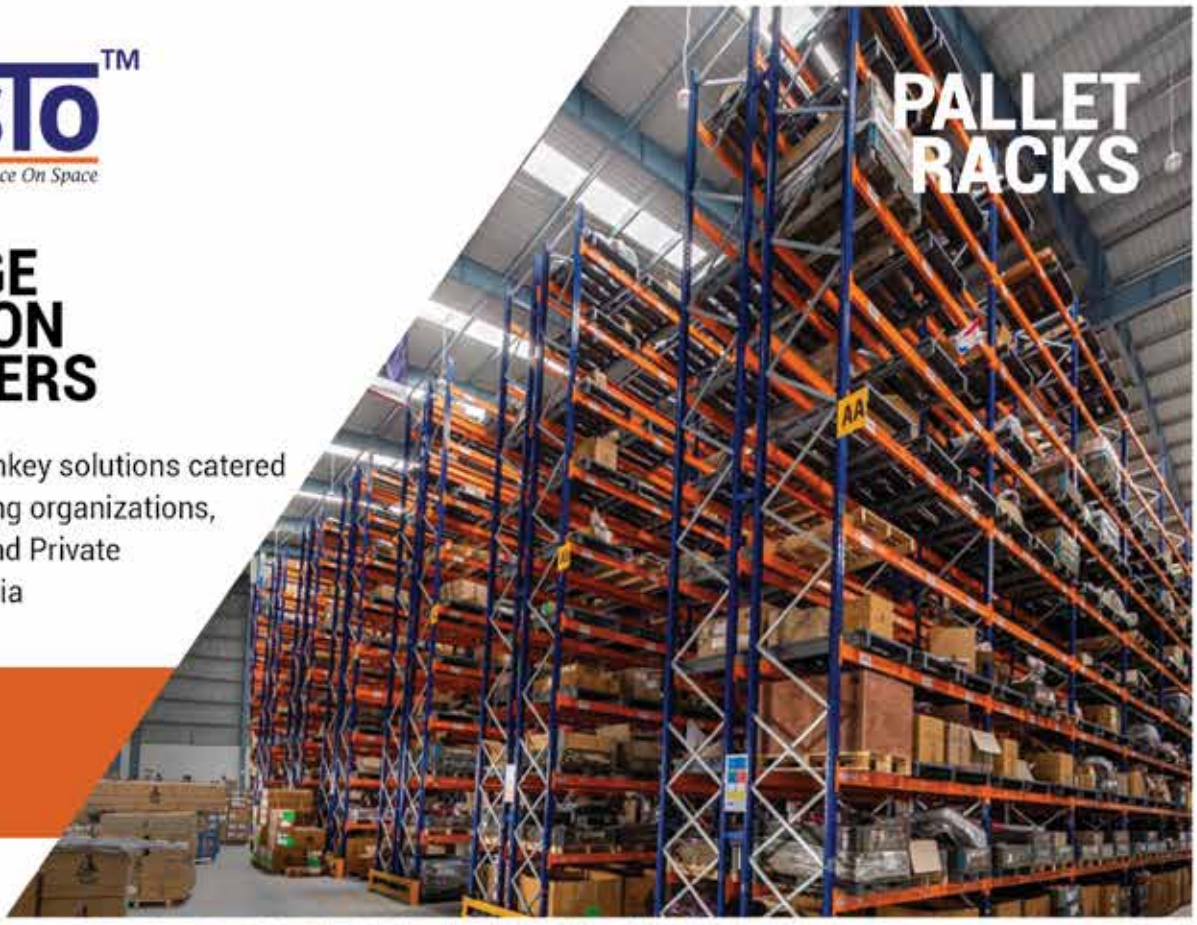

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"I have never let the fact that I am a woman or the fact that I am a family member cloud my thinking. I always have and continue to work with a lot of integrity, with a lot of enthusiasm and with a lot of commitment. When you are applying yourself to the job wholeheartedly, you are not bothered about such things.

spare parts and service. Finally, it is an automobile. You need to be able to scale up. You need to be able to create new and quality products. You need to provide a nationwide dealer network.

So, while we are a pureplay EV start-up, we also have the ability to scale up in terms of experience, manufacturing, brand, linkages in the ecosystem and so on. I think that is our USP that we have the best of both the worlds and we are in a very high growth sector, which is a very unique opportunity.

Tell me something about your products.

Let me tell you that we began our company with two products. Golf carts and three wheelers. Golf carts are used for tourism, on golf courses, in the hospitality industry, in farm houses, in corporate campuses. We began with this because we wanted to understand the technology of electric vehicles.

Then, we zeroed in on three wheelers as the next area of focus because a three-wheeler runs in a certain periphery. The route is known. It's typically used for the mile connectivity. A rickshawalla doesn't want a vehicle that can travel at the speed of 200 km/h from Pune to Mumbai. He's happy as long as you're giving him a decent range and decent speed along with low running cost. He is happy as long as he is able to make decent money out of it. And the passenger sitting in the vehicle also wants a ride at a very affordable price. The electric three wheeler is able to provide this without putting a stress on the environment. So, you are able to provide green transport and you are able to convince the stakeholders to give support to this new technology. It's a win-win-win situation. It's affordable, it supports employment and it is non-polluting public transport.

So, looking at this sector, we started developing a product range. And I am happy to say that we made the first three wheeler maker in 2016 when there was no supply chain in the country. It had seventy percent import content. Today, I am happy to share that we have almost hundred percent local content. It's only about five percent that we are importing in the country. Other than the battery cells, everything is pretty much localised in our electric three wheelers. When the government came up with the FAME II policy with focus on high level of localisation, from day one we were following it.

Our products have our own design, our own design registrations and our own IPs. We are a self-reliant company in that sense. While designing the vehicle, we have focussed on some key areas like light-weighting, aerodynamics, better efficiency, suitability to Indian road and weather conditions, as well as passenger capacity. We are focused on this kind of technology solution, which is affordable and advanced.

ADVANCED BATTERY SOLUTIONS FOR SUSTAINABLE ENVIRONMENT

Toshiba's SCiB™ lithium-ion rechargeable battery offers advantages that include high safety feature, a long-life cycle and rapid charging, all demonstrated by a wide range of applications in passenger vehicles, trains, boats, industrial equipment and more since 2008.

Unmatched pace and appetite for economic development has put India at the centre stage of urbanization. This rapid urbanization however, also stresses upon the transport infrastructure leading to congestion and pollution. Reducing tailpipe emissions from urban transportation is critical to address the increasing pollution and public transport system to lead this transformation is the key. Political will translated into government policies is driving the social change and awareness, leading to development of a coherent ecosystem where automotive manufacturers, infrastructure and component suppliers, personal and commercial end-users will play a vital role.

The uptake of Electric Vehicles (EV) in India is set to increase in momentum as the Indian government puts impetus through its Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles (FAME) schemes that encourage, and in some segments mandates the adoption of electric vehicles (EV), with a goal of reaching 30 percent EV penetration by 2030.

The FAME India scheme promotes manufacturing of electric and hybrid vehicle technology and aims to ensure its sustainable growth. Coupled with a highly skilled and experienced labor force that encourages domestic sourcing of components and parts, the country is set to be an attractive and competitive production hub for low-emission vehicles, giving a fillip to the government's ***Make-in-India*** initiatives. With countries in Africa also developing eco-systems for promoting EV consumption, it presents a grand opportunity companies in India to ***Export-from-India***.

"Technological advances in materials and energy management will further alter the transportation landscape."

Technological advances in materials and energy management will further alter the transportation landscape. Advances in battery technology have led to higher energy densities, faster charging and reduced battery degradation from charging, which have reduced the ownership costs and improved the performance and efficiency of electric vehicles.

Toshiba has long focused on research and development of rechargeable batteries. Its SCiB™ lithium-ion rechargeable battery uses lithium titanium oxide (LTO) in the anode, and offers advantages that include high safety feature, a long-life cycle and rapid charging, all demonstrated by a wide range of applications in passenger vehicles, trains, boats, industrial equipment and more since 2008. The company's R&D for a next-generation lithium-ion battery with a new anode material, titanium niobium oxide, is making progress. Work so far has confirmed that the oxide is characterized by high-energy density and rapid recharging capability, essential for automotive applications.

Toshiba is also increasing investments and building strategic alliances to meet market needs. A new SCiB™ production facility is being constructed in Yokohama in Japan, to reinforce output from the current Kashiwazaki facility. In addition, the establishment of a plant in India, a joint venture with Suzuki Motor Corporation and Denso Corporation, continues to make progress. New Energy and Industrial Technology Development Organization (NEDO), Japan, has entrusted Toshiba and few other companies with a demonstrative operation of Super Quick Charge electric bus system where Toshiba's SCiB™, long-life lithium-ion rechargeable battery, plays a core role. The project aim is a social implementation of smarter urban transportation system with less emission. It is evident that active promotion and adoption of EV from various stakeholders in the ecosystem can fuel growth.

"Toshiba recognizes that the future of automotive industry is driven by CASE: Connectivity, Autonomous, Shared and Electrification."

Toshiba recognizes that the future of automotive industry is driven by CASE: Connectivity, Autonomous, Shared and Electrification. The company is harnessing its knowledge and expertise to deliver technologies and services for both vehicles and their operating environment, highly connected infrastructure systems for traffic control, user navigation that employs power devices, and sensors to support the use of artificial intelligence on the road. At the same time, governments, corporations and consumers need to see the importance of electrification of vehicles as not only the evolution of personal mobility, but also an advance that mitigates climate change.

TIME TO SURGE

A recent report from CII in association with US India Business Council (USIBC) has a set a target of US$500 billion in bilateral trade from US$142 billion in 2018.

The Confederation of Indian Industry (CII) in association with US India Business Council (USIBC) recently launched '$500 Billion Roadmap', a report that provides an assessment of current trends in U.S.-India trade and the policy reforms needed to set business ties on a faster growth trajectory. Specifically, the report has listed out 13 policy interventions to help boost trade between the two economies. The report also includes several case studies of "green field" growth potential in areas outside of the traditional industry verticals, apart from headlining three scenarios to reach the $500 billion target in bilateral trade.

"There is increased focus on fostering greater synergies in the economic relationship between India and US. This is evident from the fact that the two-way trade between India and US has grown at an impressive compound annual growth rate (CAGR) of 11.8 percent over the last two decades," said Chandrajit Banerjee, Director General, Confederation of Indian Industry. "However, to achieve the shared goal of reaching US$500 billion in trade from the current US$142 billion in 2018, would require renewed focus on tackling some of the irritants to unleash the full potential of the economic relationship," he added.

"This report undertaken by CII and USIBC outlines the steps needed to facilitate greater trade and opportunity sectors that can unleash US$ 500 billion in two-way trade between the U.S. and India. We have seen trade grow by over 50 percent in the past 5 years. But in order to see a doubling and tripling of the trade relationship, the two countries must work out a trade deal that can open markets in both directions," said Nisha Biswal, President, USIBC.

Aside from trade, investment ties between the two economic behemoths also remain solid—cumulative US foreign direct investment (FDI) into India amounted to roughly $44.5 billion in 2017, 15.1 percent jump from 2016. However, in order to boost investment levels further, additional steps are required by the Indian policymakers in the form of further streamlining & simplifying the Single Window Clearances, instituting a mechanism of Automatic Deemed Approvals for NOCs, further liberalization of FDI norms among others.

The report has been launched at an opportune time, when there is a significant opportunity to give a major fillip to the U.S.-India relationship, given the trade tensions with China. Many U.S. companies are actively exploring alternative investment destinations to relocate their manufacturing supply chains—with India as a competitive destination. However, for this to materialize, both sides have to look at the challenges in the relationship as opportunities for growth and look for creative solutions to break the logjam wherever possible.

The report has listed out interventions in 13 specific areas which if resolved, will provide a significant thrust to trade between the two countries by turning challenges into opportunities. The interventions range from reinstating Generalized System of Preferences (GSP) benefits by US for India, bringing down import duties on high end motorcycles to zero percent, arriving at a consensus on a pricing mechanism for medical devices, modifications in India's E-Commerce Policy, removing high tariffs on steel & aluminium imports by US, fostering greater cooperation in strengthening partnership in defence & aerospace among others.

Source: CII

Three possible scenarios for pushing the India-U.S. trade

1) The 'Limping' scenario assumes a deterioration in the India-U.S. trade relationship. Accordingly, bilateral trade grows at a CAGR of 3.9 percent over the next several decades, crossing the $500 billion mark only in 2052.
2) Under the 'Chugging' scenario, the bilateral trade relationship and key drivers of economic growth largely remain unchanged from the current status quo, bringing the bilateral relationship to $500 billion by 2035. The implied growth rate is 7.9 percent over the 2019–2035 period.
3) The 'Soaring' scenario assumes positive policy and regulatory moves and a significant increase in positive trade engagement, bringing bilateral trade growth to 11.8 percent and reaching the $500 billion mark by 2030.

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By Niranjan Mudholkar

HARVESTING EMPOWERMENT

Swaraj Tractors is nurturing a culture of inclusivity and diversity on its shopfloors. The Machinist toured the company's plants in Mohali and also caught up with **Harish Chavan,** CEO, Swaraj Division, Mahindra & Mahindra Ltd. to understand more…

This is not a story of farm equipment manufacturing. This is a story of freedom from gender discrimination. This is a story of empowerment in the true sense. This is a story of women, who are capturing newer fronts in the male dominated manufacturing industry. This is the story of Swaraj Tractors, which has showed the courage to introduce women employees on the shopfloor.

It was about seven years ago that Swaraj started recruiting women on the shopfloor to bring diversity and to create a better work culture in the organisation. The initiative was started by recruiting 14 women employees in one plant in the core manufacturing function. These female workers were deployed in the assembly and the machine shop. Of course, today, these ladies are also working in areas of heat treatment and stores. Between its two plants in Mohali, Chandigarh, Swaraj Tractors today deploys 102 women employees in core manufacturing. In fact, the dashboard sub assembly station in Plant-2 is exclusively managed by women employees today.

"We started in a small way. But when you look at it from a broader perspective, it was important for us to create an environment, which can accept women employees. Fortunately, we never had a policy problem; there was enough backing to make this work."

CASE STUDIES OF COURAGE

When you meet a spirited young woman like Seema Rani, who is successfully working on the shopfloor of Swaraj Tractors in Mohali, you can only be inspired to do better. Of course, her journey to this shopfloor has been a tough one. Born in the family of a farm labourer in Haryana, Seema literally grew up on the farm where her father worked. Schooling was tough; the school was far off and there was no transportation available. So, she cycled. There was no electricity at home, so she studied using a flashlight torch. These challenges could not stop her from chasing her dreams. But not only did she complete her own schooling but also encouraged her younger brother to do so. Moreover, being a girl who is differently abled did not stop her from pursuing ambitions of working in manufacturing. Obviously, she was initially discouraged at almost every level. But she overcame all these odds to achieve her dreams. Today, the people of her village proudly use a tractor made by Seema Rani herself. Today, while she inspires the people of her village, Seema is also setting new benchmarks at her home. Seema's mother, who hails from Bangladesh, could never go back to her own parents after she was married to Seema's father. But once Seema became financially independent, thanks to her job in manufacturing, she took it upon herself to take her mother to her native place in Bangladesh. Not surprisingly, Seema received a hero's welcome at her mother's native place. Of course, this is not the end of Seema's story. It actually starts here. And it is also not the only story on the shopfloors of Swaraj Tractors. There are many such stories. And each story is equally inspiring.

CGW-Company Profile

For more than 60 years, CGW - Camel Grinding Wheels, the only Israeli abrasives manufacturer, has been the first choice in grinding and cutting products for both the local and international markets. CGW's products are available in more than 50 countries across North and South America, Europe, Africa, Asia and Oceania regions.
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> For the women employees, it becomes a chance to prove themselves. So, they also have a different orientation towards it. They also have to prove something in life. And, it works both ways.

CREATING THE CULTURE

So, what is motivating Swaraj to undertake this mission of bringing women to its shopfloors and empowering them in such a way that they are having a positive impact not just on the profitability of the company but also on the society? Harish Chavan, CEO, Swaraj Division, Mahindra & Mahindra Ltd. says that this initiative is essentially a part of the Mahindra culture. "We are having that drive of bringing diversity and inclusivity at the Group level." But isn't the north region known to discourage participation of women outside their homes? Chavan says that Swaraj has not experienced it, at least where the plants are located. "First of all, people from this region – where we operate from – are very enterprising. You'll not find a supplier community as enterprising as it is here. There's a spirit of willingness to do something different. Whether it is our suppliers, our workmen or our union leaders, they have the mindset and the openness to do better when you emotionally connect with them. When we say Mera Swaraj, it's actually bringing an emotional connect the brand has with the customers, the connect employees have with the company and the connect suppliers have with the organisation." Chavan feels that there is a willingness to do different and there is a willingness to change for the love of the brand. When Mahindra took over Swaraj, it had slipped to number three position in the market. But the management aimed at getting it back to the number two position and aligned the people with its vision. "It worked. So, when we thought of bringing this exercise for the first time in the tractor industry, we were also wanting to transform the work culture, and also the workforce. Many people at that time were retiring and there was a need for us to bring in a new workforce, a younger workforce. So, at the same time we thought, it's a good way to also bring women in the workforce," Chavan shares.

If you look at Swaraj's shopfloor today, majority of them are young people. They are all young diploma holders. So, the traditional workforce is very less. Now, having embarked on this type of approach, it was easier for the management to also get women folks on the shopfloor.

"We started in a small way. But when you look at it from a broader perspective, it was important for us to create an environment, which can accept women employees. Fortunately, we never had a policy problem; there was enough backing to make this work. For example, if it was about giving more facilities, we never shied away from doing that. We invested in a very focused approach that we need to make it successful, and it started panning out. Many of our women employees are from the nearby regions but many of them are not. Many come from other parts that are beyond Punjab as well," Chavan informs.

For the women employees, it becomes a chance

Steps taken by Swaraj to increase gender diversity

- Facilitate women to adjust in manufacturing industry and align the organisation to accept them in workforce.
- Initially conducted several sessions with employees to bring in acceptance for women employees.
- Conduct behavioural workshops for women employees in order to help them work in a previously male dominated environment.
- Gender diversity increase at shopfloor is KRA for plant manufacturing and ER team.
- Regularly organise Gender Diversity workshops to sensitize new joiners.
- Posh training is part of behavioural trainings given to men as well as women.

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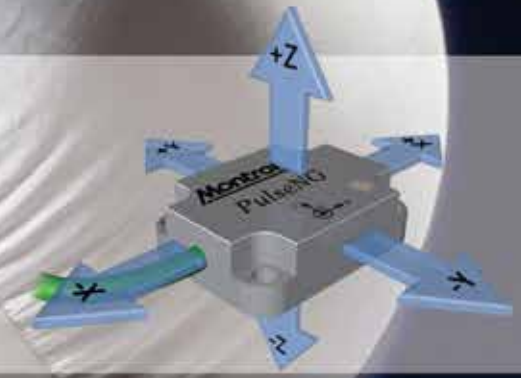

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to prove themselves. So, they also have a different orientation towards it. They also have to prove something in life. And, it works both ways. "We give them the opportunity to make a different way of life. And then they work towards it by excelling in their work."

DRIVEN BY 'POWER'

This whole initiative is, in fact, driven by what Swaraj calls as 'women power'. Chavan explains that Swaraj Tractors stand for power. "Swaraj's powerful engine is the biggest value proposition amongst farmers. Taking a cue from this, we expanded the word power to encourage women employees." The idea is to have a holistic approach to the initiative rather than making it a random or one-time activity. So, P in power stands for 'promoting' diversity. O is for orienting. Orienting is focused at not just the women employees but also the male employees. "We had to educate our male employees and even coach them to accept and work with women employees. We did sessions for women employees to help them get accustomed to working with men on the shopfloor."

Then, the W stands for 'weave'. "How can we weave the fabric of our organisation? By taking them in and by connoting that they are really part of our family. When we added new trades to the work schedules of women employees, we were sending a message that there is nothing that they cannot do on the shopfloor that male employees can do."

The E stands for 'engage'. For engaging the female employees, Swaraj undertakes many initiatives at different levels. "For example, women are part of the quality circles and they are part of all the activities that we do." The emphasis is to engage them and make them feel part of the ecosystem because they are employees and not because they belong to a different gender. "In fact, some of our women employees come from a farming background. So, they understand our product. We trained them to drive the tractors. So, that is another level of engaging them."

Finally, the R stands for Recognition. Basically, it means acknowledging, appreciating and endorsing their contribution to the organisation. Indeed, it is a very 'power'ful idea that is driving Swaraj Tractors to encourage and empower women on the shopfloor.

Swaraj Tractors – Plant 1

	Plant 1
Plant Size (area)	97000 Sq. mt. (Around 23.9 Acres)
Production capacity	250 per Day
Number of models/variants produced from each plant	10 models and 53 variants
Total shop floor employees	1015
Total women employees on shopfloor	55

Empowering women at work level

- Regular meetings are conducted with women employees to understand any issues faced at workplace or suggestions for further improvements.
- Women are deployed at various stations and areas in plant, their role is not just limited to one particular function.
- Women employees are very much part of Quality Circle teams that represent Swaraj in national and International competitions.
- Women participate in all Skill competitions along with their male counterparts.
- InFY18, Swaraj started second shift for women employees.
- Crèche facility, six months maternity leave.
- Female nurse, janitors and guards in both shifts.
- Psychologist on board.
- Buses for pick and drop along with lady guard.

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By Raghavendra Deolankar

A JOURNEY OF TRANSFORMATION

Organisations are going through a series of challenges, and management needs to focus on handling these challenges to sustain the performance.

In this article, we will explore various dimensions of 'understanding the current challenges and building improvement focussed culture in organisation'.

CHALLENGES FACED BY ORGANISATIONS

Any small and medium sized manufacturing organisation today is facing various challenges which are both internal and external in nature. These challenges, if not understood and addressed properly, can become major obstacles in day to day operation and that will have serious impact on organisation performance and results.

Most of the manufacturing organisations are facing these challenges in varied intensity and time depending on business model and industry segment. These challenges are mapped in a system dynamic model, which is based on learning "from Five Step Discovery Process" by Prof Shiba.

The journey of transformation for an organisation has three key milestones:

1. Understanding the current challenges and building an improvement focussed culture in an organisation
2. Create an eco-system for the organisational transformation
3. Establish continuous improvement processes as way of working.

NEED FOR AN IMPROVEMENT FOCUSSED CULTURE IN ORGANISATIONS

Organisations are going through a series of challenges, and management needs to focus on handling these challenges to sustain the performance. These challenges are ongoing in nature and need a continuous focus and systematic approach to handle. It is observed that some of the organisations follow a fire-fighting approach to handle these challenges and take measures only when things go wrong. On the other hand, some organisations deploy systematic way of handling these challenges and have gained sustained performance levels. The nature and scope of challenges is spread across the width and depth of organisations and needs involvement of all levels of management including operators.

> "The nature and scope of challenges is spread across the width and depth of organisations and needs involvement of all levels of management including operators.

Also, the same challenges will reoccur if not addressed systematically. This calls for an organisation-wide initiative, involving employees from all functions, with a defined approach of handling these issues/problems/challenges. Here, it demands the need of "improvement focussed culture", which then becomes a way of working for the organisation. Also, it gives a visibility to predict the results for a sustained performance.

AN IMPROVEMENT FOCUSSED CULTURE

Typically, the word 'culture' has very wide scope, deep rooted values and a specific way of working, which others will notice with a "difference" as unique "identity".

When we talk about the culture of a country, a region or a society, this has a lot of dimensions inside. If we go a little deeper inside and try to understand what

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System dynamic model, which is based on learning "from Five Step Discovery Process" by Prof Shiba.

defines a "culture", we will come to the findings below:

1. Deep rooted value systems, beliefs, traditions, operating systems, vision, strategy, code of conducts etc. This defines the foundation of a country or society and it also stands valid for an organisation.
2. The routines & practices being followed. These are "rituals" – For example the festivals celebrations in the society, typical life cycle pattern being followed, traditional ways of thinking and working.
3. The people who are driving these rituals. There are typically called "heroes" who drive the culture.

> "Organisations should create their identity as "improvement driven" company and should demonstrate the same to all stakeholders including customers and society. This should reflect as a company "symbol" to the world outside.

4. How do we demonstrate or present our culture? There are "symbols" which reflect our identity to the outside world.

In summery there are values & beliefs, rituals, heroes and symbols which define a culture.

WHAT NEEDS TO BE DONE

For an organisation to build an improvement focussed culture, let's see what needs to be done:

1. ***Values & Beliefs:*** Organisations must define continuous improvement as a core belief and adopt various initiatives such as the deployment of a quality management system and a production system. Management should take stretched improvement targets which sets directions for all employees to contribute. These systems should form a strong foundation for the organisation.
2. ***Rituals:*** Organisations should set improvement targets periodically and install a strong review process. Improvement projects in all functions with defined project teams and meeting patterns should be established. Periodic product-, process- and system audits, as well as customer visits should be organized to capture opportunities for improvement and to initiate respective improvement actions.
3. ***Heroes:*** Nothing can be achieved without people involvement. It is very important to empower the employees at all levels who can take lead and decisions to handle the improvement initiatives / projects. The organisation can also identify the CIP leads / coordinators, champions, sponsors, etc. who can be seen as Hero's to take lead roles in deploying improvement culture in organisation. The required empowerment, resources, recognition and appreciation are also needed for the team motivation.
4. ***Symbols:*** Organisations should create their identity as "improvement driven" company and should demonstrate the same to all stakeholders including customers and society. This should reflect as a company "symbol" to the world outside. This also helps giving a message to all that we as an organisation believe in Improvement and demonstrate the same through actions and results.

An organisation's challenges

Internal Challenges related to	External Challenges relate to
Man	Competition in same Industry segment
Machine	Technology changes
Material	Societal changes
Methods	Environmental changes
	Economical changes
	Customer expectations change

LONG-TERM PROCESS

An organisation can develop an improvement focussed culture which will help in handling various challenges and also can deliver a sustained performance. But, it is important to note that culture building is a long-term process and requires lot of meticulous efforts and strong drive with top management commitment.

The author is Head Operations – Region India, ZF India Pvt Ltd.

JCB ROLLS OUT ITS 750,000TH BACKHOE LOADER

The late Joseph Cyril Bamford CBE conceived the idea of the JCB backhoe loader in 1953. Created for the first time, it was a single machine which combined a front shovel and rear excavator arm. In its first full year of production in 1954, just 35 of the machines were produced and it took more than 20 years for the first 50,000 to be made. JCB now manufactures backhoe loaders in the UK, India, Brazil and the USA.

JCB Chairman Lord Bamford said today: "Some of my earliest childhood memories are of watching our first backhoe loaders being produced at Rocester and it's incredible to think we have now manufactured 750,000.

"What's even more incredible is that the backhoe remains one of the world's most popular pieces of construction equipment almost seven decades after the first was produced. It really is testament to the versatility of the machine that its popularity continues to endure and will see it continue to prosper in the future."

The 750,000th model is a Special Edition of JCB's latest 3CX backhoe loader, bearing a unique livery and comprehensive specification.

Speaking at the occasion Subir Kumar Chowdhury, Managing Director and CEO of JCB India said "JCB introduced the iconic Backhoe Loader in India four decades ago. Today, it is visible at almost every worksite in metros, towns, and villages, working tirelessly towards building a new India. JCB Backhoe Loaders have made a significant impact in the country, with the machine becoming almost synonymous with infrastructure development"

Royalty, Prime Ministers, politicians and TV stars have all been photographed in the cabs of JCB backhoes over the years. The JCB backhoe was even the subject of a song which made the top of the charts. And it was a JCB backhoe which thieves used in a failed attempt to steal £350 million worth of diamonds from the Millennium Dome in 2000.

The latest backhoe production milestone comes after JCB celebrated the manufacture of its 500,000th backhoe in December 2012 – a 5CX, the most powerful commercially available backhoe JCB has ever made.

BRANDS THAT MATTER!

An overview of The Economic Times Best Brands in Plastics & Polymers 2020 felicitation ceremony

Representatives of the Best Brands on the stage with the Chief Guest Lulu Raghavan, MD, Landor Associates

In the best interest of the Indian plastics industry, The Economic Times along with its knowledge Partner– BMGI India has consolidated a list of 50 Best Brands in the Plastics & Polymers industry. These Best Brands have offered the Plastics Industry a fantastic combination of economics, excellence, engineering and environment friendly solutions.

Featured Best Brands of 2020

Alok Masterbatches

Alok is India's leading masterbatch producer, co-creating innovative, reliable and high-quality solutions for the plastic industry to cater to the current and future needs of its customers. Over the last several years, Alok has continued re-inventing itself by putting innovation and sustainability at the core of its business. It is committed to continue 'Adding Good' to make better plastics that are sustainable, safer and affordable.

Blend Colours

Blend Colours Pvt. Ltd. is an ISO 9001:2008 certified manufacturer, exporter and supplier of different types of Masterbatches. Technology has always been a key differentiator for the company, which has notably benefited its customers and has in fact set a new standard in industry. A well-equipped R&D, technically advanced production and testing facilities, qualified human capital ensure that customers get a product that they are confident.

Econ Machinery Pvt. Ltd.

Econ is a worldwide technological leader in the pelletizing field for over 20 years. Constant technical development processes have made Econ an innovation leader in pelletizing systems. Since its inception in India in 2013, Econ Machinery Pvt. Ltd. has put in great efforts in after sales support to its customers.

Electronica Plastic Machines Limited

Also known as EPML in the industry, the company's sophisticated technology has ensured high scalability and accurate products. It has a pan India presence at strategic locations to ensure swift and efficient customer correspondence for all its plastic injection moulding machines.

GAIL (India) Limited

GAIL is committed towards producing a quality product with creating, maintaining and ensuring a safe and clean environment. Its polymer products are environment-friendly and fully recyclable. GAIL provides a

Some of the Best Brands representatives

wide choice of grades with consistent and reliable quality to its customers.

GMS Plastics Machinery

GMS Plastic Machinery Pvt. Ltd. is synonymous with quality and excellence in the recycling industry. In a period when "Plastics" is touted as a pollutant and several organisations are targeting a "BAN" on plastics, GMS strives to encourage proper disposal of plastics and systematic recycling of the same.

Haitian Huayuan Machinery India Private Limited

Haitian International, having headquarters at Ningbo, Republic of China is one of the world's largest Plastic Injection Moulding manufacturing organisation. It forayed in India in India in 2001 and also has a manufacturing facility in the country.

HASCO India Pvt. Ltd.

Hasco enables its customers to build moulds in the easiest way possible. With the invention of the modular standard component system, HASCO has defined international standards and revolutionised mouldmaking. Designers and mouldmakers benefit from a complete range of ready-to-install, high-precision system components and intensive specialist advice that Hasco provides.

igus India Private Limited

igus, the motion plastics specialist, undertakes turnkey projects in moving cable management system in numerous industries including material handling, power plants, defence, automation, etc. It has also contributed towards prestigious projects of ISRO.

JJ Plastalloy Pvt. Ltd

JJ Plastalloy specialises in manufacture of various thermoplastic compounds and masterbatches. What sets it apart is its tremendous focus on R&D. Along with the domestic market, the company exports to 30 countries.

Kandui Industries Pvt. Ltd.

With a vision to consistently create innovative world-class masterbatches, Kandui was established in 2006 with a modest production capacity

ET BEST BRANDS 2020 in Plastics & Polymers
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Alok Masterbatches Pvt Ltd
Apar Ind Ltd
APPL Industries Limited
ASB International Pvt Ltd
Ashish Exports
Birla Carbon
Blend Colours Pvt. Ltd.
Borouge (India) Pvt Ltd
Brahmaputra Cracker and Polymer Limited
Brakes India Pvt Ltd
Branson Ultrasonics
Bry-Air (Asia) Pvt. Ltd.
BulBul Masterbatches Pvt Ltd
Chilton Refrigeration Pvt Ltd
Clariant Chemicals India
Covestro (India) Pvt Ltd
D & M Enterprises
Devu Tools Pvt Ltd
Dollplast Machinery Inc
Dow Packaging Specialty Plastics
DSM India Pvt Ltd.
E.I.DuPont India Private Limited
Econ Machinery Pvt Ltd
Electronica Plastic Machines Ltd.
Ester Industries Ltd.
Evonik India Pvt Ltd
Extrusiontech
Fine Organics
Flamingo Additives & Colourants Pvt. Ltd
GAIL (India) Limited
Gem Orion Machinery Pvt Ltd
Genn Controls India Pvt Ltd
Global Pet Industries Pvt Ltd
GMS Plastic Machinery Pvt Ltd
Gurucharan Industries
H. K. Industries
Haitian Huayuan Machinery (India) Pvt. Ltd.
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Hindustan Plastic & Machines Corporation
HPL Additives Ltd
HRSflow India Pvt. Ltd
Husky Injection Molding Systems
igus (India) Private Limited
Illig India Pvt. Ltd.
Indian Oil Corporation Ltd
Indo air Compressors Pvt Ltd
J P Extrusiontech Limited
Jagmohan Pla-Mach Pvt Ltd
JJ Plastalloy Pvt. Ltd.

ET BEST BRANDS 2020 in Plastics & Polymers
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Kandui Industries Pvt. Ltd.
KBM Extrusions Machines Pvt Ltd
KK Compounding Tech Giant limited
Konkan Speciality Polyproducts Pvt. Ltd.
Kuraray India Private Limited (EVAL)
Lanxess India Private Limited
Leister Technologies India Pvt. Ltd.
Lohia Corp Limited
Luk Plastcon Limited
Mahalaxmi Pet Machines
Mamata Machinery Pvt. Ltd.
Matsui Technologies India Limited
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Milacron India Pvt. Ltd.
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Sankhla industries
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Shree RadheKrishna Extrusions Pvt Ltd
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Welset Plast Extrusions Pvt. Ltd.
Windsor Machines Limited
Wittmann Battenfeld India Pvt. Ltd.
Yudo Hot Runner India Private Limited
Yuken India Limited
Yupo Corporation

of 2500 TPA. With a wide acceptance of its vast range of products, today, the company has a production capacity of 30,000 TPA. Further expansion is underway.

Kuraray India Private Limited

Kuraray India is a local subsidiary established in September 2008. Globally, the company has been manufacturing and marketing ethylene vinyl-alcohol copolymers (EVOH) under the name EVAL since 1972, and remains the world leader in EVOH production and market development.

Lohia Corp Limited

Lohia Corp Limited is the flagship company of the Lohia Group and a global supplier of machinery for end-to-end solutions for plastic woven fabric industry used for packaging systems for solid bulk materials and infrastructure applications.

Mahalaxmi PET Machines

Established in the year 2008, Mahalaxmi Pet Machines has been in business of manufacturing Pet Stretch Blow Moulding Machines for the past 10 years. The range includes of machines includes Fully Automatic Pet Blow Molding Machines & Semi-automatic Pet Blow Molding Machines.

Mamata Machinery Private Limited

Today, with installed base of nearly 4800 Machines in more than 78 countries, Mamata is one of leading manufacturers and Exporters of Plastic bag / Pouch Making Machines globally. Mamata also offers packaging lines for the end user flexible packaging market in form of Automatic Form Fill and Seal Pouching machines.

Meusburger India Pvt. Ltd.

Meusburger is the market leader in the field of high-precision standard parts. With over 50 years of experience in working with steel, Meusburger is the reliable global partner for making moulds, dies, jigs and fixtures. Locally based and present worldwide, it believes in catering to the individual needs of its customers.

Soltex Petroproducts Limited

Soltex is driven by constant innovation and research to meet the demands of its customers to provide the best balance between quality and cost effectiveness. Its masterbatch manufacturing facilities at Mumbai, Daman, Silvassa, Kolkata and Uttaranchal are equipped with the latest machinery and research centers to provide unmatched quality.

Steer Engineering Pvt. Ltd.

Founded in 1993 by Dr. Babu Padmanabhan, Steer Engineering Pvt. Ltd, is committed to the design, creation and implementation of advanced materials platform technology that effectively transforms and functionalises materials in the field of pharmaceuticals, plastics, food & nutraceuticals, biomaterials and biorefining.

Yudo Hot Runner India Private Limited.

Since its foundation in 1980, YUDO has strived to develop and produce Quality hot runner system. The company is also a leading solution provider for automated takeout robot and factory automation, injection auxiliary equipment, machine tool automation system, Packaging and PET Preform solutions.

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I, Joji Varghese, hereby declare that the particulars given above are true to the best of my knowledge and belief.

(Joji Varghese)

Date: March 1, 2020

Signature of the Publisher

By Deepak Prahlad

UNDERSTANDING HMI TESTING

Newer and more advanced Human Machine Interface (HMI) solutions ensure an increasingly advanced in-vehicle experience, and that is today driving state of the art In-Vehicle infotainment (IVI) features in the automotive industry.

In today's world, infotainment systems are required to provide seamless connectivity. *Image provided by QuEST Global*

While testing an HMI is a very complex task, it is not possible to automate it completely.

The automotive industry is operating in a world that demands much more than vehicles for transportation. It must deliver highly efficient machines with an even higher level of interface for various systems in the vehicle. Newer and more advanced Human Machine Interface (HMI) solutions ensure an increasingly advanced in-vehicle experience, and that is today driving state of the art In-Vehicle infotainment (IVI) features in the automotive industry.

In today's world, infotainment systems are required to provide seamless connectivity with mobile device app features and also operate intuitively, flawlessly and intelligently. A modern vehicle needs to communicate various functionalities - commands for safe driving, personalized in-vehicle digital systems - and also offer advanced connectivity options - like V2X (Vehicle to Everything), predictive maintenance and OTA (Over the Air) updates - to the driver that will essentially make driving experience a two-way communication. While this raises expectations of innovation, there are challenges that need to be addressed before the HMI aspect of in-vehicle functionalities can be declared fit and efficient, while being intuitive and contextual as well.

ENSURING A HEALTHY INTERFACE

A fine balance needs to be maintained between the driver and the in-vehicle functionalities. The human interface with the machine's capabilities need to be easy to manage, decipher, navigate and also be accurate for graphics and sound acoustics etc. That is a basic requirement, and now there is innovation that should deliver an HMI experience that is more advanced in many ways. While aesthetics is a big part of the HMI design, easy functionalities and high efficiency is the bigger bit.

By some measures, while they deliver diverse functionalities in entertainment, the IVI system is perhaps the most complex system in the vehicle. They are needed to support multiple input/ output facilities, multiple connectivity functions and touchscreens. They naturally need to process large amounts of data as well, and this actually changes the entire equation. It goes without saying that HMI needs to be the most robust part of the in-vehicle systems. And for that to hold, testing plays a critical role in its engagement readiness.

In order to be compatible with multiple displays of various sizes & types and connections, the IVI needs to be a distributed system to ensure they support all facets of system interaction - command and control, AV source transport, data and diagnostics.

THE TEST CHALLENGE

As the number of interfaces increase, the testing environment becomes more complex. With multiple user interfaces, testing needs to cover all possible interfaces and stimuli, and the system will need to track each input, and capture data of fail to ensure resolutions and no repeat failures. Various mobility devices and operating systems need to be a part of the integrated commu-

"While aesthetics is a big part of the HMI design, easy functionalities and high efficiency is the bigger bit."

nication system in vehicle, and it goes without saying that for increased features, the number of test scenarios would increase too.

The biggest challenge, however, is about the User Interface (UI) and design of the HMI - its easy navigability, and harmony with other in vehicle design elements. Ideally, it should be as easy as one or two clicks for the driver to reach the UI screen, and derive data required. The challenge comes from the new features that need to be tested to perfection. In case there are really complex animations involved in IVI, it will be usually tested by recording video and checking frame by frame. The testing needs to ensure clarity of screen, smoothness of animations, clarity of audio, complete interoperability of new innovative functionalities, and networked devices.

THE LIMITATIONS OF MANUAL TESTING

While testing an HMI is a very complex task, it is not possible to automate it completely. While diagnostics on some systems like media and mobility can be automated, in HMI testing, the best ratio that can be achieved is about 60 percent. The trend is moving into a Computer Vision based testing, with extensive use of Artificial Intelligence (AI) and Machine Learning (ML). There are some OEMs who are developing ML and AI friendly specifications for testing and automation that will allow creation of test cases from specifications. The scripts that can be generated using this helps to reduce efforts of testing by two levels, but most effort will then go into the preparation of specification itself. With time, this complexity will only increase as there could be around 40 languages supported by a single system. Even though AI and Optical Character Recognition (OCR) technology can be used for system language testing, it will succeed only if that intelligence can be brought into the test automation framework.

Cleary, both manual and automated testing have their advantages. As a starting point, manual testing has higher advantages since the specifics of functionalities being tested are often not very precise. We can switch to automated testing process once the IVI features are fine-tuned for testing and all specifics are appeased.

AUTOMATION TRENDS IN HMI TECHNOLOGY

There are several interesting new trends in automated HMI testing technologies. Increasingly, Robotic Process Automation (RPA) is becoming a part of HMI testing these days. There are companies that are betting on Robotic Arms that support automated testing. They provide some APIs used for automation - something like a camera setup with a robotic arm, that can detect a button and will be used instead of a human touch, swipe or pinch on the screen. Even today, a robotic pressure sensitive arm is needed to test a 3D touch enabled screen that is currently available only in few iPhone models. Very near in the future this will be available for IVI as well. Even for the normal display without 3D-touch, pressure applied to the screen should be controllable to ensure the screen does not crack under pressure. This demands the need of a sensitive robotic arm for automation of IVI testing – one that is sensitive to the different functionalities of the system.

It is unlikely that any time in the near future, HMI testing can be completely automated. It is very difficult to achieve a robust automation setup during the Engineering Version (EV) and Design Version (DV) phases, where the IVI system is evolving. Usual practice is to build the automation framework during these phases and deploy in Production Version (PV) phase and continue using it during and after the PV through Start of Production (SOP) and until end of life of the IVI testing. Recent advancement of AI and ML along with robotics helps the companies in bringing the automation down the line largely into DV phase effortlessly. AI and ML helps the automation team to adapt the requirement changes in the device during the DV and PV phases into their system much easily and with lesser effort. It actually makes business sense to automate the design version, because changes are inevitable during this phase which can be tested and delivered with less effort of using AI. Employing ML along with AI will ensure the accuracy of the graphics usage. Verifying the graphics in DV phase is not a must, though this will ensure less changes in graphics in further phase of the system. The PV also see many changes in terms of system requirements but will be more robust in nature and so automation will give more test coverage.

So, if automation is taken up from the design stage, the first couple of months the testing needed will be largely manual, and hoping for some strides in the field of automated testing in HMI, we can expect automation to take the upper hand in subsequent stages.

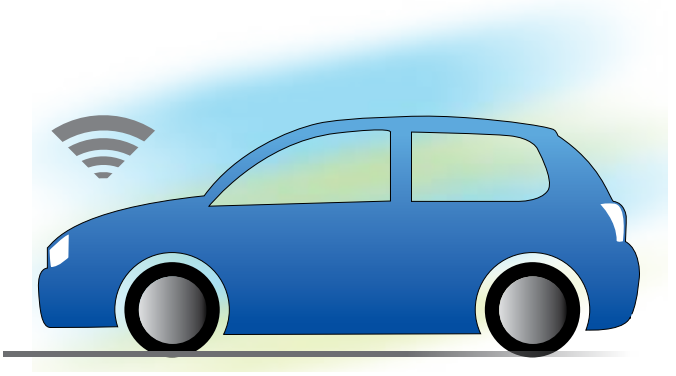
Clearly, HMI testing is on a path of innovation and with features getting smarter, better and much more intuitive. Testing them will be a challenge that technologies of the future will need to deal with, on priority.

The author is Program Manager, QuEST Global

By Ramakrishnan Ramanathaia

EMERGING TECHNIQUES IN SMART AUTOMOTIVE SYSTEMS

The large data generating nature of autonomous vehicles poses many important challenges from data storage and data processing.



"It is estimated that a fully automated vehicle will be able to produce up to 3TB of data every day. This data includes many different classes of data such as video footage, sensor data, traffic data and Lidar data."

The state of automotive transport is changing very rapidly due to the advent of a wide range of technologies. These technological changes include advances in fields such as data science, route optimisation and cloud computing. This article outlines the major techniques and questions that have emerged in recent years in the field of smart automotive systems. In particular, this article focusses on the self-driving cars and other related enabling fields.

A smart automotive system is a system that uses technology to either aid a driver get to his / her destination in an efficient manner (partially autonomous cars) or relieves the driver of driving responsibilities completely and automatically transports all people in the vehicle to their destination (fully autonomous cars). Both types of smart autonomous vehicle use a wide variety of sensors to facilitate their respective operations and this tends to generate a lot of data which needs to be processed or stored. In the future, it is further envisioned that cars will be able to communicate with each other to transmit traffic related data and therefore cars may need to also store and process information that they may not have collected themselves.

The large data generating nature of autonomous vehicles poses many important challenges from data storage and data processing. It is estimated that a fully automated vehicle will be able to produce up to 3TB of data every day. This data includes many different classes of data such as video footage, sensor data, traffic data and Lidar data. This data would need to be filtered through (using data science techniques) and the important parts of it either stored in the car's storage system of uploaded onto the cloud. If a car attempts to store all its data off-line then it will need a unrealistically large storage system to accommodate all the data and if a car uploads it's information to the cloud then the car needs to have access to an adequately secure and fast data connection in order to be able support the data connection needs. This is the big cloud computing challenge being put forward by smart automotive systems.

Emerging frameworks that could enable autonomous vehicles to efficiently access the cloud mainly comprise of vehicles accessing cloud services through some Software-As-A-Service (SaaS) based platform. This comprises vehicles subscribing to some software based autonomous assistance service which is based in the cloud. The purpose of the cloud software platform would be receiving, storing and sending information to each vehicle. This is an evolution to the current subscription-based service models currently being used today such as OnStar. Due to the fact that the cloud platform receives different data from a wide variety of different parties, it can aggregate the data it receives and use data science centric techniques to extract network wide information which it would then forward to the vehicles. In order to facilitate the communication between vehicles and the cloud, there needs to be new infrastructure put in place to ensure that cars are always connected. This infrastructure should facilitate both Vehicle to Cloud (V2C) communication and Vehicle to Vehicle (V2V) communication.

Technologies such as 5G are enabling technologies

In order to facilitate the communication between vehicles and the cloud, there needs to be new infrastructure put in place to ensure that cars are always connected.

for V2V and V2C communication to be possible. This is because 5G technologies are both low latency and high bandwidth and can thus be used in autonomous driving scenarios. These are coupled with cloud based autonomous applications which might be provided as a SaaS using technologies such as OpenStack. OpenStack is a free and open source cloud platform which can use to deploy SaaS based software. It is emerging as the most prominent manner in which SaaS applications are deployed in modern scenarios and has gained a very wide user base.

The general framework to successfully cater for the low latency needs of smart automotive networks is to divide the cloud into two distinctive sections. There is one cloud which is physically located on infrastructure near the actual transport network which is called the Edge cloud and then there is another cloud service which is running on a remotely located data centre. Vehicles communicate wireless with each other and the EDGE cloud and the EDGE cloud aggregates data and sends it both to the remote cloud and also back to the vehicles.

> "Emerging frameworks that could enable autonomous vehicles to efficiently access the cloud mainly comprise of vehicles accessing cloud services through some Software-As-A-Service (SaaS) based platform.

The goal of the EDGE cloud is to ensure that low latency processing can be quickly conducted and then sent back to the vehicles. This processing could include notifying cars of imminent slowdowns in traffic flow, up-to-date best route data etc. The vehicle can then take that use that information to ascertain the best route to take when getting to its destination, or to avoid any obstacles which may have suddenly arisen on the road. This information could have been gained for the edge cloud from other vehicles and then passed on to other vehicles on the road. The information can then be further aggregated and passed onto the remote cloud where network wide information is stored and analysed.

At the remote cloud, the key goal is to perform network wide, real-time analytics. This required the remotely located cloud to run vehicular applications on a high-speed cloud platform such as OpenStack. The OpenStack based solution could run on a host platform such as Rackspace Cloud or DigitalOcean. The requirement of having a separate edge cloud place significant infrastructure challenges for governments worldwide who will need to invest a lot in transport infrastructure in order to get it ready for use by partially and fully automated vehicles.

Vehicles collect a wide variety of sensor information such positional data, LIDAR data and camera data from a wide variety of devices. This data can swell upwards of 1TB a day in some autonomous vehicle implementations. Data collected from vehicles and reaching the EDGE cloud infrastructure is thus massive and needs Big Data based methodology to assess and process it. This can be done on the EDGE cloud infrastructure using big data processing technologies such as HADOOP and R. HADOOP is a software framework that has been specifically optimised for handling and processing big data.

Once algorithms and required aggregation has been conducted on the data, the aggregated data is then passed onto the remote cloud application via some communication protocol. This data is then used either for further analytics or for monitoring purposes. The monitoring in particular is commonly done with software libraries such as Prometheus and using some time series database such as InfluxDB. If the remote clouds analytic engine wants to continuously monitor some attribute of some vehicle, such as change mean velocity, it subscribes to receive mean velocity data from the EDGE cloud and doing that will enable it to routinely receive the relevant data from the EDGE.

In summary, a lot of research has been conducted in smart automotive systems and we are a point now where the particular framework that would enable autonomous vehicles to be realised is a cloud based frame work. This cloud framework would be composed of an edge framework which processes low latency data on the traffic network and a remote cloud which receives network wide information and performs network wide analytics.

The author is Vice president, Microexcel

CUTTING TOOLS THAT CUT OUT VIBRATIONS

How to say no to vibrations in machining?

Figure 1

Vibrations in machining are generally an unavoidable part of the metal cutting process. They have a forced or self-excited nature and always accompany a cutting action. Machining vibrations are referred to as "chatter", highlighting their specific nature, which inheres in every processing where chips are formed. Even if cutting is considered as stable, it does not mean that vibrations do not take place. In this case, the vibrations simply remain on a level that provides the required machining results, and is considered as a "no vibration" operation.

In fact, vibrations in cutting are a damaging factor that reduces performance. Manufacturers make every effort to diminish vibration and, ideally, bring them to a level that does not affect machining results. Chatter is a subject of serious research that has already provided manufacturers with ways to model vibrations in machining which, despite their complexity, can be very effective in finding a way to reduce chatter. However, this modelling takes time and requires various input data, including sometimes additional measurements. In most cases, when manufacturers face vibrations during machining, they only have a few tools at their disposal for a real-time response to decrease the chatter. The most common practice is to vary cutting speed and feed, which usually leads to productivity reduction. Therefore, any effective method of diminishing vibrations that does not adversely affect machining operation productivity will be attractive to manufacturers.

Vibration reduction in machining requires consideration of a manufacturing unit as a system comprising the following interrelated elements: a machine, a workpiece, a workholding device, and a cutting tool. While the influence of each element on total vibration reduction is different, improving a vibration characteristic of one element may have a significant impact on the system's overall dynamic behaviour. Most efforts to protect against vibrations focus on developing more rigid machines with intelligent sensors and computer control, and advanced vibration-dampening tooling. Can a cutting tool, the smallest - and probably the simplest - system component, dramatically change the vibration strength of a manufacturing unit? Even though producers might not have great hopes for the role of cutting tools in decreasing chatter, in certain cases a correctly selected tool can simply stop vibration without any adverse effect on productivity.

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Vibration reduction in machining requires consideration of a manufacturing unit as a system comprising the following interrelated elements: a machine, a workpiece, a workholding device, and a cutting tool.

CUTTING GEOMETRY

The right tool geometry makes cutting action smooth and stable. The geometry strongly influences cutting force fluctuations, chip evacuation and other factors, which are connected directly with vibration modes.

Figure 2

ISCAR's tool design engineers believe that the cutting geometry can considerably strengthen vibration dampening of a tool and have developed interesting solutions accordingly.

ISCAR's various indexable inserts, exchangeable heads, and solid carbide tools feature chip-splitting cutting edges. Such an edge may be serrated or have chip-splitting grooves. The chip splitting action causes a wide chip to be divided into small segments, resulting in better dynamic behaviour of a tool during machining, and vibration is stabilized. In rough machining, extended flute milling cutters remove a large material stock and work in heavy conditions. Significant cutting forces acting cyclically generate vibration problems. When using chip-splitting indexable inserts, it is possible to tackle these difficulties. Mills with round inserts, a real workhorse in machining cavities and pockets, particularly in die and mold making, are often operated at high overhang that affects rigidity and vibration resistance of a tool. Problems with cutting stability occur when the overhang already exceeds 3 tool diameters. Applying serrated round inserts with a chip-splitting effect redresses this situation and substantially improves robustness (Fig. 1).

> "An assembled cutting tool comprises a body with mounted cutting elements such as indexable inserts or exchangeable heads. Choosing the right body material presents an additional option for forming a chatter-free tool structure.

A skillfully defined tooth pitch is an effective way of taking the dynamic behaviour of a cutting tool to the next level. ISCAR's CHATTERFREE family of solid carbide endmills (SCEM) was designed on the basis of a pitch control method. The family features a variable angle pitch in combination with a different helix angle. This concept ensures chatter free milling in a broad range of applications.

The FINISHRED series of solid carbide endmills features chip-splitting geometry coupled with variable pitch flutes (Fig. 2) that provide surface finish when machined according to rough machining data.

The principles of vibration-proof cutting geometry, which demonstrated their effectiveness in solid carbide endmills, have been applied to the design of exchangeable multi-flute milling heads made from cemented carbides in the MULTI-MASTER family.

CHATTER-FREE DRILLING

Chatter in drilling leads to poor surface finish and accuracy problems. In ISCAR's SUMOCHAM family of assembled drills with exchangeable carbide heads, the double margin design of QCP/ICP-2M heads substantially increases tool dynamic stability.

If vibration occurs when a drill enters material, it may cause serious damage and even breakage of the drill. The SUMOCHAM-IQ family of HCP exchangeable carbide heads (Fig. 3), intended for mounting in the bodies of standard SUMOCHAM tools, can ensure reliable self-centering capabilities. The key is an unusual concave profile for the head cutting edge reminiscent of a pagoda shape. This original cutting geometry enables high-quality drilling holes of depths of up to twelve-hole diameters, directly into solid material without pre-drilling a pilot hole.

The "magic pagoda" features another ISCAR innovation: the LOGIQ3CHAM family of latest-gener-

Figure 3

Figure 4

ation drills carrying exchangeable carbide heads with 3 teeth to ensure higher productivity. The steel drill bodies have 3 helical flute that weaken the body structure when compared with a 2-flute assembled drill of the same diameter. In order to improve the dynamic rigidity, the flute helix angle is variable. This design principle in combination with the pagoda-shaped cutting edge provides a durable chatter-proof solution for stable high-efficiency drilling.

> "The right tool geometry makes cutting action smooth and stable. The geometry strongly influences cutting force fluctuations, chip evacuation and other factors, which are connected directly with vibration modes.

TOOL BODY MATERIAL

An assembled cutting tool comprises a body with mounted cutting elements such as indexable inserts or exchangeable heads. Choosing the right body material presents an additional option for forming a chatter-free tool structure. Most tool bodies are made from high-quality tool steel grades, for which the material stress-strain behaviour is similar. However, in some cases tool design engineers have identified successful material alternatives to improve vibration strength.

The MULTI-MASTER, an ISCAR family of rotating tools with exchangeable heads, provides a range of tool bodies, referred to as shanks, produced from steel, tungsten carbide or heavy metal. A steel shank is the most versatile. Tungsten carbide with its substantial Young's modulus provides an extremely rigid design, so carbide shanks are used mainly when milling at high overhang and machining internal circumferential grooves. Heavy metal, an alloy containing around 90 percent tungsten, is characterized by its vibration-absorbing properties, and heavy metal shanks are most advantageous for light to medium cutting operations in unstable conditions.

ANTI-VIBRATION TOOLS FOR DEEP TURNING

A typical tool for internal turning or boring operations comprises a boring bar with a mounted insert or a cartridge carrying an insert. The bar is the main factor in the dynamic behaviour of a tool. Stiffness of a bar is the function of the bar overhang to diameter ratio, and large ratios may be a reason of tool deflection and vibrations, affecting dimensional accuracy and surface finish during machining.

ISCAR has developed three types of boring bar to cover a wide range of boring applications: two integral (from steel and solid carbide) and one assembled, having a vibration dampening system inside.

The steel bars enable stable machining with the overhang up to four diameters. Exceeding this value can induce vibrations due to steel's elasticity characteristics. Changing the bar material from steel to a more rigid solid carbide ensures efficient vibration-free boring with the overhang of up to seven diameters. However, further increasing the boring depth is also limited by the material stress-strain behaviour. In order to clear this overhang barrier, ISCAR developed the ISOTURN WHISPERLINE family of anti-vibration cylindrical bars. The bars carry interchangeable boring heads for indexable inserts of different geometries and have inner coolant supply capability. The main element of the bar design is a built-in vibration-dampening mechanism to provide "live" vibration damping during machining. This enables effective boring with the overhang from seven to fourteen diameters (Fig. 4).

A vibration-dampening unit is used also in ISCAR deep grooving and parting tools. The unit is in a tool blade under the insert pocket. Each blade is pre-calibrated by ISCAR for optimal performance for a wide range of overhangs, but end-users can complete fine tuning calibration themselves if needed.

Cutting tool manufacturers have a limited choice of means in the abatement of machining vibrations, with only tool cutting geometry, tool body material, and maybe a cutting tool with built-in vibration-damping device at their disposition. Considerable skill and ingenuity are required to make a chatter-free tool with these limited resources. It is feasible, however, and ISCAR's solutions highlighted in the above examples affirm the possibilities.

LARGE SPACE, SMALL PRICE

motion plastics make igus delta robots cost-effective and low-maintenance

Simple automation and low cost: the igus delta robot makes this possible by the use of lubrication-free components made of tribo-polymers. At the 2019 Motek show, the motion plastics specialist presented a new version with a 10 times larger work space volume compared with the proven model. This lightweight system for easy pick & place tasks, is delivered as a pre-assembled kit or ready to install product. This guarantees quick operation and saves costs immediately.

Lightweight, cost-effective and with a larger range – that's the new delta robot drylin DLE-DR from igus. Using lubrication-free tribo-polymers, it is not only very cost-effective when buying, but also low maintenance when in use. This reduces maintenance and downtime costs. Thanks to a modular system, users can choose between a compact self-assembly modular kit or pre-assembled version in a transport frame. The robot consists of three maintenance-free drylin ZLW toothed belt axes with NEMA23 XL encoder stepper motors, lubrication-free igubal coupling joints and matching adapter plates for grippers and motors. This ensures the quick handling of up to 5 kilograms with a precision of ± 0.5 millimetres. The new delta robot offers a 10 times larger working space with 660mm diameter at 180mm height, which significantly increases the range. A calibrating pin allows the robot to be positioned at the zero point. It is directly fixed to the mounting hub.

Simple automation available from 5.9 Lakhs

The use of the delta robot is very apt for simple assembly activities, pick and place tasks, as well as applications in inspection technology. As a construction kit, it can be set up in just 30 minutes and is extremely cost-effective. "Even a smaller or medium-sized company can venture into automation for a few lakhs," says Stefan Niermann, Head of Low Cost Automation at igus. "At the same time, the operator benefits very quickly from their new automation solution. The payback period is less than six months for most applications." Depending on the customer's requirements, the new drylin DLE-DR can be delivered within 2 weeks as a pre-assembled construction kit with assembly instructions in a box, or as a ready-to-install system in a transport frame. As an option, the customer can use their own software and control system, or the intuitive and easy-to-use dryve D1 control system from igus.

THE ROBOT CONSISTS OF THREE MAINTENANCE-FREE DRYLIN ZLW TOOTHED BELT AXES WITH NEMA23 XL ENCODER STEPPER MOTORS, LUBRICATION-FREE IGUBAL COUPLING JOINTS AND MATCHING ADAPTER PLATES FOR GRIPPERS AND MOTORS. THIS ENSURES THE QUICK HANDLING OF UP TO 5 KILOGRAMS WITH A PRECISION OF ± 0.5 MILLIMETRES.

The delta robot from igus relies entirely on the advantages of motion plastics and enables simple, cost-effective automation. The new version has a 10 times higher working space diameter than the proven model.

Build your own robot with just a few clicks

With the drylin DLE-DR delta robot, igus is expanding its broad selection of robotics components. Based on its tribo-polymer expertise, the company has been developing cost-effective automation solutions for order picking, feeding, quality assurance and assembly for many years. These include robolink DP - a modular system that allows users to assemble articulated arms with a robust and lightweight plastic housing, gearboxes and motors into a robotic arm of their own. The offer also includes robolink DCi, a pre-configured, ready-to-use automation system. It consists of a 4 or 5-axis robot and a control system that is integrated at the base of the gripper arm in a space-saving manner. This year, igus and its industry partners introduced the RBTX.com platform to enable customers to quickly assemble their own robot solution. With just a few clicks, you can put together your own low-cost robotic solution online. The basic electro-mechanical structure is thereby the articulated-arm robots, delta robots and linear robots. In the next step, the user supplements this basic structure by adding individual components of different manufacturers such as grippers, suction units, cameras, motors, sensors and control systems. The advantage: all components are compatible with each other. The user quickly receives a reliably operating overall automation package that meets their individual requirements and budget.

For more information, contact Ragesh Kumar, Product Manager, igubal®, xiros, bar stock, igus (India) Private Limited, Email: ragesh@igus.in; or visit www.igus.in

ROBOT ACCESSORIES

The 6-axis compensation unit makes intuitive bin-picking possible

Reliable gripping without having to first detect the exact position and location of the gripping object – what humans do every day – is now possible for robots with the universal compensating unit SCHUNK AGE-U. Its complex design combines angled, lateral and rotary compensation, and applies sensor detection once deflection takes place. For example, when bin picking, ferromagnetic pre-machined parts can be picked up by a magnetic gripper without having to detect their exact position or orientation. Instead, all that is needed is an approximate – and therefore cost-effective – localization using equipment such as a simple 2D scanner, which decreases hardware and software costs as well as the effort needed for programming. In addition, the module is able to compensate for tolerances and position deviations in six axes during automated assembly.

The AGE-U universal compensation unit was specially developed for intuitive handling, such as with bin picking or automated assembly applications. *Photo: SCHUNK*

"THE AGE-U HAS COMBINED ROTATIONAL AND ANGULAR COMPENSATION, ALLOWING THE END EFFECTOR TO FULLY ADAPT TO THE UNDEFINED COMPONENT POSITION OR TO FEED THROUGH INSERTION OPERATIONS WITH GRIPPED COMPONENTS."

Detecting contact with a component

Whereas the compensation units that have been available on the market up to now only offer angled, lateral or rotary compensation, the AGE-U has combined rotational and angular compensation, allowing the end effector to fully adapt to the undefined component position or to feed through insertion operations with gripped components. In the X and Y directions, the maximum possible compensation is +/- 2.7 mm. In the Z direction it is +/- 6.1 mm. Laterally, the compensation around the X and Y axis is at up to +/- 3°, rotationally, it is at up to +/- 8° around the Z axis. While the return to the basic position is achieved both via springs and actively via compressed air, the flexibility of the unit can be adjusted individually by regulating the air pressure. At a pressure of 6 bar, the unit is switched to a completely rigid mode, eliminating uncontrolled movements during the handling system process. Both the locked status as well as the deflection of the unit from the basic position can be monitored with inductive monitoring of the locking piston. That means that when approaching an object, it is possible to precisely detect when contact is made with a component without having to know its exact position. Afterwards, for example, the SCHUNK EMH magnetic gripper that is mounted to the compensation unit can be activated to pick up the part.

ISO flange for industrial and lightweight robots

The compensation module is recommended for handling weights up to 5 kg and can be connected to a wide range of industrial and lightweight robots quickly and easily using the standardized ISO-50 flange without adapter plate. The housing made of anodized aluminium and the functional components made of hardened steel ensure a long service life and reliable operation with minimum maintenance costs. The SCHUNK AGE-U is designed for one million compensation cycles.

For more info, contact:
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UPDATE

GOVT. APPROVES PORT DEVELOPMENT AT VADHAVAN IN MAHARASHTRA

Government of India has accorded in-principle approval to develop port at Vadhavan in the State of Maharashtra on landlord model by a Special Purpose Vehicle (SPV). The SPV is incorporated under Companies Act, 2013 with Jawaharlal Nehru Port Trust (JNPT) as a lead Partner. The project is proposed to be financed through a blend of equity and debt. The SPV will provide equity and raise debt from multilateral financial institutions. The Project has been planned to be completed in two phases. First phase is planned to be ready for operation in five years, subject to necessary statutory clearances and investment approval.

COMPREHENSIVE AIR MOTOR RANGE

New air motors from Chicago Pneumatic provide simple yet reliable power

Chicago Pneumatic has introduced a new range of air motors to its portfolio. The comprehensive air motor range combines multiple configurations, a compact and well-balanced design and excellent performance in harsh environments, enabling OEM and machine builders to improve the efficiency of their systems. There are nine models of motors in the range providing power from 0.16 kW (0.21HP) to 1.8 kW (2.45HP), maximum output torques of up to 299 Nm and speeds of up to 21,500 rpm. The motors are highly efficient due to a lightweight and compact design. They feature internal planetary gears which contribute to a long, slim design, and the motors are up to six times smaller and

"THE NEW RANGE COMPLEMENTS OUR EXISTING RANGE OF PNEUMATIC PRODUCTS AND TOOLS."
PRIYA RAJESH, PRODUCT MARKETING MANAGER – CHICAGO PNEUMATIC TOOLS

lighter than electric motors of equivalent output power. They are a cost-effective solution compared to other motor types, with low installation, operation and maintenance costs. The heavy-duty motors provide reliable operation in hostile environments. They can be used in constant stop-start operations and be stalled indefinitely without overheating or sustaining any other damage. There is no heat generated or the possibility of sparks being created and the air motors from Chicago Pneumatic are ATEX certified for use in zone 2 hazardous areas. The stainless-steel air motors also offer safe operation. Reversible and non-reversible variants of Air Motors are suitable for majority of applications in Industries.

"Addition of air motors to our catalogue is ideal for OEMs and machine builders looking for simple yet reliable power in applications including pipe processing, mixing, blending, filling, metering in food and chemical processing, and machine maintenance. The new range complements our existing range of pneumatic products and tools and reinforces our position as leaders in industrial pneumatic solutions," says Priya Rajesh, the author and Product Marketing Manager – Chicago Pneumatic Tools.

To learn more, visit www.cp.com

NEW TOOLING SYSTEM PROVIDES SPEED AND ACCURACY

Ideal for use on multi-task machines, the polygon shank coupling (PSC) is a spindle interface which promotes higher productivity through reduced set-up time and faster, more precise machining.

Dormer Pramet has launched a high precision, quick-change tooling system for a variety of internal and external turning applications.

Ideal for use on multi-task machines, the polygon shank coupling (PSC) is a spindle interface which promotes higher productivity through reduced set-up time and faster, more precise machining.

It achieves this with a unique tapered polygon cone shank and flange surface, which supports a high degree of rigidity. With an accuracy in X, Y, Z directions of +/-2 µm, the PSC holders provide a high level of repeatability.

"IN ADDITION, A REDUCED OVERHANG LENGTH MINIMIZES VIBRATION AND RUNOUT INACCURACY FOR A HIGH-QUALITY SURFACE FINISH, MAKING IT IDEAL FOR AEROSPACE AND GENERAL MACHINING APPLICATIONS."

Dormer Pramet has launched a high precision, quick-change tooling system for a variety of internal and external turning applications.

In addition, a reduced overhang length minimizes vibration and runout inaccuracy for a high-quality surface finish, making it ideal for aerospace and general machining applications.

Connected by a triangular conical structure and cross section, which uses 1/20 taper, the PSC features internal coolant channels and a steel toolholder for high toughness.

More than 130 different items are available, including a variety of tool holder styles, internal tools, interface types and shank sizes.

For more information, visit www.dormerpramet.com

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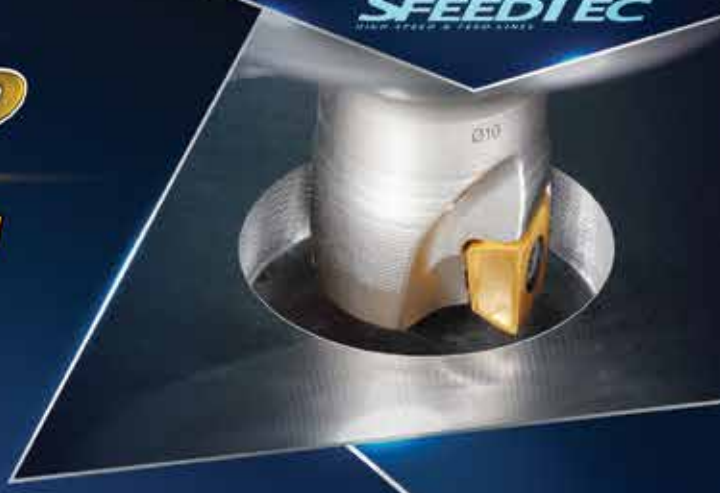

High Productivity Shoulder Mill with Strong Tangential Insert

- Strong tangential insert
- High productivity due to ramping angle
- Strong tool body with large core
- High positive rake angle
- 90° shouldering

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