विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY

सत्यमेव जयते

AMRITA TEC

DST-AMRITA
TECHNOLOGY
ENABLING
CENTRE

Dr. Krishnashree Achuthan

Amrita Vishwa Vidyapeetham, Amritapuri, Kollam, Kerala - 690546

DST-Amrita Technology Enabling Centre

Table of Contents

Technologies Mined, Developed, Commercialised and Transferred

Technologies Mined

One of the focus areas of activity of DST-Amrita TEC is mining of technologies. The technologies were mined from Amrita Vishwa Vidyapeetham's IP portfolio, DST recommended projects and the technologies developed in other academic institutions where the Amrita-TEC acts as a hub or nodal centre for developing technologies and inculcating the innovative mindset amongst the young minds

TRL Assessment
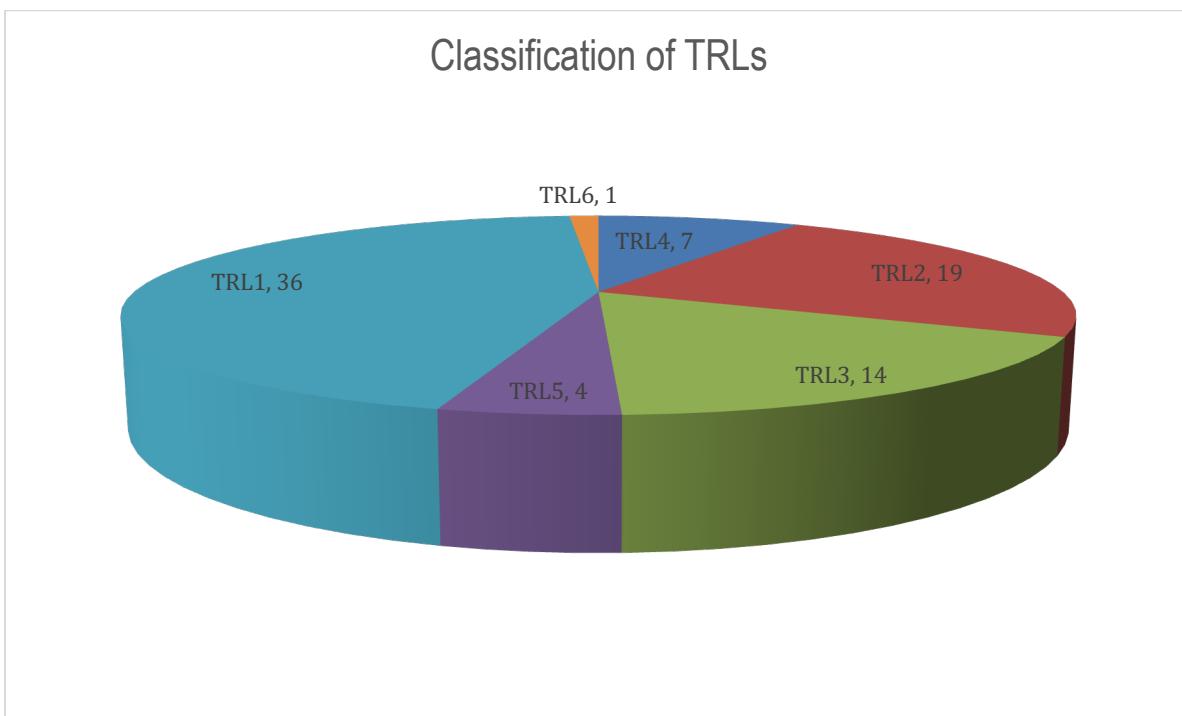
The technology mining process involves approaching the innovators, MSMEs, R&D in academia to share their ideas / innovations / prototypes in a prescribed format. An NDA agreement is signed with them to make them feel comfortable to share their ideas / innovations. A presentation is made by the innovator to explain their ideas in detail during the TRL assessment. Questions are asked to fine tune their ideas / innovations so that the products gain acceptance in the market. Amrita TEC has so far assessed about 80+ technologies in last 6 months enabling the innovators to fine tune and take their ideas to the next level. The TRL level assessment chart followed is presented here.

Classification of the technologies mined based on the Verticals

Classification of TRLs of the Technologies Mined

Technologies mined Jul – Dec 2022

TRL Rating	Project Name	Field
TRL4	A Distributed Agent Based Network Fault Diagnosis Tool	Bio-Technology

TRL1	Agricultural Product Price Reduction and Its Implications	Agro
TRL2	An Apparatus for Collecting Tree SAP	Agro
TRL1	Aquaponics - Food Production	Agro
TRL2	Automatic Garbage Segregator	IOT
TRL1	Biodegradable Spoons from Banana Fibre Alternative to Single Use Plastic Spoons	Bio-Technology
TRL1	Bio-Inspirer Approach of Cloud Security	Bio-Technology
TRL2	Chemical Manure and Human Health	Bio-Technology
TRL5	Design and Development of Pot and Bamboo Based Filtration System	Bio-Technology
TRL1	Detection of Foodborne Pathogens with Green Synthesized Nanozymes	Bio-Technology
TRL3	Development of Smart Kneepad for Herbal Drug Delivery	Healthcare
TRL2	Development of Sports Drink Using Coconut Water	Healthcare
TRL1	Eco Friendly Riders	Environment
TRL2	Eco Preserver	Environment
TRL6	Electronic Loban	Electrical
TRL2	Frames With Love	Others
TRL1	Fully Automated Public Distribution System - Smart Card (Ration Card)	CS
TRL3	Home Based Herbal Chewing Gum & Fibre Biscuit	Agro
TRL4	Hydrogen Fuel	Energy
TRL1	Image Sensors - Detect Human Presence	AI
TRL2	Ironing & Caring	Others
TRL2	K - Cookies Millet Based Food Product	Agro
TRL5	Low Cost Aquaponics System For Food Security	Agro
TRL1	Multipurpose Breakfast Machine	Others
TRL3	Network Monitoring Mobile Application	CS
TRL1	Ornaments From Waste Medical Foil	Environment
TRL1	Reprocessing Old Clothes With Nanotechnology	Nano Technologies
TRL1	Self Weight Based Tricycle	Mechanical
TRL4	Sugar Free Jelly From By Product of Beet Root	Agro
TRL3	AI based Education App for Tribal Education	AI
TRL3	Algorithm for Long Span Bridge	CS
TRL1	Auto Crash Detection App	AI
TRL1	B Milk	Bio-Technology
TRL1	Biofertilizer	Bio-Technology
TRL1	Biometric Voice	Bio-Technology
TRL1	Block Chain for Document Verification	CS
TRL3	Bringaraj Oil & Tea	Agro
TRL2	BusMate	CS
TRL1	Colourful Events	Others
TRL1	Counselling Service	Healthcare
TRL1	Cube Chocolate factory	Agro
TRL3	Culture Pickle	Agro
TRL1	Emergency Detection using AI	AI
TRL1	Faculty Vacancy Portal	CS
TRL1	Furnace Oil	Industrial Engineering
TRL1	Health is Wealth	Healthcare
TRL2	Inipaggam	Agro

TRL1	IoT Device for Heart Patient	IOT
TRL4	Lip Scrub & Lip Balm	Agro
TRL1	Nutri World - Hotel	Agro
TRL1	PET bottle crushing for Roof Sheet	Environment
TRL1	Rythm Sticks - Eco-friendly Agarbatti	Environment
TRL1	Sanatorium at Palm	AI
TRL1	Scented Candle	AI
TRL1	Smart CCTV for RIOT Detection	AI
TRL2	Smart Clothing	AI
TRL1	Tree Visualisation	AI
TRL2	Tutoring Service - Be Your Own Boss	CS
TRL1	VEGGIES	Agro
TRL1	Weather Visualisation	AI
TRL3	AI based mirror health assistance	AI
TRL2	Air Borne Wind Turbine	Electrical
TRL2	Code Playground Learning by Gaming	CS
TRL4	Efficient Rainfall Irrigation System	Agro
TRL3	Energy Monitor System	IOT
TRL3	Hybrid V to L - Vertical Take Off & Landing	Aeronautics
TRL3	Intelligent Irrigation	Agro
TRL4	Portable Plantation	Agro
TRL3	Push Up Counter Machine	AI
TRL5	Robotic Bird to Save Crops	Aeronautics
TRL2	Smart Assistance System for Drowsiness Driver	AI
TRL4	Smart Automated Universal Vending Machine	IOT
TRL2	Smart Bio Waste Collector	IOT
TRL5	Smart Buffer Stock Solution	Agro
TRL2	Detecting Covid-19 (using face recognition) suspects in crowd	AI
TRL3	Development of Fortified Sauce using Moringa and Food Agar Grade E406 as Emulsifier.	Agro
TRL1	Maintaining and updating the records for SHG	CS
TRL3	NANOCELLULOSE BIODEGRADABLE FILM FOR PACKAGING APPLICATION	Nano Technologies
TRL1	Optical Character Recognition (OCR) on handwritten text in Hindi language.	CS
TRL2	SOFTWARE FOR VOCATIONAL TRAINING FOR PERSONS WITH VISUAL IMPAIRMENT	CS
TRL2	Virtual reality based solution for training medical students	AI

The number of technologies mined were close to 100+ during the period July 0 Dec 2022. The number of ideas / innovations which are in TRL level 4 and above are few. Others are in various stages of development. Suggestions and ideas were shared with the innovators for modifying their ideas, according to the needs of the market. Ideas on market driven innovation and how to inculcate the ideas that would benefit the society at large are shared with the innovators.

Technology Commercialisation

Tie-up with Medimove LLP for Product Commercialisation

Amrita TEC signed an MOU with Medimove LLP, a wheelchairs manufacturing company based out of Faridabad, Haryana for technology transfer and commercialisation of Humanitarian Technology (HuT) labs products of Amrita Vishwa Vidyapeetham.

Some of the products the company is interested in are - Hooded Wheelchair and MUDRA- Foldable Wheelchair. Amrita team is finalising the term sheet for technology transfer of these products.
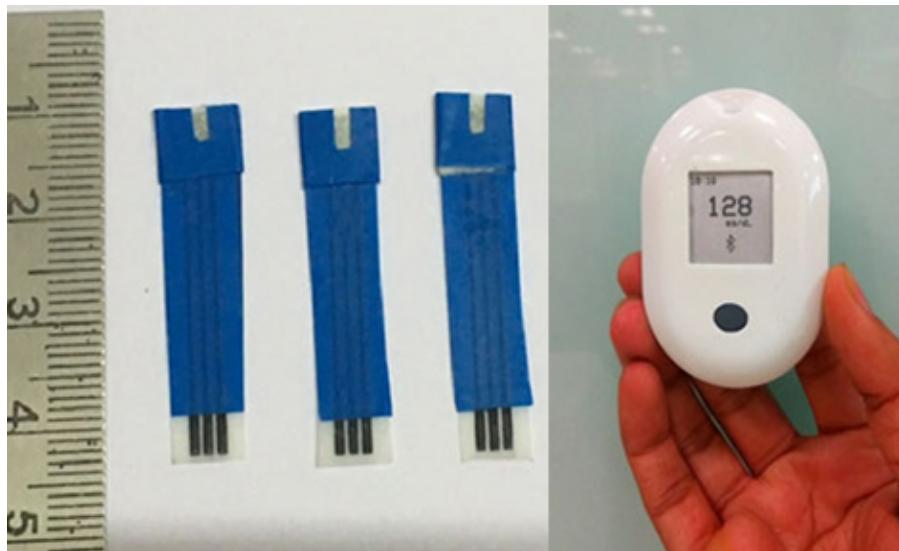
Company's motive is to make these wheel chairs indigenously in India, since such products are currently being imported at a high cost, which is not affordable to many. Medimove would like manufacture the quality products at a lower cost and make it available to the Indian market.
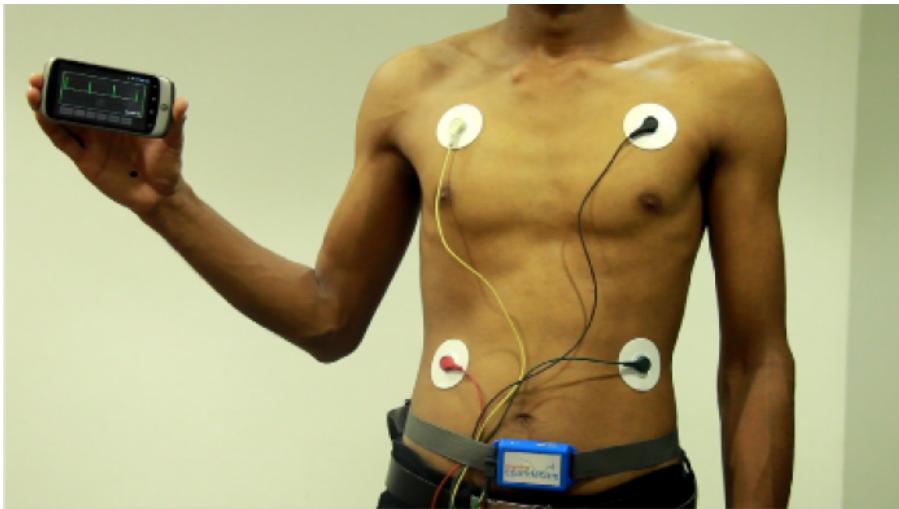
MOU also covers a joint R&D on innovative wheel chair products. And the company is also interested in developing the "Step Compatible" wheel chairs with Amrita R&D team.

Collaboration with GenWorks for Medical Equipment Commercialisation

GenWorks Health Pvt. Ltd., a medical equipment manufacturer, based in Bengaluru signed MOU to commercialise the products developed at Amrita Vishwa Vidyapeetham. Some of the products ready for commercialisation are 5 in 1, Lab on a Chip and Glucometer.

Glucometer - Diabetes mellitus is a public health problem affecting millions of people worldwide. Commercially available glucose sensors are enzyme based and has serious drawbacks like insufficient long-term stability, which originates from the intrinsic nature of the enzymes. This nonenzymatic glucose sensor strip overcomes the drawbacks of the commercially available counterparts by replacing the enzyme with metal oxalate nanoparticles. The product has successfully passed pre-compliance testing and is currently undergoing clinical trials.

5 -in- 1 device - A low-cost, low-power wearable ECG-monitoring monitoring framework that utilizes wireless body sensors, mobile phones and web browsers for monitoring cardiac patients who are in remote areas.

The ECG data is sent over wireless networks, in real-time, to the patient's cardiologist/doctor, with alerts if a patient requires examination. The device can be worn either as a necklace or as a belt and continuously monitors and analyses a patient's ECG.

A low-cost patient monitoring system indented for hospitals, clinics, primary and community health centres, private practitioners in rural areas, and disaster areas and can even be used by the patient as a wearable device.

A **Lab-on-a-Chip device** for the detection of cholesterol, creatinine, and glucose was successfully fabricated and tested. A three-stage fabrication process was developed for bonding the electrodes with the PDMS microfluidic channels. Sensors for cholesterol, glucose, and creatinine were integrated with microfluidic channels. Molecules such as ascorbic acid, urea, uric acid, and dopamine had negligible interference on detection of cholesterol, creatinine, and glucose. The sensors were also found to be free from cross interference. Physiological glucose, creatinine, and cholesterol concentrations were successfully measured in the LOC device. The LOC was integrated with the indigenously developed electronic meter and the integrated POCT device was tested successfully. The results obtained were successfully transferred to a smartphone using Bluetooth.

A Non-Disclosure Agreement & Pre-term sheet signed with GenWorks and discussions are on set up the marketing structure for commercialising the products.
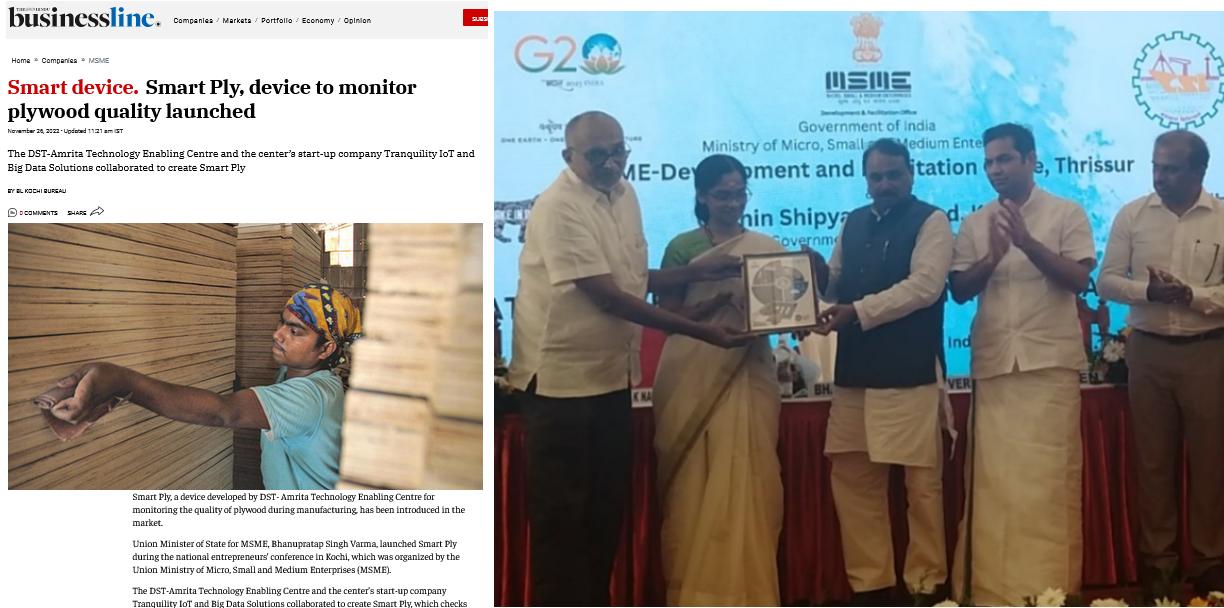
The MOU covers joint collaborations on new product combinations and innovation pertaining to the chosen medical products and exploring new markets to promote the products.

Technology Development

Smart Ply, device to monitor plywood quality launched

The DST-Amrita Technology Enabling Centre and the centre's start-up company Tranquility IoT and Big Data Solutions collaborated to create Smart Ply.

Smart Ply, a device developed by DST- Amrita Technology Enabling Centre for monitoring the quality of plywood during manufacturing, has been introduced in the market. Union Minister of State for MSME, Shri Bhanupratap Singh Varma, launched Smart Ply during the national entrepreneurs' conference in Kochi, in the presence of Dr. Krishnashree Achuthan, Head of Technology Enabling Centre (TEC), Amrita Vishwa Vidyapeetham, which was organized by the Union Ministry of Micro, Small and Medium Enterprises (MSME).

The DST-Amrita Technology Enabling Centre and the centre's start-up company Tranquillity IoT and Big Data Solutions collaborated to create Smart Ply, which checks the plywood quality during each manufacturing stage. The device was introduced to the market after successfully completing trials and tests at plywood manufacturing facilities. Various parameters that are critical to manufacturing are monitored and also linked to the mobile phone for remote monitoring. The system is capable of determining variations in plywood sheets and providing warnings. The system will bring down the manufacturer's production-related losses. Dr. Shiju Satyadevan, Ms. V. Akhila, Mr. Deepu Sasidharan, Mr. Abhilash Radhakrishnan, and Mr. Bimal Satish from DST-Amrita Technology Enabling Centre and the start-up ventures Tranquility IoT and Big Data Solutions led the team that developed Smart Ply.

Technology Transfer

Brake pad Assembly for Wind Turbines

India is the 4th largest wind power market with cumulative wind installed capacity of 2 GW, growing at CAGR of 5.5% between 2017 and 2021. Net electricity generated in Indian though wind energy reached 72,832.2 GWh in 2021 and growing at 21.1% YoY.

Brake pads for the wind turbines is one of the highly used consumables and requirement is ever increasing due high wear and tear. Currently it is being imported at high cost. Industry is looking for an alternative to increase the life of the brake pads and reduce the cost. Faculty and students at Amrita Vishwa Vidyapeetham Coimbatore campus had developed a technology and prototype which meets the requirements of the industry. An industry in this field shown keen interest in our product and exploring possibilities of using this technology to produce the brake pads.

The Amrita TEC team are in discussion with Nutech Industries Pvt. Ltd., who are in the business of alternative energy technologies, based in Chennai for possible technology transfer. The industry team comprising of MD, GM and Management Representative visited Amrita Vishwa Vidyapeetham Coimbatore campus for detailed discussions on the product.

The industry team had a detailed discussion with the mechanical engineering departmental faculty team and visited the labs to understand the setup and process. The team is satisfied with the technology showcased by the Amrita team and has asked Amrita team to develop the product for field trials. Amrita team is in the process of developing the product as per the specification shared by the industry team. The product development and field trials will be funded by the industry. Amrita TEC is signing an NDA with the industry team for technology transfer.

Collaboration with Pavizham Rice Mills for Product Development

Amrita TEC collaborated with Pavizham Rice Mills for industry collaboration as an Industry partner to conduct research to develop products based out of biomass fly ash from the rice mills in cement-based products. The research idea is submitted to DST for approval and Pavizham Rice Mills has also agreed to fund the research & development of the same, once they receive approval from the DST.   A consent letter was signed by Pavizham Rice Mills owner, Mr. M D Anthony, with Armita TEC for initial funding a sum of rupees 1 lakh for research & development work.

Pavilazham Rice Mills is also a prospective partner to deploy sensors to monitor the humidity of steam (quality of steam) & temperature of boilers and vessels.   Sensors developed by Amrita TEC are used towards these functions.

Tie-Up with Holmarc for developing Universal Measuring Machine (UMM)

Universal Measuring Machine (UMM) was designed and developed at department of mechanical engineering Amrita Vishwa Vidyapeetham, Amritapuri campus, Kollam, Kerala. This device is used to measure the roundness /

cylindricity of precision components, which are used in aerospace, automobiles and manufacturing equipment. Measuring instruments allow sub-micron analysis of precision components in fully or semi-automated CNC operation. Whether for the inspection room, Calibration laboratory or shopfloor this precision instrument provides the versatility and accuracy required for modern manufacturing.

Amrita TEC has signed an MOU with Holmarc for technology transfer and commercialisation of this product. Mr. Jolly Ciriac, MD and Mr. Abdul Rasheed A K, Group Head – Electronics R&D, from Holmarc met with Amrita team comprising of Dr. Ganesh Sundaram, Associate Professor-Sciences, Dr. Ganesh Udupa, Professor of Mechanical Engineering, Amrita Vishwa Vidyapeetham, Amritapuri campus, Kerala and Mr. Surendran K.N. from Amrita TEC to assess the progress of the UMM project.

Discussion with Suvrat Pvt. Ltd

Suvrat Pvt. Ltd, Alappuzha, an intelligent energy managemnt system, which identifies electricity wasteage and reduces cost for the users by alsmost 30%. The company has shown interest in colloborating with Amrita TEC and the discussion are underway to sign an MOU. Mr. Surendran from Amrita TEC team is in touch with the industry take it ahead.

Whitepaper

Whitepaper Supply Chain Analytics for MSME Clusters

"Today's leading real-world retailer, Walmart, uses software to power its logistics and distribution capabilities, which it has used to crush its competition."

Mark Andreesen, Co-founder of Netscape

Rapid technology advances and dynamic market forces have altered the business landscape as also fundamentally altered existing business models. Information and Communication Technology (ICT) usage and deployment have opened the doors for all enterprises and especially Micro, Small, and Medium Enterprises (MSME), to compete in any marketplace. Today's challenging and dynamic business environment is popularly referred to as VUCA, short for Volatility, Uncertainty, Complexity, and Ambiguity. Information Superhighway has further muddled the

competitive waters by providing round-the-clock access and dissemination of information. The following examples illustrate the power of ICT, the Internet, and the worldwide web:

- The largest media company in the world is Facebook, but interestingly Facebook does not create any content. This content is created by its 2.94 billion monthly active users in 112 languages. Facebook is the 3rd most website on the Internet.
- The largest car company in the world is Uber, but interestingly Uber does not own any of the taxi cabs that use its ride-hailing app to provide mobility as a service for the gig economy. 122 million people use Uber every month in 72 countries and 10,000+ cities. It is estimated that 3+ million cars are available for hire using the app, with 21 million per day as per company disclosures.
- The largest retailer in the world is the e-commerce giant Alibaba, but interestingly, Alibaba does not own or run any swanky stores in malls or shopping complexes. Alibaba is a pure online-play retailer in a crowded virtual marketplace with a turnover of US$ 134.5 billion in 2022, as per the company's financial statements. Alibaba hosts the most prominent B2B, C2C, and B2C marketplaces in the world. On 11th November 2021, singles day per the Chinese calendar, Alibaba and JD combined had a whopping single-day sales of US$ 139 billion.

The deployment of cutting-edge technologies such as big data analytics, the Internet of Things (IoT), cloud computing & virtualization, mobile apps, and the like are revolutionizing automation in enterprises. ICT adoption and deployment across various processes and links in the supply chain has become a determinant of competitive advantage for enterprises. Interestingly, many of the buzzwords in Supply Chain Management (SCM), such as Vendor Managed Inventory (VMI), Point of Sale (POS), Collaborative Planning, Forecasting and Replenishment, and Enterprise Resource Planning (ERP), stem from ICT usage. The Covid-19 pandemic has also accelerated the digital transformation of enterprises and their supply chains. The pandemic has disrupted not only global supply chains but also exposed various vulnerabilities and dependencies. No doubt, digital is here to stay....

Business Analytics

A paradigm shift in enterprise computing is the emergence of business analytics for improving their bottom line as well as maintaining their competitive edge over their rivals. Business analytics aims at building fresh perspectives and new insights into business performance using data, statistical methods, quantitative analysis, and predictive modeling. Business analytics coupled with disruptive and game-changing technologies like social media like Facebook, Twitter, and LinkedIn; cloud computing & associated technologies like virtualization and mobile & android technology in the form of the SMAC - Social, Mobile, Analytics, and Cloud stack holds tremendous promise to be the next inflection point in enterprise computing. Some common usages are retailers using business analytics to predict consumer buying patterns, governments providing a better delivery of services to citizens, and banks categorizing their customers based on their credit history.

Business analytics is primarily classified into the following three types namely:

- Descriptive Analytics gets insights and patterns from historical and raw data by using techniques like reporting and scorecards
- Predictive analytics gets insights from historical data using techniques like statistics, modeling, machine learning, and data mining.
- Prescriptive analytics is a kind of predictive analytics involving building predictive models using techniques like optimization and simulation.

The business analytics industry's annual spending was worth US $ 231 billion in 2021. The amount of corporate data was in the order of 97 zeta bytes in 2022 and is expected to breach 120 zeta bytes in 2023. This explosion of information is dubbed Big Data. Analytics of this big data can point towards actionable intelligence to help enterprises to adapt their strategy. Various sources of big data which provide inputs for analytics include internet data, primary research, secondary research, location data, image data, supply chain data, and device data. Netflix, the global video distribution company, has over 222 million subscribers, who watch tens of billions of hours of programs every quarter. Netflix, through its Cinematch engine, uses business analytics and trends of consumer preferences to recommend movies. Another example of analytics usage from a common man's perspective is Apple iTunes, which analyses user experiences to facilitate quicker, downloads of popular music.

MSME Sector in India

Micro, Small, and Medium Enterprises (MSME) sector has emerged as a vibrant sector of the Indian economy over the last five decades. MSMEs contribute more than 29% to the GDP and are responsible for 50% of the country's total exports. They are also accountable for one-third of India's manufacturing output. Interestingly, in the EU, 99% of all businesses fall under this category, and globally it is 90%, per the International Finance Corporation. MSMEs not only play a crucial role in providing enormous employment opportunities at comparatively lower capital costs than big industries but also help in the industrialization of rural & backward areas, thereby reducing regional imbalances and assuring a more equitable distribution of national income and wealth.

MSMEs are complementary to big industries as ancillary units, and this sector contributes enormously to the socio-economic development of the country. Khadi, village industries, and coir have historically been the early MSME clusters. The coir industry originated in Kerala and spread to other coconut-producing states like Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Maharashtra, Assam, Tripura, etc. Likewise, the MSME segment includes various verticals and sectors, including services, and the recent governmental classification scheme for MSME has also widened the net as also provided more considerable benefits accrued to the MSME. As per the MSME ministry's annual report of 2021-2022, there were 65 lakhs+ MSMEs registered in the Udyam portal at the beginning of 2021, but the actual number is in the order of 10 times that number in sectors including manufacturing, services, and trades. 99% are micro, with 0.52% small and 0.1% medium. The number of jobs in the MSME sector is estimated to be 15+ crores. Considering the sector's importance, the Government of India has created a separate ministry for MSME under a senior cabinet minister. Over a period of time, through MSME-friendly policies and initiatives, it is envisaged that MSME will contribute 50% of the GDP and 75% of the exports of India.

Supply Chain Analytics

ERP systems and SCM packages have a limited amount of analytical capabilities primarily aimed at transactional data generated. Supply chain data can be analyzed for inventory management as well as demand forecasting and prediction. This could be in the form of reports, queries, and forecasts. These forecasts may not be very accurate considering the complex nature of business and unpredictable external factors like weather patterns, price, and economic volatility. This calls for Supply Chain Analytics (SCA) which promises several benefits like improved decision-making, customer engagement, adaptability, and cost reduction due to better inventory visibility and accurate demand forecasts. Supply chain analytics allows companies to deconstruct new forms of data as also analyze the data to give actionable intelligence. Analytics will provide us with the ability to extract, cleanse and integrate data from multiple data sources. Supply chain analytics render supply chains with advanced capabilities like dashboards, pattern & trend analysis, drill-down views, forecasts, knowledge base, scenario & what-if analysis, simulation, and optimization capabilities. These significantly improve decision-making and interpretation of situations, which is crucial for enterprises. Timely information through analytics significantly impacts raw material sourcing, manufacturing, goods delivery, and return.

Business analytics has the potential to impact wide-ranging improvements in SCM both at the strategic and operational levels, thereby improving operational efficiency and creating customer value. However, some challenges faced include the high cost of such solutions. This is all the more significant when considering enterprises that have made substantial investments in ERP or SCM packages and solutions. The aggregation of

data from multiple sources is another challenge. For example, production data from the factory shop floor is difficult to gather and collate as most of these systems use proprietary applications and systems with multiple data formats. Almost 85% of big data is unstructured and needs to be translated into an understandable format. Supply chain analytics can be just data analytics in general or big data analytics depending on the availability of data in different companies. Several companies like SAS, Genpact, and Capgemini are offering Supply Chain Management analytics solutions to companies across all verticals. IBM uses its own Buy Analysis Tool (iBAT) channel collaboration solution for large partners across North America and Europe. This primarily focuses on inventory management for optimized replenishment decisions under price protection. The company estimates considerable business savings due to the tool. The ERP world leader, SAP, has its in-house BusinessObjects analytics solution. This platform has in-built scenario analysis, risk management, alerts, and monitoring features for factors like order fulfillment, payments, shipment tracking, etc.

Supply Chain Analytics for MSME clusters

- Indian MSMEs are steadily moving towards technology adoption and usage. MSME's software deployment is primarily restricted to stand-alone packages for finance, HR manufacturing, or payroll. Video-conferencing and messenger services are also being widely used. There has been a visible digital shift in channels for communication, marketing, payments, hiring, and other business verticals.

- A recent MSME digital readiness survey of 250 Indian MSMEs by PayPal highlights that 29 percent of these firms witnessed an increase in online customers and 32 percent experienced better payment solutions. The survey highlights that 98 percent of surveyed MSMEs were keen on investing further in digital payment solutions.

- However, there is a significant digital divide between big industry and MSME. Most of the MSMEs fall into the group of low digitalization and low data-driven companies. This is a trend not only in India but even in developed economies. Competitive pressures amongst MSMEs are also not so evident regarding ICT adoption.

- This white paper outlines the wide-ranging benefits of supply chain analytics for MSMEs and their clusters. It also provides recommendations for MSMEs to adopt this advanced digital technology and outlines the barriers to its adoption.

- Adopting cutting-edge digital technologies, such as Supply Chain Analytics (SCA), provides immense benefits to MSMEs and gives them opportunities to transform their supply chains into value chains. A cluster-based approach towards procurement of digital technologies can benefit them if the procurement of the technologies is done as an MSME cluster. This could transform the modest adoption rate, which is the status quo.

- SCA is available in the application areas such as inventory management, procurement planning, demand shaping, demand forecasting, distribution planning & management, production planning, Customer Relationship Management (CRM), and fleet and route sizing and optimization. Of course, large enterprises can leverage all of these capabilities, but most of these apply to MSMEs in varying measures as well.

- SCA helps MSMEs to capture and analyze internal and external data, which has become an enormous asset. SCA provides access to historical data, which can be used to generate insights. simulate and forecast future scenarios. The ability to capture, collate, analyze and infer the external data concerning competition, dynamic market conditions, market demand, and customer preferences helps the MSME to pivot their plans on distribution channels and strategies. It prepares the ground for them to exploit Omni-channel distribution avenues, which has now become the industry norm.

- SCA provides MSMEs better visibility, transparency, and integration into their distribution network that includes distribution channels, inventory, logistics, invoicing, and payment, as also ensure efficient delivery of products to their customers. The ability to track the physical logistical movement of goods puts the MSME on a stronger wicket to satisfy customers' expectations.

- SCA helps MSMEs to understand the internal performance of their companies as well as the external market in terms of chronicling all interactions, transactions, and dialogue with all the stakeholders like suppliers, subcontractors, partners, branches, and customers.

- Decision-making for the MSME migrates from intuition to data points, e.g., demand planning; analytics will transform those SMEs into a data-driven culture. This has a force-multiplier effect in terms of greater agility which translates to improved firm performance.

- SCA helps MSMEs to effectively address problems related to demand planning, inventory management, and logistics that cause a lot of cost for the companies. SCA adoption results in cost-cutting in the long run and reduces the TCO. The benefits of supply chain analytics adoption unlock value and outweigh the cost of the adoption.

- SCA helps in ascertaining and tackling the pain points and analyzing key performance indicators such as production quantity, plant downtime, operating costs, and return on assets in the manufacturing and production process to enable the enterprise to address these and meet business goals.

- Predictive SCA can be used to perform preventive maintenance of the equipment in the MSME. Predictive analytics can be used to forecast the possible failure of the machine components and take corrective actions.

- SCA helps in the functions of sales and marketing, which complement the manufacturing and services where they are engaged in. Analytics can be used in various stages of marketing customer segmentation to do demographic-based targeting, analyzing customer behavior and designing new products, market mix modeling to analyze the effectiveness of their advertising, and customer feedback analysis to improve their existing products and services.

- In 2020, India emerged as the fifth-largest automotive market, with around 3.5 million units combined sold in the passenger and commercial vehicles categories. A significant number of MSME units in the auto ancillary sector who are supporting large manufacturers such as Tata Motors, Mahindra and Mahindra, Hyundai & Ford are very technology-savvy, and some of them have also adopted SCA. Some of these MSMEs are tier-1 suppliers in the Rupees 200 to 300 crore turnover range, while others are in the tier-2 mid-size suppliers with a turnover of Rupees 100 to 200 crores.

- India has now emerged as the 3rd largest ecosystem and destination for startups, with the number of unicorns breaching the 100 mark. It is heartening to note that several startups are now offering solutions for MSMEs. Pickrr provides end-to-end logistics solutions using SCA. Pickrr is a virtual shipping partner for the full shipping needs of MSME. Another B2B platform using SCA, Magma, supports capacity utilization and operations for the MSME.

Challenges in Adoption of Supply Chain Analytics for MSMEs

- Challenges in adopting SCA for MSME primarily fall into 2 buckets, namely organizational and technical challenges. Organizational challenges include human resources, financial resources, and management resources.
- There is a need for domain experts in the supply chain to work collaboratively with the ICT experts.
- There is also a need for re-training and adapting to changes in the workforce.
- Management support is needed in articulating a vision and executing the adoption of SCA in terms of policies, strategies, and initiatives.
- Technical issues point out the existence of legacy systems in the MSME and integrating these with SCA, as also infrastructure requirements and compatibility issues.
- Most MSMEs do not have a comprehensive ICT policy or wide deployment of enterprise-wide software like ERP.
- A minuscule percentage of these MSMEs harness cutting-edge digital technologies such as business analytics, block chain, robotics, 5G, IoT, sensors, AI, AR/VR, 3D printing, etc. Generally, MSMEs need to be faster towards technology adoption.
- Added to this, credit facilities for working capital are also a challenge. The scarcity of funds is undoubtedly the biggest challenge for MSMEs to adopt digital technologies.
- There is also a need for more awareness of these advanced ICT-based solutions and/or technologies and their wide-ranging benefits.
- Hiring trained manpower such as data analysts, data engineers, and data scientists is also a significant challenge, as the numbers available in the market are not very high. And these job roles are in high demand.

Recommendations for Adoption of Supply Chain Analytics for MSMEs

- In terms of procurement of advanced ICT technologies, a cluster-based approach can reduce the Total Cost of Ownership (TCO) for the MSMEs. An added advantage is that most of the MSME clusters are well-organized. To cite an example, CODISSIA, Coimbatore District Small Industries Association, boasts more than 2000 members in 43 sectors. A world-class trade Fair Complex as an industrial and exhibition venue and incubation center for defense are some of the achievements of this cluster. Likewise, there are many similar success stories Pan-India. Another cluster representing the pump, foundry, and motor sectors in the Coimbatore region is the Southern India Engineering Manufacturers' Association (SIEMA) has 300 members.

- SCA packages can be sold as a cloud-based solution to the MSME. This would reduce the TCO as the MSME need not procure expensive servers, hardware, and/or infrastructure to host the software package. Exploring open-source supply chain packages such as OpenBoxes and Odoo for analytics capabilities may be a good option.

- SCA packages, either as part of comprehensive supply chain solutions or ERP packages, can have modules that would permit MSMEs to choose specific capabilities as per their need. And this can be scalable, providing the opportunity for the MSME to top up step by step and migrate rather than change their existing legacy systems in one go. This flexibility and choice would be indeed a boon.

- Considering the rapid growth of digital technologies, regular upskilling and training programs for employees in MSMEs are absolutely necessary. Their domain knowledge, coupled with their expertise in analytics and the link, would be an excellent combination.

- Awareness needs to build from top to bottom of the organizations such that not only the top management but employees at all levels also champion the adoption of SCA. This awareness would also propel top management to make the necessary investments toward procurement of SCA and other digital technologies. Data management and associated policies must also be formulated and communicated to all stakeholders.

No doubt, there is a considerable benefit to adopting SCA for MSMEs. To tackle the barriers and follow the recommendations, efforts are underway to develop a framework on the factors that affect the adoption of supply chain analytics in MSMEs and measure their contribution and impact in organizational performance of MSMEs.

Whitepaper on Industry 4.0 for MSME Clusters

"Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000."
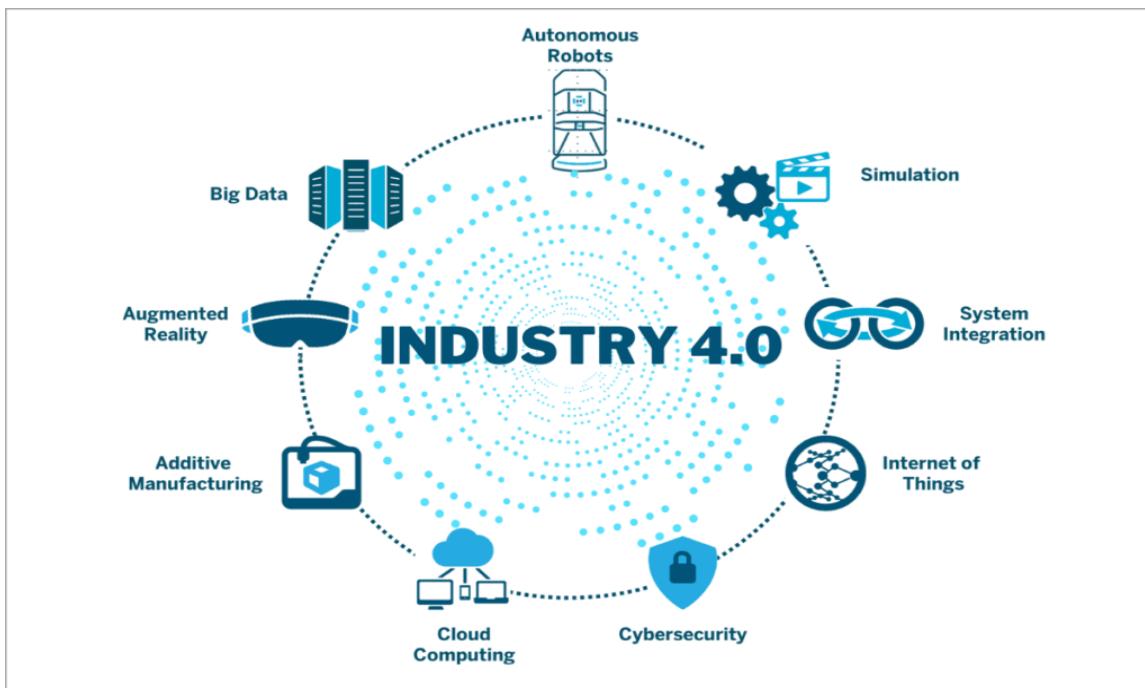
Pierre Nanterme, CEO, Accenture

Introduction

Rapid technology advances and dynamic market forces have altered the business landscape as also fundamentally changed existing business models. Information and Communication Technology (ICT) usage and deployment has opened the doors for all enterprises and especially Micro, Small, and Medium Enterprises (MSME), to compete in any marketplace. Information Superhighway has further muddled the competitive waters by providing round-the-clock access and dissemination of information. The following examples illustrate the power of ICT and WWW.

- The most prominent media company in the world is Facebook, but interestingly Facebook does not create any content. This content is created by its 2.94 billion monthly active users in 112 languages. Facebook is the 3rd most popular website on the Internet.
- The largest car company in the world is Uber. Still, interestingly Uber does not own any of the taxi cabs that use its ride-hailing app to provide mobility as a service for the gig economy. 122 million people use Uber on a monthly basis in 72 countries and 10,000+ cities.
- The largest retailer in the world is the e-commerce giant Alibaba, but interestingly, Alibaba does not own or run any swanky stores in malls or shopping complexes. Alibaba is a pure online-play retailer in a crowded virtual marketplace with a turnover of US$ 134.5 billion in 2022, as per the company's financial statements. On 11th November 2021, singles day as per the Chinese calendar, Alibaba and JD together had a whopping single-day sales of US$ 139 billion
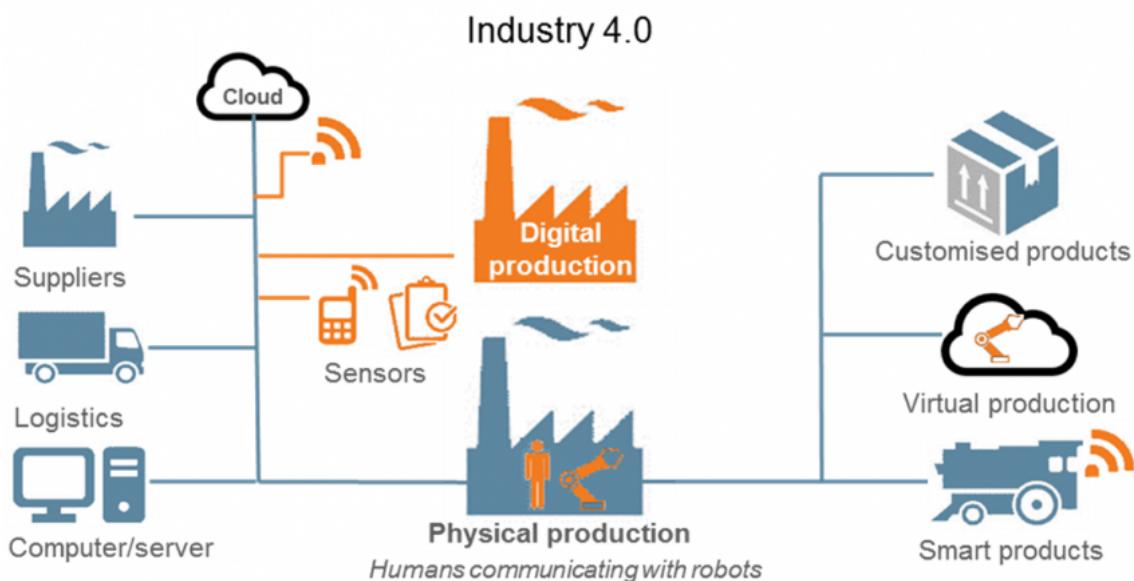
Industry 4.0

One of the recent buzzwords widely spoken about is Industry 4.0, also popularly referred to as the fourth industrial revolution. The first three waves of the industrial revolution were headlined by the steam engine, assembly line & mass production, and automation facilitated through computers, respectively.
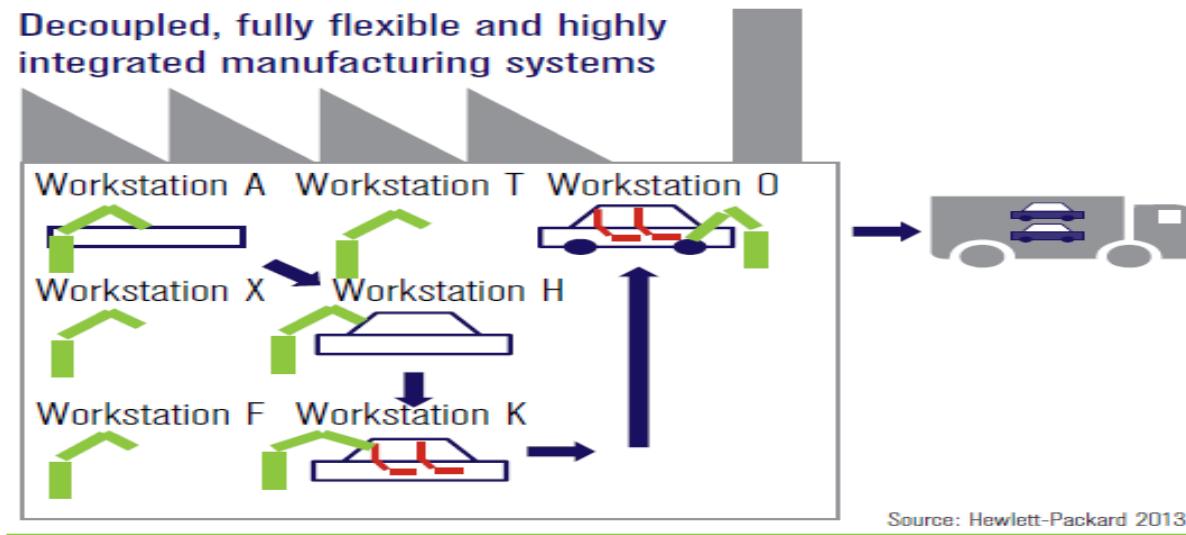
Industry 4.0 is the latest disruptive trend of automation headlined by Cyber-Physical Systems (CPS). It includes cutting-edge ICT tools and technologies such as autonomous robotics, business analytics, Industrial Internet of Things (IIoT), simulation, cloud computing, cyber security, additive manufacturing, horizontal & vertical system

integration, and Augmented Reality (AR). Industry 4.0 has realized the manufacturer's dream of a "smart factory." Within these modular structured smart factories, cyber-physical systems monitor physical processes, create a virtual copy of the physical world, and make decentralized decisions. Interestingly these systems are fueled not by gasoline or oil or electricity but by 'data' and the capabilities to leverage and mine this data using machine learning and artificial intelligence. Manufacturing and production become adaptive, agile, autonomous, automated, collaborative, coordinated, connected, decentralized, fast, flexible, and intelligent resulting in greater operational efficiencies and lesser costs for enterprises.

Over the Internet of Things (IoT), i.e., connectivity of physical assets, CPS communicates and cooperates with each other and humans in real-time both internal & cross-organizational services are offered & utilized by participants of the value chain. CPS consists of collaborating computational elements controlling physical objects, whose processes are seamlessly monitored, coordinated, controlled, and integrated. The resultant value chain becomes more agile, collaborative, visible, and responsive. An example would be a connected and retooled supply chain, which can reconfigure itself on receipt of any new data point. If a weather delay ties up a shipment, an interconnected system can proactively adjust and modify manufacturing priorities bringing about perfect alignment between supply chain planning and execution.

To put it simply, processes and devices become inseparable in Industry 4.0. The origins of these technologies for manufacturing, collectively being referred to as Industry 4.0, stems from the famed German engineering. The German government, as also leading industrial powerhouses like Robert Bosch and Siemens, unveiled the basic concepts and recommendations in the Hannover fair to be adopted by industry worldwide.

Smart Factory

German manufacturing powerhouse Siemens is implementing an Industry 4.0 solution in medical engineering. For years, artificial knee and hip joints were standardized products, with engineers needing several days to customize them for patients. New software and steering solutions enable Siemens to produce an implant within 3 to 4 hours. Predix, the Operating System (OS) for the Industrial Internet, is powering digital enterprise businesses that drive the global economy. By connecting manufacturing equipment, analyzing data, and delivering real-time insights, Predix-based apps are unleashing new levels of performance for General Electric (GE).

Industry 4.0 Building Blocks

o Autonomous Robotics: Advanced and autonomous industrial robots are designed to collaborate with humans in real time. They have embedded electronic software, integrated sensors, actuators, and standardized interfaces that enable them to wirelessly connect with the internet and interact in real time with other equipment and humans. The cost of these robots will progressively decrease as also these robots will develop better capabilities and competencies.

o Business Analytics: Business analytics aims at building fresh perspectives and new insights into business performance using data, statistical methods, quantitative analysis, and predictive modeling. At a lower level, there is business intelligence which is the standard measure for comparing past performance for future improvement based on enterprise data and statistical analysis. Some common usages are retailers using business analytics to predict consumer behavior and buying patterns, understanding citizen needs for government to provide better delivery of services, and banks & financial institutions detecting and preventing fraudulent transactions or categorizing their customers based on their credit history. Business

analytics will have become an industry worth US $ 200+ billion by 2022. Corporate data generated and managed by enterprises amounts to billions of gigabytes of data, and this data is primarily unstructured and raw. The explosion of information is now dubbed Big Data, and its analytics can point toward actionable intelligence to help enterprises tweak their strategy.

o   Industrial Internet of Things (IIoT): Industrial IoT establishes interconnections across all industrial devices, equipment objects, and humans using Internet technologies. Industrial IoT enables networking and collaboration, and communication between all internal and external stakeholders in the manufacturing environment which includes factory machinery, production shop floor, assembly line and their operators such as workers, shop floor supervisors, and managers, as well as the suppliers and customers. Real-time communication and interaction between all connected stakeholders result in fast, adaptive, real-time decision-making and responses.

o   Simulation: Simulation methodologies are modeling tools used to predict and evaluate the potential of complex systems and give unique empowerment and autonomy to workers, equipment, and processes. Simulations create digital twins of physical processes like manufacturing or inventory. The real-time access to the data, as also its interactions with workers, equipment, and processes give, facilitates better decision-making, operational efficiency, and speed.

o   Cloud Computing & Virtualization: Cloud computing and associated technologies like virtualization, Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) are touted as the next 'big' thing and a game changer for enterprises. The global cloud computing industry has grown from US $40.7 billion in 2010 to more than US$ 241 billion in 2021. Cloud reduces the Total Cost of Ownership for enterprises. Cloud computing is a form of utility computing where hardware, software, storage, and platform are made available as per need and on a subscription basis. In this service model, clients can access the cloud-based application through an Internet browser. The data can be resident in a remote place also. Complementing the cloud is the usage of server farms and data centers where all applications and data can be stored, shared, and accessed on demand using virtualization. Cloud is a 'green' technology as it eliminates the need for enterprises to procure and maintain large servers and associated space and infrastructure.

o   Cyber Security: 'Data' being the new 'Oil' means its security becomes paramount. Ensuring secure operations within connected networks and open systems is a challenging requirement of connected enterprises and their supply chain processes. Industrial systems and manufacturing processes have to be protected from cyber security threats. This entails secure and reliable communication as also secure access controls and identity management for both machines and human users.

o   3D Printing: This is a form of additive manufacturing that can be used for rapid prototyping and producing individual components. The focus is to produce customized modules that are easy to use and also minimize transportation and inventory.

- o Horizontal & Vertical system integration: Horizontal Integration is a modular system that connects the information across the entire value chain. Vertical Integration pulls together information from across all verticals and levels of the organization and seamlessly exchanges this across all levels. As a result, management functions such as production, HR, and finance, as well as departments, branches, and capabilities, are interconnected and cohesive and interrelated with stakeholders such as suppliers, partners, and customers.
- o Augmented Reality (AR) / Virtual Reality (VR). These technologies provide an interactive representation of the real-world environment. This is enlarged and improved by computer-generated interpretation of required information to aid decision-making. AR is now possible across sensory perceptions, including auditory, visual, touch, smell, heat/cold, and pressure. Potential applications include customer co-creation, remote maintenance, predictive maintenance, virtually guided self-service, and remote monitoring and control.

MSME Sector in India

The Micro, Small, and Medium Enterprises (MSME) sector has emerged as a vibrant sector of the Indian economy over the last five decades. MSMEs contribute more than 29% to the GDP and are responsible for 50% of the country's total exports. They are also accountable for one-third of India's manufacturing output. Interestingly, in the EU, 99% of all businesses fall under this category. Globally it is 90% as per the International Finance Corporation MSMEs not only play a crucial role in providing large employment opportunities at comparatively

lower capital cost than big industries but also help in the industrialization of rural & backward areas, thereby reducing regional imbalances, assuring more equitable distribution of national income and wealth.

MSMEs are complementary to big industries as ancillary units, and this sector contributes enormously to the socio-economic development of the country. Khadi, village industries, and coir have historically been the early MSME clusters. The coir industry originated in Kerala and spread to other coconut-producing states like Tamil Nadu, Karnataka, Andhra Pradesh, Orissa, West Bengal, Maharashtra, Assam, Tripura, etc. Likewise, the MSME segment includes various verticals and sectors, including services, and the recent governmental classification scheme for MSME has also widened the net as also provided more extensive benefits accrued to the MSME. As per the MSME ministry's annual report of 2021-2022, there were 65 lakhs+ MSMEs registered in the Udyam portal at the beginning of 2021, but the actual number is in the order of 10 times that number in sectors including manufacturing, services, and trades. 99% are micro, with 0.52% small and 0.1% medium. The number of jobs in the MSME sector is estimated to be 15+ crores.

Considering the sector's importance, the Government of India has a separate ministry for MSME under a senior cabinet minister. Over a period of time, through MSME-friendly policies and initiatives, it is envisaged that MSME will contribute 50% of GDP and 75% of exports. The Ministry of MSME has executed a slew of ICT initiatives for the benefit of the sector. These include web-based application modules, namely, MyMSME and other e-portals for loans, job-seekers, procurement, digital payments, marketing, and app development. The Ministry of MSME has taken numerous initiatives to enable the entire MSME ecosystem digitally. This includes subsidies for cloud and analytics platforms and the CHAMPIONS (Creation and Harmonious Application of Modern Processes for Increasing the Output and National Strength) portal, a technology-driven centralized control room, grievance management, and an information platform to support MSME. This is a one-stop solution for handholding MSMEs and uses the power of AI & ML. Future enhancements of the CHAMPIONS portal include information intelligence and sentiment analysis based on widely available social media and online data and AI-enabled Chat Bots for faster response to the query of portal users.

Indian MSMEs are steadily moving towards technology adoption and usage. The Covid-19 pandemic has accelerated this trend and the Internet economy. MSME's software deployment is primarily restricted to stand-alone packages for finance, HR manufacturing, or payroll. Video-conferencing and messenger services are also being widely used. There has been a visible digital shift in channels for communication, marketing, payments, hiring, and other business verticals. Since many MSMEs are suppliers of raw materials and other goods for large corporations, the latter are also impacted if vendors in their value chain are not entirely compliant with the latest intelligent manufacturing protocols. However, most MSMEs do not have a comprehensive ICT policy or wide deployment of enterprise-wide software like ERP and/or Industry 4.0 technologies. A minuscule percentage of these MSMEs harness cutting-edge Industry 4.0 technologies such as business analytics, blockchain, robotics, 5G, IoT, sensors, AI, AR/VR, 3D printing, etc. Generally, MSMEs are slow towards technology adoption. Added to this, funding, working capital, and availability of trained manpower resources are also a challenge. There is also a lack of awareness of these advanced ICT-based solutions and/or technologies and their wide-ranging benefits. There is also a misconception that these are of a disruptive nature. MSME employees are also apprehensive with respect to the changes that are likely to occur due to the adoption of these technologies. This could be in terms of layoffs and also the need for upskilling themselves. Another pertinent issue is the absence of frameworks and steps that assist MSMEs in adopting Industry 4.0 technologies like understanding data.

Recommendations for MSME Clusters towards Adoption of Industry 4.0

- This white paper provides recommendations to MSMEs for adopting cutting-edge Industry 4.0 technologies. This is very relevant considering the fact that there is a significant digital divide between

big industry and MSME. Most of the MSMEs fall into the group of low digitalization and low data-driven companies. This is a trend not only in India but even in developed economies.

- The adoption of Industry 4.0 technologies provides immense benefits to industries and MSMEs and gives them opportunities to transform their supply chains into value chains. No doubt, at the initial stages, some of these technologies may be out of reach for individual MSMEs due to the cost and the fact that these MSMEs may also face liquidity issues. MSMEs may have to look for alternatives for short-term financing that can assist in fixing credit issues and enhancing financial performance. The scarcity of loan-granting institutions other than nationalized banks poses another challenge. However, a cluster-based approach towards procurement and adoption of Industry 4.0 technologies can prove to be beneficial to them if these procurements are done as an MSME cluster. Total Cost of Ownership (TCO) will reduce for these MSMEs

- An added advantage is that most of the MSME clusters are well-organized. To cite an example, CODISSIA, Coimbatore District Small Industries Association, boasts more than 2000 members in 43 sectors. A world-class trade Fair Complex as an industrial and exhibition venue and incubation center for defense are some of the achievements of this cluster. Likewise, there are many similar success stories Pan-India. Another cluster representing the pump, foundry, and motor sectors in the Coimbatore region is the Southern India Engineering Manufacturers' Association (SIEMA) has 300 members.

- Regarding software packages in AI and/or IoT as part of Industry 4.0, these packages can be sold as a cloud-based solution to the MSME. This would reduce the TCO as the MSME need not procure expensive servers, hardware, and/or infrastructure to host the software package.

- Exploring open-source packages and menu-based approaches is also an option. In other words, procure the required modules from the software package as per need and top up as required. However, these targeted digital improvements need to be focused and dovetailed into the strategic roadmap of the MSME.

- MSMEs can incrementally procure Industry 4.0 technologies. They can start small by starting with apps, sensors & IoT and then move up the value chain to high-end robotics, AI, and the like. This results in the optimization of resources. Pilot projects can be pursued as proof-of-concept and implemented in localized value chains.

- Considering the rapid growth of digital technologies, regular upskilling and training programs for employees in MSMEs are essential. Their domain knowledge, coupled with their expertise in analytics and the link, would be an excellent combination.

- Awareness needs to build from top to bottom of the organizations such that not only the top management but employees at all levels champion the adoption of Industry 4.0. This awareness would also propel top management to make the necessary investments toward procurement of other digital technologies. Data management and associated policies must also be formulated and communicated to all stakeholders.

- MSMEs should target external value chains first by utilizing commercially available Industry 4.0 tools in the e-commerce and logistic sectors. Batch and continuous manufacturing MSMEs will be the early beneficiaries of Industry 4.0 solutions compared to those involved in the process and discrete manufacturing. This is because they rely on an established Bill of Material (BOM) and defined work processes in the form of assembly lines, while process manufacturing relies on a process formula.

Undoubtedly, Industry 4.0-enabled MSMEs have a massive opportunity for growth and success. This is the right time for MSMEs to embrace Industry 4.0 to bring about dramatic improvements in their performance. This will go a long way in terms of streamlining their processes & support systems digitally, bringing in automation, and leveraging big data toward customer satisfaction. Using these recommendations, the next course of action would be to develop a framework on the factors that affect the adoption of Industry 4.0 in MSMEs and empirically capture their contribution towards the organizational performance of MSMEs.

CONSULTANCY

Amrita TEC team visit to the Shoranur Agri Implements Consortium (SAICO)

Amrita TEC team along with the Mechanical Engineering department faculty of Amrita Vishwa Vidyapeetham, Coimbatore campus visited SAICO to understand the issues faced by the cluster. The Amrita team comprised of Dr. R. Venkatraman, Distinguished Professor; Dr. Govindaraju M, Assistant Professor; Dr. Saimurugan N., Associate Professor and Mr. Venkatesh R., Liaison Manager, TEC.
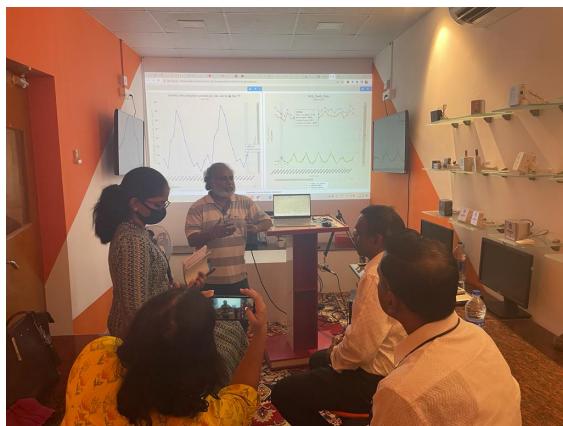
Amrita team discussed with the owners of the industries in the cluster to understand the issues and problems faced by the industry. This cluster needs a turn around and it is requires consultancy services, involving cross-functional team of researchers from Amrita.   The team has started preparing the questionnaire for collecting the initial data from the inudstry, to analyse current situtaion. The findings from the data analysis will be shared with SAICO and an optimal solution will be discussed with them. Discussions are on sign an MOU with SAICO for moving forward with this consultacny project.

BRIDGE BHARAT COUNCIL (BBC)

Amrita TEC signed NDA with Bridge Bharat Council (BBC) to undertake research activities and projects specifically to address the problem statements of the defence sector. Amrita TEC is collaborating with BBC to organize joint events like workshops, symposiums, conferences, seminars pertaining to defence sector.
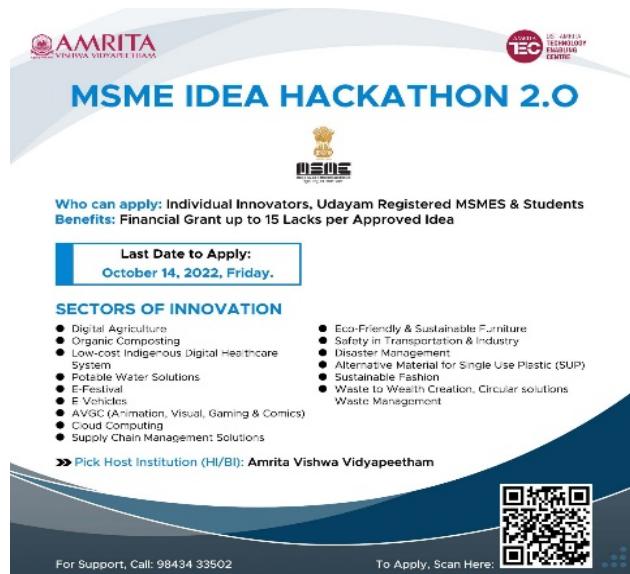
Various research and development work done at Amrita was discussed, and some ideas were selected for implementation in the defence sector. Discussion is underway with the innovators to develop the products to suit the needs of the defence services.

Industry & Government Bodies Tie-Ups for Technology Enablement Through TEC

Amrita – TEC & MSME Idea Hackathon 2.0

Amrita TEC team interacted with various industry associations in Kerala and Tamilnadu to assist the MSMEs, Individual Researchers, Faculty, and Student innovators to upload their ideas on idea hackathon 2.0, an initiative of the MSME department, Government of Indi. Each successful submission can get a grant of INR 15 Lakhs towards research and development. Amrita TEC team passed on the information about the Idea Hackathon 2.0 and the benefits of participating in the event. The team also assisted in submitting the ideas in the prescribed format by the MSME ministry..

This effort attracted more than 25+ ideas with host institution as Amrita Vishwa Vidyapeetham. Amrita Team helped the individuals clarifying their doubts and upload their ideas.

Collaboration with Coir Board, Kochi

Amrita TEC team is in talks with Coir Board, Kochi and CCRI, Aleppey for proposed collaboration with Coir Board, Govt of India. The team met with Adv. D Kuppuramu, Chairman of Coir Board and the CCRI team for taking this ahead.

This MOU is expected to cover - R&D Projects, designing the final coir outputs, designing innovative mechanical devices towards fibre knitting and Consulting for Business Services.

Foundries Expo 2022 at CODISSIA, Coimbatore

Amrita TEC team got an opportunity to set up a stall during the Foundries Expo 2022at CODISSIA exhibition complex at Coimbatore. The team was able to meet many of the foundry industry owners. Visitors were also briefed about the activities of Amrita TEC.

Mr. K. A. Joseph, General Secretary, KSSIA and Director, Safe Power visited the expo and had a detailed discussion with Operations Manager, Foundries Development Foundation (FDF), regarding setting up a foundry in Kerala. Amrita TEC team facilitated the meeting with the technology expert from FDF, to get clarity on the various specifications required to set up a foundry.

Laghu Udyog Bharathi, Keralam

Laghu Udyog Bharathi, Keralam signed an MOU with Amrita TEC to connect the affiliated LUB organizations for mutual benefits.   This MOU covers –

- Identification of technical issues and providing solutions
- Technology sharing for product development
- Assisting in developing the prototype and take it towards commercialisation
- Facilitation of joint workshops and seminars on various industry verticals and latest technology developments
- Industry – Academia symposium
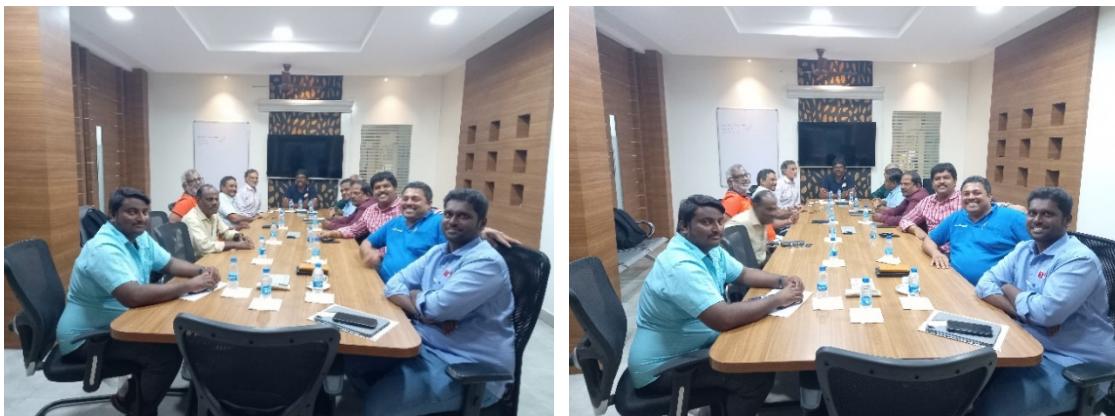
News article regarding the MoU signing was published in Newsboard India

Collaborating with LUB Chennai

Amrita TEC is exploring the opportunities to tie-up with LUB Chennai chapter for enabling MSMEs in & around Chennai. Amrita TEC team made a presentation to the Executive Council (EC) members of LUB Chennai chapter, about the activities of the Amrita Technology Enabling Centre. EC members shown keen interest in collaborating with Amrita for addressing the technical issues faced by the industries. Discussion are on to sign an MOU with LUB Chennai.

The main areas of focus would be addresseing the technical issues faced by the industry and assistance to the MSMEs in getting the financial aid. Amrita TEC will be collaborating with the LUB Chennai for the benefit of its associate members and identifying the financial aid provided by the state and central governments, wherein there is requirement for the industry to tie up with an academic insitution for the research and development activities.

Collaboration with Confederation of Indian Industry (CII) Kerala

Amtita TEC team of Mr. Mahesh Mohan and Mr. Surendran K.N. met with Mr. Harishankar, EO, CII Kerala chapter and Mr. Jeikrishnan, Director, CII, Kerala. Amrita TEC proposes to collaborate with CII for South India region by possibly participating as an academic partner for various corporate events conducted by CII.

Ecosystem Collaboration Interaction with Entrepreneurship Development & Innovation Institute (EDII) of the Government of Tamil Nadu

Dr. Prashant R. Nair, DST-Amrita Technology Enabling Center (TEC) fellow, represented Amrita TEC in an ecosystem collaboration interaction with Dr. J.U. Chandrakala, IAS, Director, Entrepreneurship Development & Innovation Institute (EDII) of Tamil Nadu and her team at Chennai on 2nd November 2022. EDII is the apex governmental organization for entrepreneurship education and self-employment promotion in Tamil Nadu. Potential collaboration opportunities identified for Amrita TEC were:

- Participation in the Innovation voucher program for faculty and final-year students associated with Amrita TEC and its academic partners. A grant of up to Rs. 5 lakhs and Rs. 2 lakhs are being provided for prototype to market and idea to prototype, respectively.
- Becoming a hub institution for the Innovation & Entrepreneurship Development (IEDP) program of EDII and thereby mentoring 20-30 academic institutions which serve as a spoke for innovation awareness and capacity building

Ecosystem Collaboration Interaction with StartupTN

Dr. Prashant R. Nair, DST-Amrita Technology Enabling Center (TEC) fellow, represented Amrita TEC in an ecosystem collaboration interaction with Mr. Sivarajah Ramanathan, Mission Director & CEO, Tamil Nadu Startup & Innovation Mission (StartupTN) at Chennai on 2nd November 2022. StartupTN is the nodal Tamil Nadu governmental agency responsible for building a strong community and support system for entrepreneurs and investors. Potential collaboration opportunities identified were Amrita TEC joining the regional hub which promote

startups in the region and actively contributing to the community circles of StartupTN. The objective of these community circles is to spread the art of innovation and entrepreneurs and create success stories within the community.

Academic Partnerships

Amrita Technology Enabling Centre is creating an Eco-System to inculcate innovation and entrepreneurial mind set amongst the students. Amrita TEC has partnered with many of the educational institutions and industry associations in Kerala and Tamil Nadu. Amrita TEC has signed an MOU with few of the well-known institutions in Coimbatore.
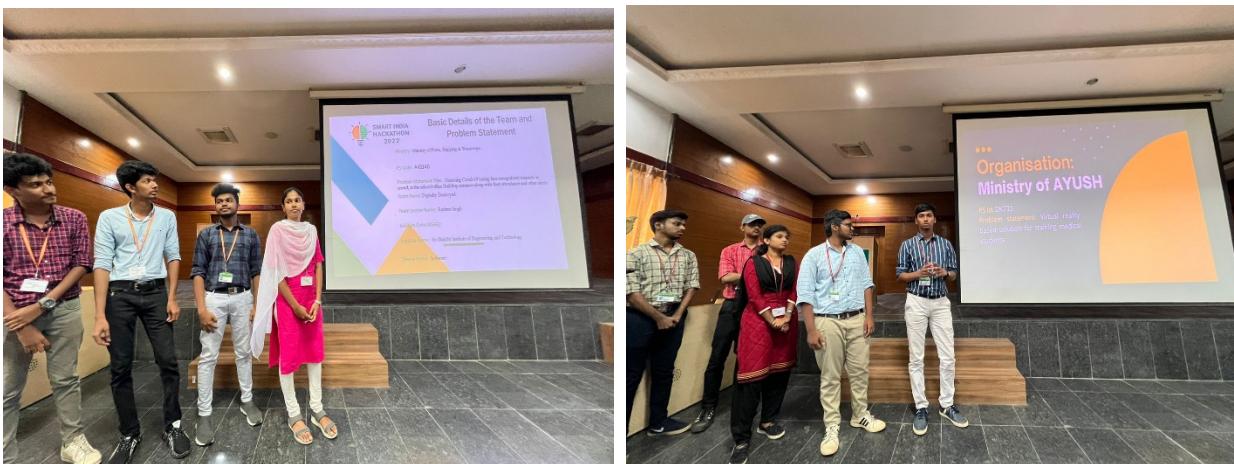
Amrita TEC signed MOU with Sri Shakthi Institute of Engineering & Technology, KPR Institute of Engineering & Technology, Kongunadu College of Arts and Science and KPR College of Arts & Science in Coimbatore for academic partnerships.

As part the MoU, Amrita TEC would work with the colleges for technology enablement of its ideas, prototypes, products and innovations developed by its students, researchers and faculty through technology mining, co-creation, development and assisting in commercialization of the ideas developed into products.

Amrita TEC team conducted assessment of technology readiness level of the projects in these institutions – approximately 80+ projects were evaluated. TRL assessment certificates were issued to the participants which would be useful for them to take their projects to next level

MOU with Sri Shakthi Institute of Engineering and Technology, Coimbatore

TRL assessment of projects at Sri Shakthi Institute of Engineering and Technology, Coimbatore

Amrita Technology Enabling Center (TEC) has signed an MoU for academic partnership with Sri Shakthi Institute of Engineering & Technology, Coimbatore

MoU exchange by Dr. A.R. Ravikumar, Principal, on behalf of Sri Shakthi and Dr. Prashant R. Nair, DST-Amrita Technology Enabling Center (TEC) fellow & Head, IQAC, Amrita Vishwa Vidyapeetham on behalf of AMRITA in the presence of Dr. A. Kalaiarasi, Deputy Director, Entrepreneurship cell from Sri Shakthi on 7 September 2022.

As part the MoU, Amrita TEC would work with the college for technology enablement of its ideas, prototypes, products and innovations developed by its students, researchers and faculty through technology mining, co-creation, development, transfer and commercialization as is the state of the technology.

Seven student innovations of Sri Shakthi were evaluated for Technology Readiness Levels (TRL) by Amrita TEC staff.

These student innovations included nano-cellulose biodegradable film for packaging applications; record management system for Self-Help Group (SHG) in rural areas with low network connectivity; fortified sauce using Moringa & food agar grade E406 as emulsifier; covid-19, attendance and mask detection using face recognition within an institutional premises; software for vocational training for persons with visual impairment; VR based medical training and OCR for Hindi language

MOU with KPR Institute of Engineering and Technology, Coimbatore

TRL assessment of projects at KPR Institute of Engineering and Technology, Coimbatore

Amrita Technology Enabling Center (TEC) signed an MoU for academic partnership with KPR Institute of Engineering & Technology (KPRIET), Coimbatore

MoU exchange by Dr. Akila M., Principal, on behalf of KPR and Dr. Prashant R. Nair, DST-Amrita Technology Enabling Center (TEC) fellow & Head, IQAC, Amrita Vishwa Vidyapeetham on behalf of AMRITA in the presence of Prof. Navaneethakrishnan Ramanathan, Head, Center for Innovations of KPRIET on 13 September 2022

As part the MoU, Amrita TEC would work with the college for technology enablement of its ideas, prototypes, products and innovations developed by its students, researchers and faculty through technology mining, co-creation, development, transfer and commercialization as is the state of the technology.

14 student innovations of KPR were evaluated for Technology Readiness Levels (TRL) by Amrita TEC staff and certificates were issued

MOU with KPR College of Arts, Science & Research, Coimbatore

TRL assessment at KPR Institute of Arts and Sciences, Coimbatore

Amrita Technology Enabling Center (TEC) funded by Government of India's Department of Science & Technology (DST) signed an MoU for academic partnership with KPR College of Arts, Science & Research, Coimbatore. MoU exchange by Dr. Balusamy S. on behalf of KPR Arts and Dr. Prashant R. Nair, DST-Amrita Technology Enabling Center (TEC) fellow on behalf of AMRITA in the presence of Dr. S. Ramachandran, Advisor, KPR Arts college on 19 October 2022.

As part the MoU, Amrita TEC would work with the college for technology enablement of its ideas, prototypes, products and innovations developed by its students, researchers and faculty through technology mining, co-creation, development, transfer and commercialization as is the state of the technology.

31 innovations of KPR College of Arts, Science and Research were evaluated for Technology Readiness Levels (TRL) by Amrita TEC staff and certificates were issued, which can be utilized to participated in various innovation or technology events.

Kongunadu Arts & Science College, Coimbatore

Amrita Technology Enabling Center (TEC) funded by Government of India's Department of Science & Technology (DST) signed an MoU for academic partnership with Kongunadu Arts & Science College, Coimbatore. MoU exchanged by Dr. C.A. Vasuki, Secretary & Director on behalf of Kongunadu and Dr. Prashant R. Nair, DST-Amrita Technology Enabling Center (TEC) fellow on behalf of AMRITA in the presence of Dr. Madhan Shankar SR, Dean-Academics, Kongunadu and Dr. Lekeshmanaswamy M., Principal, Kongunadu on 18 October 2022.

29 student innovations of Kongunadu were evaluated for Technology Readiness Levels (TRL) by Amrita TEC staff and certificates were issues to the students.

Some of the innovations developed by Kongunadu college researchers and students included the development of a metal-air battery, a smart knee pad for the elderly, an apparatus for collecting tree sap, biodegradable spoons from banana fibre, sugar-free jelly from beetroot byproduct, self-weight-based tricycle, coconut water-based sports drink, homemade chewing gum & fiber biscuits from Cissus Quadrangularis etc.

Amrita TEC Signed MOU with SNIT, Adoor, Kerala

Amrita TEC signed with Sree Narayana Institute of Technology (SNIT) Adoor, Kerala for enabling technology ideas, innovation, developing prototypes and products.

Amrita TEC will be facilitating the innovation & entrepreneurship ecosystem, process and support system. Amrita TEC will connect to industry so that the technologies/innovations developed reach the market through collaborations with companies, through market-driven technology transfer & research. Facilitating and organizing skill development activities such as curriculum design, training modules, certification programs, value-added courses and conduct of training as appropriate.

Technical conferences, seminars, symposium, technology showcase, hackathons, competitions, exhibitions including EDP / FDP may be arranged under joint venture by both parties.

Events

Recap of the PAG review meeting

PAG review meeting held online on 24th Sep 2022 and Dr. Krishnashree, Dean PG Programs made the presentation of the activities of the Amrita Technology Enabling Centre during the last one year, covering activities like technology mining, development, transferred, commercialised and technologies in the pipe line. The list of attendees were:
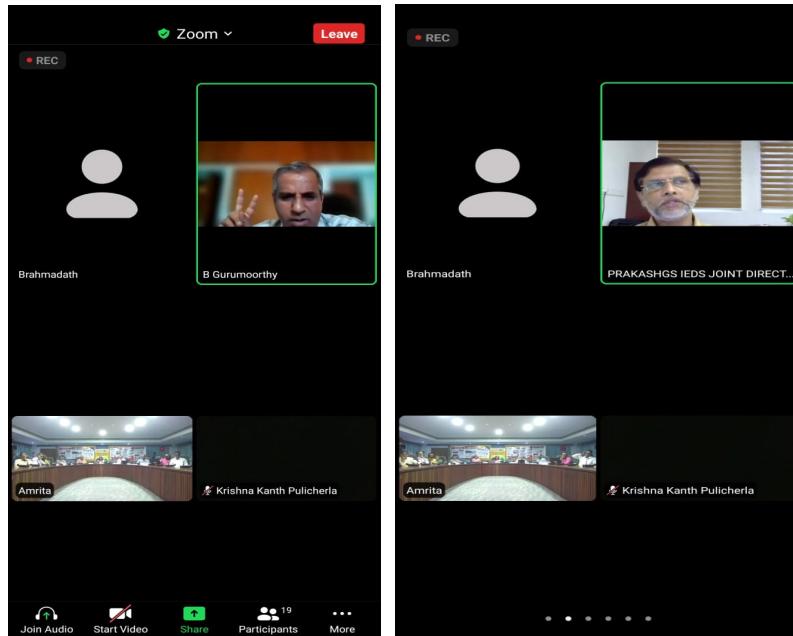
Dr. Anita Aggarwal, Scientist F, Head, TDT, DST, Govt of India

Dr. Krishnakanth Pulicherla, Scientist E, TDT, DST, Govt of India

Dr. Gurumoorthy, Professor, Indian Institute of Science

Mr. G. S. Prakash, Director, MSME-DI, Thrissur, Kerala

Dr. Mahadevan Pillai, Vice-Chancellor & Dr. Manoj Changat, University of Kerala

Mr. Arun Kumar, Vice President, OMNEX International

Dr. Ajith Prabhu, Chief Scientist, Kerala State Council for Science, Tech and Envt.

Mr. Sumeet Bahl, Vice President, Amrita Technologies

Mr. Suresh Kumar, Head Operation, Foundry Development Foundation,

Shri. K. A. Joseph, State General Secretary, Kerala State Small Industries Association

Shri. K. K. Pillai, Regional Chairman, Export Promotion Council for EOUs & SEZs, Kochi

Shri. Abdul Majeed, President, Plywood Cluster, Perumbavoor

Shri. M. D. Antony, President, Rice Cluster, Kalady

Shri. S. Venkatesan, State Joint Secretary, Laghu Udyog Bharati, Kerala

Shri. T. O. Suresh Kumar, South Zone President, Laghu Udyog Bharati, Kerala

Shri. Sunil, State Secretary, Laghu Udyog Bharati, Kerala

Shri. Purushottam, President, Agri Impliments Cluster, Shornur

Dr. Venkat Rangan, Vice-Chancellor, Amrita Vishwa Vidyapeetham
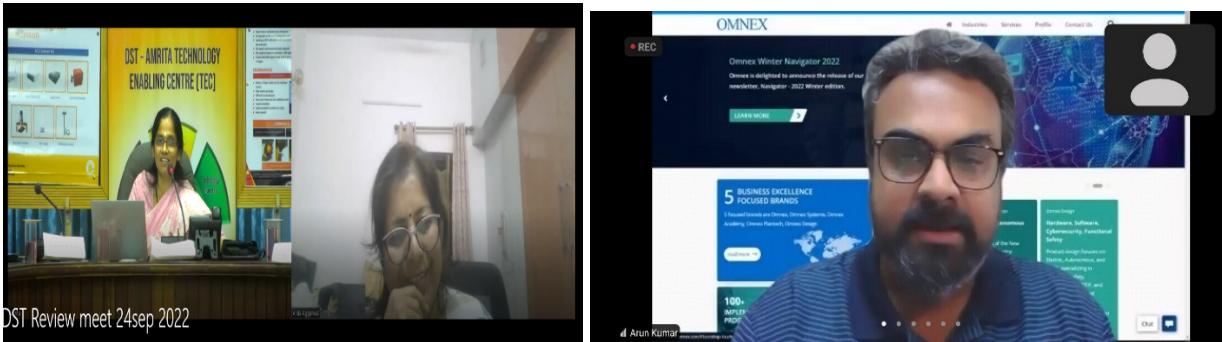
Dr. Maneesha Sudheer, Provost, Strategic Initiatives AI+X, Dean, International Programs

Shri. Mohan Kumar, Dean, Academic Progression (IAS & Former Defense Secretary, Govt of India)

Shri. Rajendra Kumar, Dean, Administration (IAS, Formerly with State of West Bengal)

Dr. Sasangan Ramanathan, Dean, Engineering, Amrita Vishwa Vidyapeetham

Dr. Raghu Raman, Dean, Amaravati Campus, Amrita Vishwa Vidyapeetham

Dr. Prashant Nair, Assoc Prof., DST-Amrita TEC Fellow, Amrita Vishwa Vidyapeetham

Dr. Meera Balachandran, Professor, Chemical Eng & Material Science, DST-Amrita TEC Fellow, Amrita Vishwa Vidyapeetham

Dr. Shiju Sathyadevan, Asso. Prof, DST-Amrita TEC Fellow, Amrita Vishwa Vidyapeetham

Dr. Venkat Rangan VC, Amrita Vishwa Vidyapeetham stressed on the support of the management to the TEC and bridge the gap between academia and industry and holistic view of what our Chancellor is stressing on - the compassion driven research and contemplation. Vice Chancellor outlined on 3Ds - Devices, Data and Delivery, 3Is - Intelligence, Imaging and Informatics and 3Cs - Competition, Compassion and Contemplation.

Dr. Maneesha touched upon the compassion driven research what Amma is stressing on. The technology or research should reach out to the people and society at large, Dr. Manesha, talked about the transformational change that TEC was able to bring in. Based on the TEC recommendation there has been changes in curriculum, research etc.,

Dr. G S Prakash MSME-DI Thrissur suggested that TEC team can collaborate with MSME for the ODOP (One District One Product) and One District One Idea (ODOI) state govt schemes and govt vision of Zero   Effect   Zero Defect, govt certification etc.,

PAG review team comprising of Dr. Anita Agarwal, Dr. Krishnakanth and Dr. Gurumruthy, IISc were present during the presentation and their suggestions and comments are captured here:

- TEC enable stake holders in the University and academia and in Industry. Focus on technology transfer, problems from the industry to be solved by the faculty and technology commercialisation. All other points are incidental.
- Training can create a funnel and indication of problems.
- Whitepaper activity - if this is an activity TEC would like to pursue then there are industry clusters and association which can pay you to make such whitepapers. This could be a revenue generation activity for TEC.
- Amrita TEC should take the initiative to enable many institutions in around, particularly in south India where lot of central laboratories are located.
- Focus on technologies which are at TRL 6 and above, to study the factors which are influencing commercialisation of these technologies.
- Outreach – news letters should be reach out to the right & wider audience. Can be shared with MSMEs, central ministries and local industry associations who can make use if these reports.
- Impact of TEC – undertake one report and analyses how it is impacted the whole eco system in terms intellectual output generation, social impact and interaction with industries.

National Vendor Development Program – Cochin

Shri. Bhanu Pratap Singh Verma, Honourable Minister of State, Ministry of MSME, Government of India, Shri. Prakash Rao, Dy. Director, by MSME – Development & Facilitation Centre, Thrissur – at Amrita TEC stall.

National Vendor Development Programme 2022 was organized by MSME – Development & Facilitation Centre, Thrissur and Cochin Shipyard Limited, Kochi on 17th and 18th November, 2022 at Gokulam Park Hotel and Convention Centre, Kochi.   Dr. Krishnashree Achuthan, Dean – Post Graduate Programs of Amrita Vishwa Vidyapeetham and Head of the DST-Amrita Technology Enabling Centre (TEC), addressed the participants virtually and shared her thoughts about the importance of the indigenous development of the products and how it contributes to the Atma Nirbhar Bharath.

Shri. Bhanu Pratap Singh Verma, Honourable Minister of State, Ministry of MSME, Government of India was the Guest of Honour at the event and he visited Amrita stall at the event and shown keen interest in the products on display, developed at Amrita Vishwa Vidyapeetham.

Amrita TEC Participation in Magnetic Manchester 2022 Startup & Investor Conclave

DST-Amrita Technology Enabling Centre (TEC) was one of the ecosystem enabler organizations invited to the Magnetic Manchester 2022 Startup & Investor Conclave held at Atal Incubation Centre (AIC) Raise, Coimbatore, on 20 December, 2022. Dr. Prashant R. Nair, DST-Amrita TEC fellow, represented Amrita TEC in the conclave to explore ecosystem collaboration and partnerships. Potential collaboration opportunities identified for Amrita TEC

included a technology enablement partnership for the proposed Smart Minds Tamil Nadu Hackathon 2023 and participation in the Startup Thinnai (Verandah) event. Magnetic Manchester was inaugurated by Mr. Sivarajah Ramanathan, Mission Director & CEO of Tamil Nadu Startup & Innovation Mission (StartupTN). During the conclave, some early-stage startups also evinced interest in technology enablement support from Amrita TEC.

NASSCOM Round Table on Digital Skilling for Engineering Research & Development (ER&D) Sector
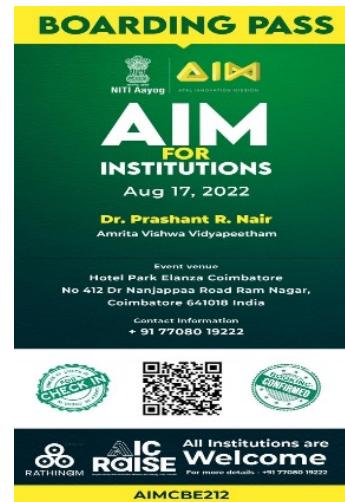

DST-Amrita Technology Enabling Centre (TEC) was invited to NASSCOM Round Table on Digital Skilling for Engineering Research & Development (ER&D) Sector held at Atal Incubation Centre (AIC) Raise, Coimbatore, on 30 September, 2022. This round table deliberated on the future outlook, career opportunities, and upskilling of working professionals and students in MSME clusters and academic institutions, respectively. As part of its Future Skills program, NASSCOM is floating an online digital engineering certification program to benefit these professionals and students. Modules in this 33-hour online program include essentials of IoT, Cyber Security, AI, embedded, etc. The nominal cost for the assessment for the certification program would be reimbursed by the skill development ministry of the government of India.

Mr. K. S. Viswanathan, Vice-President, NASSCOM, and his team requested input for this program, which has the potential to emerge as a significant digital skilling initiative, especially for professionals in MSMEs. Dr. Prashant R. Nair, DST-Amrita TEC fellow represented Amrita TEC for this round table meeting and provided relevant inputs such as providing a dashboard for an MSME to track the progress of their employees subscribing to the certification program and topping this certification with sector-specific advanced digital and Industry 4.0 certification programs. Engineering Research and Development (ER&D) sector spans hardware, software, and digitization of

products and cloud engineering across sectors. A significant number of MSMEs are engaged in ER&D, especially in areas such as automotive components, hardware (mechanical, electrical & electronics), pumps, foundries, motors, etc.

Interaction meeting of Atal Incubation Center (AIC) Raise, Coimbatore
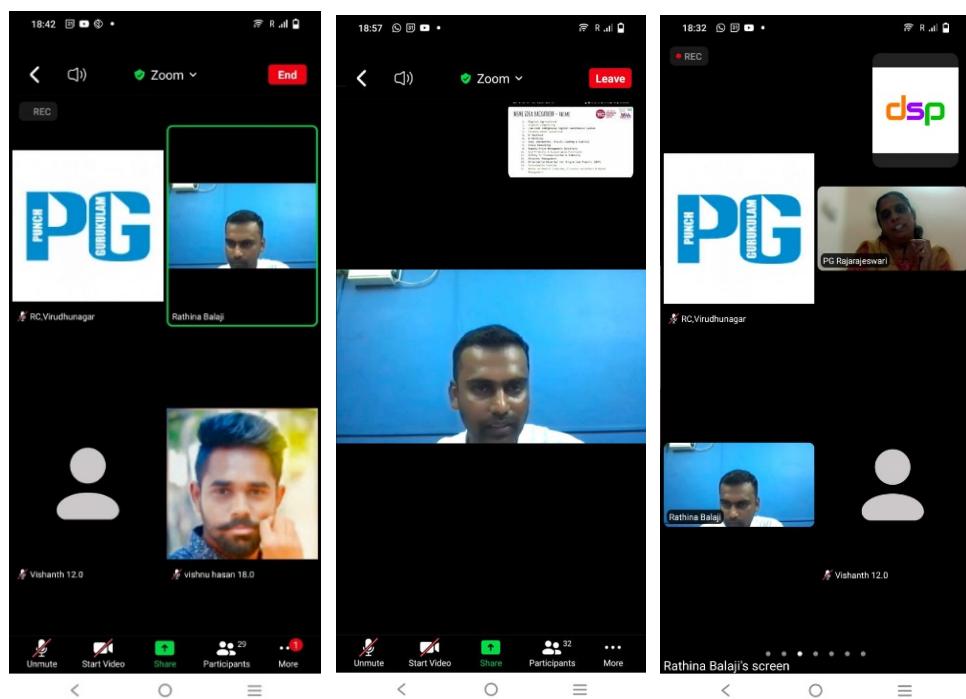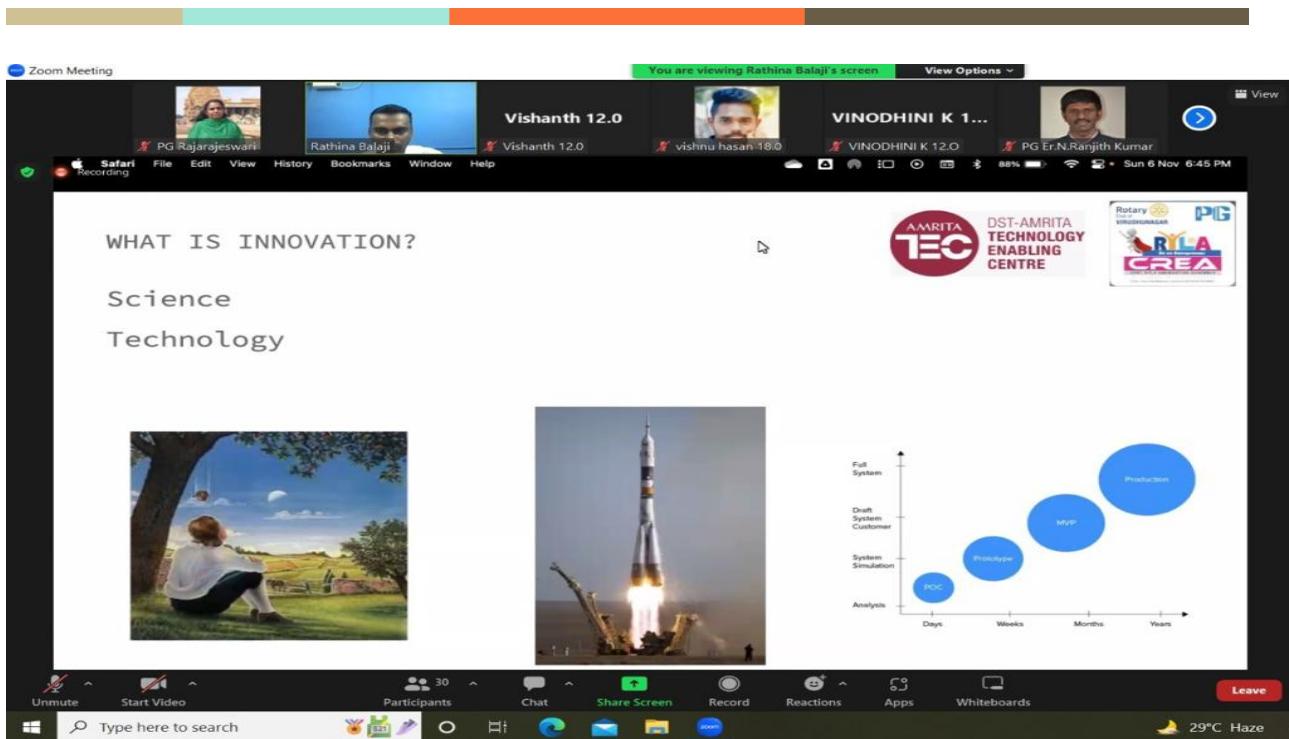
Dr. Prashant R. Nair, DST-AMRITA TEC fellow was a special invitee for an interaction session of Atal Innovation Mission (AIM) for institutions organized by Atal Incubation Center (AIC) Raise on 17 August, 2022 at Hotel Park Elanza, Coimbatore. He had extensive discussions on ecosystem collaboration opportunities for Amrita TEC with Mr. Rohit Gupta, Program Director, AIM; Mr. Vinodh Kumar, General Manager, CODISSIA Defence Innovation and Atal Incubation Center and Dr. Nagaraj Balakrishnan, Director, AIC Raise among others.

Training / Webinars

An online training program was organised on 'Understanding MSME Hackathon 2.0' by Rotary club of Virudhunagar & Punch Gurukulam on 6 November, 2022. This program was exclusively for the emerging entrepreneurs of CV PG CENT RYLARIANS. A total of 26 entrepreneurs participated in the program.

The role of TEC and the importance of innovation in business were explained. The various themes available in MSME Hackathon 2.0 and the process of application were explained. The queries raised by the participants were addressed. PG. Raja Rajeswari proposed the thank note.

List of Seminars and Webinars for Amrita TEC Eco-System Partners & Beneficiaries

AWARDS

DST-AMRITA TEC fellow is the Top Performing Innovation Ambassador of the Ministry of Education's Innovation Cell (MIC)

Dr. Prashant R. Nair, DST-AMRITA TEC fellow and Head, IQAC, Amrita Vishwa Vidyapeetham Coimbatore campus has been recognized as one of the top performing Innovation Ambassadors (IA) of the Ministry of Education's Innovation Cell (MIC) of the Government of India. This recognition was presented by Mr. Dipan Kumar Sahu, Assistant Innovation Director, MIC during the regional meet of the Institution's Innovation Council (IIC) held at PSNA College of Engineering & Technology, Dindigul on 8th August, 2022. During the regional meet's track 2 knowledge sharing session, Dr. Prashant also showcased the best practices of AMRITA related to innovation outreach such as Amrita TEC & TBI, hackathon culture, and linkage to Atal Tinkering Labs (ATL) in 3 schools namely Yuvabharathi Public School, Coimbatore, and Amrita Vidyalayams at Trichy and Nagapattinam. 6000 faculty from 900 higher education institutions Pan-India have been recognized as innovation ambassadors by MIC with an objective to mentor students and drive innovation and a startup ecosystem at the campus and community. As of now, 4000 IICs have been set up in colleges and universities in India.

DST-AMRITA TEC fellow is Top Performing Mentor of Change (MoC) of Atal Innovation Mission (AIM), NITI Aayog

Dr. Prashant R. Nair, DST-AMRITA TEC fellow and Head, IQAC, Amrita Vishwa Vidyapeetham Coimbatore campus has been recognized as one of the top performing mentors of change of Atal Innovation Mission (AIM), NITI Aayog for 2021-2022. Dr. Chintan Vaishnav, Mission Director, AIM presented the appreciation certificate to him during the mentor round table 2022 held at NITI Aayog, New Delhi on 9 November 2022. 35 top mentors were recognized from 5800+ mentors in the Mentor India program, who are involved in innovation outreach of AIM for Atal Tinkering Labs (ATL), Atal Incubation Centers (AIC) and innovation challenges such as ATL Marathon and Tinkerpreneur.

Amrita TEC in News

THE HINDU

COIMBATORE TODAY

Arsha Avinash Foundation: Talk on Brahma Sutra, Tatabad, 5 p.m.

Sri Ramakrishna Engineering College: MEQUEST 2K22, 9.30 a.m.; Inauguration - Library Club, 2 p.m.

Vivekananda Institute of Management Studies: 'Entrepreneurial Success Through Fostering Leadership', 11 a.m.

Dr. NGP Institute of Technology: Basic life support awareness programme', 9.30 a.m.

Jansons Institute of Technology: 'Discover your Creative Thinking' session, 2.30 p.m

Adithya College of Arts and Science: Art and Drama workshop, 2.30 p.m.

CADD Technologies & Adithya College of Arts and Science: Public speaking, essay, chess competition, 1.30 p.m.

KPR College of Arts Science and Research and Amrita Viswa Vidapeetham: MoU Ceremony, KPR College of Arts Science and Research, 10.30 a.m.

KPR College of Arts Science and Research: Lecture - Issues, Challenges in Business, 11 a.m.

Angappa College of Arts and Science: 'World Cotton Day', 11.30 a.m.

Youth Red Cross & Women Empowerment Cell and Sree Narayana Guru College: YRC Orientation program, 11.30 a.m.

Sree Narayana Guru College Coimbatore: Seminar on 'Digital Marketing', 10 a.m.

Pollachi

Sree Saraswathi Thyagaraja College: Seminar - Divinity and Nationalism, 10 a.m.

THE HINDU
26.10.2022 Page.No : 11

KPR CASR signed MoU with Amrita TEC

KPR College of Arts, Science & Research, signed MoU with Amrita Technology Enabling Centre, funded by GoI's Dept of S&T. Dr. S. Balusamy, Principal, KPRCAS and Dr. Prashant R. Nair, Head, IQAC, Amrita Vishwa Vidyapeetham have exchanged the MoU in the presence of Dr. S. Ramachandran, Secretary, KPRCAS. As part of the MoU, Amrita TEC would work with the KPRCAS for technology enablement of its ideas, prototypes, products and innovations developed by its students, researchers and faculty through technology mining, co-creation, development, transfer and commercialization as is the state of the technology. Dr. K. Kumuthadevi, Dean – Commerce, Dr. P. Sharmila, Dean – CS, Dr. P. Syamsundar, Dean – Management were also present.

THE COVAI MAIL
ENGLISH & TAMIL WEEKLY NEWSPAPER
Date: 15 Sep 2022

KPR & Amrita Technology Enabling Centre sign MoU

KPR Institute of Engineering and Technology signed MoU with DST Amrita Technology Enabling Centre. Dr. Akila M., Principal, on behalf of KPR and Dr. Prashant R. Nair, Head, IQAC, Amrita Vishwa Vidyapeetham on behalf of AMRITA exchanged the MoU. Followed by the MoU signing ceremony 14 student innovative projects of KPRIET were evaluated for Technology Readiness Levels (TRL) by Amrita TEC team.

COVID-19 IS NOT OVER. FOLLOW THE RULES !

Amrita TEC MoU with Kongunadu college

Coimbatore, Oct 21: Amrita Technology Enabling Center (TEC) funded by Government of India's Department of Science & Technology (DST) and headed by Dr. Krishnashree Achuthan, Dean, Amrita Vishwa Vidyapeetham signed a MoU for academic partnership with Kongunadu Arts & Science College, Coimbatore.

The MoU was exchanged by Dr. C.A. Vasuki, Secretary & Director on behalf of Kongunadu and Dr. Prashant R. Nair, Head, IQAC, Amrita Vishwa Vidyapeetham on behalf of AMRITA in the presence of Dr. Madhan Shankar SR, Dean-Academics and Dr. Lekeshmanaswamy M., Principal of Kongunadu Arts and Science College.

As part of the MoU, Amrita TEC would work with the college for technology enablement of its ideas, prototypes, products and innovations developed by its students, researchers and faculty through technology mining, co-creation, development, transfer and commercialization as is the state of the technology. A total of 29 innovations and ideas of Kongunadu Arts and Science College were evaluated for Technology Readiness Levels (TRL) by Amrita TEC staff, R Venkatesh & C Rathina Balaji.

TRINITY MIRROR NEWSPAPER

THE KOVAI HERALD

Amrita TEC MoU with Kongunadu Arts & Science College

Amrita Technology Enabling Center (TEC) funded by Government of India's Department of Science & Technology (DST) and headed by Dr. Krishnashree Achuthan, Dean, Amrita Vishwa Vidyapeetham has signed an MoU for academic partnership with Kongunadu Arts & Science College, Coimbatore. The MoU was exchanged by Dr. C.A. Vasuki, Secretary & Director on behalf of Kongunadu and Dr. Prashant R. Nair, Head, IQAC, Amrita Vishwa Vidyapeetham on behalf of AMRITA in the presence of Dr. Madhan Shankar SR, Dean-Academics and Dr. Lekeshmanaswamy M., Principal of Kongunadu Arts and Science College. As part of the MoU, Amrita TEC would work with the college for technology enablement of its ideas, prototypes, products and innovations developed by its students, researchers and faculty through technology mining, co-creation, development, transfer and commercialization as is the state of the technology. A total of 29 innovations and idea of Kongunadu Arts and Science College were evaluated for Technology Readiness Levels (TRL) by Amrita TEC staff, Venkatesh R. & Rathina Balaji.C.

അമൃത ടെക്നോളജി എനേബിളിങ് സെന്റർ വികസിപ്പിച്ച 'സ്മാർട്ട് പ്ലൈ' വിപണിയിലിറക്കി

വീക്ഷണം

VEEKSHANAM NEWSPAPER

Mathrubhumi മാതൃഭൂമി

പ്ലൈവുഡിന്റെ ഗുണനിലവാരമറിയാൻ 'സ്മാർട്ട് പ്ലൈ'

MATHRUBHUMI NEWSPAPER

'സ്മാർട്ട് പ്ലൈ' വിപണിയിലിറക്കി

കൊച്ചി: നിർമാണത്തിനിടെ തന്നെ പ്ലൈവുഡിന്റെ ഗുണനിലവാരം നിരീക്ഷിക്കുന്നതിനായി കേന്ദ്ര ശാസ്ത്ര, സാങ്കേതിക വകുപ്പിന്റെ സഹകരണത്തോടെ അമൃത ടെക്നോളജി എനേബിളിങ് സെന്റർ വികസിപ്പിച്ച ഉപകരണം 'സ്മാർട്ട് പ്ലൈ' പുറത്തിറക്കി.

ജനയുഗം

JANAYUGAM NEWSPAPER

അമൃത ടെക്നോളജി എനേബിളിങ് സെന്റർ വികസിപ്പിച്ച സ്മാർട്ട് പ്ലൈ വിപണിയിലിറക്കി

കൊച്ചി: നിർമാണത്തിനിടെ തന്നെ പ്ലൈവുഡിന്റെ ഗുണ നിലവാരം നിരീക്ഷിക്കുന്ന തിനായി കേന്ദ്ര ശാസ്ത്ര, സാ ങ്കേതിക വകുപ്പിന്റെ സഹക രണത്തോടെ അമൃത ടെക് നോളജി എനേബിളിങ് സെന്റർ വികസിപ്പിച്ചെടുത്ത ഉപകരണം 'സ്മാർട്ട് പ്ലൈ' പുറത്തിറക്കി. കേന്ദ്ര സൂക്ഷ്മ, ചെറുകിട-ഇടത്തരം വ്യ വസായ മന്ത്രാലയം (എം എസ്എംഇ) കൊച്ചിയിൽ സം ഘടിപ്പിച്ച ദേശീയ സംരംഭക തുടെ സമ്മേളനത്തിൽ കേന്ദ്ര സഹമന്ത്രി പ്രകാശ്, അമൃത ടെ ക്നോളജി എനേബിളിങ് സെ ന്റർ ഡയറക്ടർ ഡോ.കൃ ഷ്ണശ്രീ അച്യുതൻ, പ്ലൈ വുഡ് കൺസോർഷ്യം പ്രസി ഡന്റ് സിക്കെ അബ്ദുൽ മജീദ് എന്നിവർ ചടങ്ങിൽ പങ്കെടു ത്തു. അമൃത ടെക്നോളജി എനേബിളിങ് സെന്ററും സെന്ററിന്റെ സ്റ്റാർട്ടപ്പ് സംര ഭമായ ട്രാൻക്വിലിറ്റി ഐഒ ടി ആൻഡ് ബിഗ് ഡാറ്റ സൊ

ലൂഷൻസും സംയുക്തമാ യാണ് സ്മാർട്ട് പ്ലൈ വിക സിപ്പിച്ചെടുത്തത്. ഐപ്ലൈ ഡ് നിർമാണവേളയിൽ എ ല്ലാകാര്യങ്ങളിലും ഗുണനി ലവാരം ഉറപ്പാക്കുന്നതിനു ള്ള നിരീക്ഷണമാണ് സ്മാർ ട്ട് പ്ലൈ വാഗ്ദാനം ചെയ്യുന്ന ത്. നിർമാണത്തിനിടെയു ണ്ടാകുന്ന ന്യൂനതകൾ തക്ക സമയം മുന്നറിയിപ്പ് സന്ദേ ശങ്ങളായി ഇതുമായി ബ ന്ധപ്പെട്ടവരിലെത്തുമ്പോൾ മൊ ബൈൽ ഫോണിലേക്കെ ത്തിക്കും.

പ്ലൈവുഡിന്റെ കനം നിയ ന്ത്രിച്ച് അതിൽ കൂടുതലൊ റ്റ്യൂക്ഷൻ ചെയ്ത് തടാലും പ്ലൈവുഡ് ഷീറ്റിന് ലെവൽ വ്യത്യാസ സാധ്യാലും ഈ സംവിധാനം ഉടൻ തന്നെ പ്ര വർത്തിച്ച് മുന്നറിയിപ്പ് നൽ കും. പ്ലൈവുഡ് നിർമാണ കമ്പനികൾക്ക് ഉത്പാദന

ത്തിനിടെയുണ്ടാകുന്ന തക രാറുകൾ മൂലമുള്ള നഷ്ടം ഇ തുവഴി ഒഴിവാക്കാനാകും.

അമൃത ടെക്നോളജി എന ബ്ലിങ് സെന്ററിന്റെ യും സ്റ്റാർട്ടപ്പ് സംരംഭമായ ട്രാൻ ക്വിലിറ്റി ഐഒ ആൻഡ് ബി ഗ് ഡാറ്റ സൊലൂഷൻസിലെ ഡോ. ശൈലു സത്യദേവൻ, വിശാഖ്ബാ, നിപു ശശിധരൻ, അഭിലാഷ് രാധാകൃഷ്ണൻ, ബിമൽ സതീഷ് എന്നിവര ടങ്ങുന്ന സംഘത്തിന്റെയും കഠിന പരിശ്രമത്തിന്റെ യും ഫലമാണ് ഈ ഉപ കരണം വികസിപ്പിച്ചെടു ത്തത്. പ്ലൈവുഡ് കമ്പനി ചില പരിശ്രമത്തിന്റെ ഫല മാര്യി വിപണിയിലേ ക്കെത്തിച്ചിക്കുന്നുവെന്ന് ടെക്നോളജി എ നബ്ലിങ് സെന്റർ അധികൃ തർ പറഞ്ഞു.

ധാരണാപത്രം ഒപ്പുവച്ചു

അടൂർ: ശ്രീ നാരായണ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഓഫ് ടെക്നോളജിയും ഡിപ്പാ ർട്ടമെന്റ് ഓഫ് സയൻസ് ആൻഡ് ടെക്നോളജിയുടെ നോഡൽ ഏ ജൻസിയായ അമൃത ടെക്നോളജി എന്നാബ്ലിങ് സെന്ററുമായി ധാര ണാപത്രം ഒപ്പു വച്ചു.

വിദ്യാർഥികൾക്കും അധ്യാപകർക്കും ഗവേഷണ മേഖലയിൽ മി കവ് പകരുവാനും പ്രൊജക്ടുകൾക്ക് ഫണ്ട് അനുവദിക്കുന്നതിനും ധാരണാപത്രം അംഗീകാരം നൽകുന്നു. നൂതന സാങ്കേതിക വിദ്യക ളുടെ സഹായത്തോടെ ഗവേഷണങ്ങളും അതിലൂടെ പുതിയ ക ണ്ടെത്തലുകളും ഉത്പന്നങ്ങളുടെ വിപണന രംഗവും ധാരണാപത്രം ലക്ഷ്യമിടുന്നു.

എസ്.എൻ.ഐ.ടി അധ്യാപകർക്കും വിദ്യാർത്ഥികൾക്കും പഠനാ വശ്യത്തിന് ഗവേഷണങ്ങൾക്കും മറ്റുമായി അമൃത വിശ വിദ്യാപീഠ ത്തിന്റെ ലാബുകളുടെ സേവനം സൗജന്യമായി ലഭിക്കും. അമൃത ടെക്നോളജി എന്നാബ്ലിങ് സെന്റർ പ്രതിനിധി മഹേഷ് മോഹൻ, എസ്.എൻ.ഐ.ടി മാനേജിങ് ഡയറക്ടർ എബിൻ അമ്പാടിക്ക് ധാര ണാപത്രം കൈമാറി.

അമൃത വിശ വിദ്യാപീഠത്തിലെ ഗവേഷകരായ പ്രഫ. ഡോ. പ്ര മോദ് ശ്രീധരൻ, പ്രഫ. കെ.എൻ. സുരേന്ദ്രൻ, എസ്.എൻ. ഐ.ടി പ്രി ൻസിപ്പൽ ഡോ. ബി. ഷാജി മോഹൻ, അക്കാദമിക് ചെയർമാൻ ഡോ. കേശവ് മോഹൻ എന്നിവർ പങ്കെടുത്തു.

Home » Companies » MSME

Smart device. Smart Ply, device to monitor plywood quality launched

November 26, 2022 · Updated 11:21 am IST

The DST-Amrita Technology Enabling Centre and the center's start-up company Tranquility IoT and Big Data Solutions collaborated to create Smart Ply

BY BL KOCHI BUREAU

Smart Ply, a device developed by DST-Amrita Technology Enabling Centre for monitoring the quality of plywood during manufacturing, has been introduced in the market.

Union Minister of State for MSME, Bhanupratap Singh Varma, launched Smart Ply during the national entrepreneurs' conference in Kochi, which was organized by the Union Ministry of Micro, Small and Medium Enterprises (MSME).

The DST-Amrita Technology Enabling Centre and the center's start-up company Tranquility IoT and Big Data Solutions collaborated to create Smart Ply, which checks