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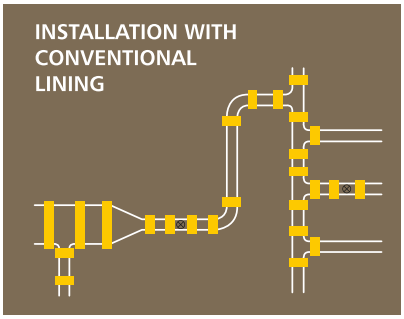

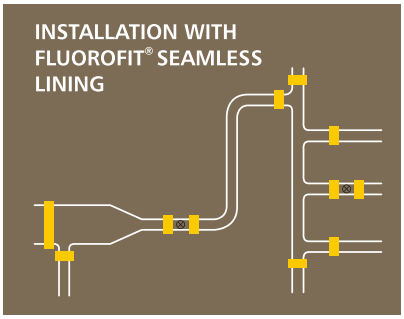

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Evonik And Stanford University Sign Research Collaboration

Dr. Thomas Riermeier, Head of Evonik's Health Care business line

Essen, Germany: Evonik is working with Stanford University on a technology to deliver mRNA to tissues and organs that goes beyond the capabilities of lipid nanoparticles (LNPs). This polymer-based platform complements Evonik's existing portfolio of lipid-based drug delivery, including LNPs. Starting this month, Evonik and Stanford scientists begin a three-year sponsored research collaboration to develop the polymer-based drug delivery system, which Evonik will license and commercialize.

The new drug delivery technology of Evonik's Health Care business accelerates the portfolio shift of the life science division Nutrition & Care towards system solutions. Characterized by high growth prospects and above average margin potential, Nutrition & Care aims to increase the share of system solutions it offers from 20 percent, to more than 50 percent by 2030.

"We are proud to collaborate with Stanford University and combine our innovative power in advanced drug delivery. Through this project we look forward to enabling the next generation of mRNA-based medicine," says Dr. Thomas Riermeier, Head of Evonik's Health Care business line.

The delivery of mRNA effectively and safely into the cell is one of the biggest challenges for expanding the use of mRNA therapeutics to promising fields such as cancer immunotherapy, protein replacement and gene editing. As a leading integrated development and manufacturing partner for advanced drug delivery, Evonik is well-positioned to address many of the pharma industry's unmet needs. Evonik's accessible market for LNP-based delivery systems alone is estimated to be in excess of USD 5 billion by 2026.

"If we are to harness the full potential of mRNA therapeutics, we will need a toolbox of drug delivery technologies to target an expanded range of tissues and organs. Therefore, it is a great pleasure to collaborate with Stanford University and bring our expertise in advanced drug delivery to commercialize the new platform," says Dr. Stefan Randl, Vice President of Research, Development & Innovation for Evonik Health Care.

Evonik will work together with Stanford University scientists to scale up the synthesis and formulation, and further develop this innovative technology for organ selective delivery

based on a non-animal-derived, synthetic degradable polymer. As one of the few integrated development and manufacturing partners for gene therapies, Evonik aims to make this technology available in GMP quality (Good Manufacturing Practice) for use in

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clinical-stage developments and ultimately on a commercial scale.

Evonik recognized the potential of gene-based therapeutic approaches early in the emergence of these advances and made a targeted investment with the acquisition of Transferra Nanosciences in 2016. The Vancouver-based laboratories have a strong focus on parenteral drug formulation development using lipid nanoparticles and liposomes.

The portfolio was further expanded in 2020 with the acquisition of Wilshire Technologies, an American manufacturer of non-animal derived excipients for the pharmaceutical industry. This includes PhytoChol®, a non-animal derived cholesterol, used in many commercial parenteral pharmaceutical products.

Glenmark's Interim Data from PMS Study on Favipiravir

Mumbai, India: FabiFlu supports its safety and effectiveness in real world settings with no new safety signals or concerns in Covid-19 patients ▪Glenmark is the only organization from India to conduct a Phase 3 study and the first to receive restricted emergency use approval for Favipiravir in mild to moderate Covid-19 ▪Glenmark commenced a 1000+ patients PMS study in mild to moderate Covid-19 after receiving restricted emergency use approval for Favipiravir interim data revealed no new safety signals or concerns till date and safety is in line with known side effects of the drug Mumbai, India; June 08, 2021: Glenmark Pharmaceuticals, a research-led, global integrated pharmaceutical company, today announced interim data of 503 patients from its Post Marketing Surveillance (PMS) study on Favipiravir in India. The PMS study commenced in July 2020 aimed to evaluate safety and efficacy of Favipiravir in mild to moderate Covid-19 patients. This PMS is the first and large post marketing study being conducted in India on Favipiravir in mild to moderate Covid-19 patients and as on date, a total of 1083 patients have been enrolled in the prospective, open label, multicenter, single arm study. A total of 13 sites – both Government and private institutions – across Mumbai, Bangalore, Hyderabad, Nashik, Nagpur, and Trivandrum took part. Interim data presented by Glenmark to the regulator reveals no new safety signals or concerns with the use of Favipiravir and already-known side effects such as weakness, gastritis, diarrhoea, vomiting etc., which were found to be mild in nature.

The time to fever resolution was seen on day 3, while two-third of the patients achieved clinical cure on day 7. The study was conducted in patients with mild to moderate COVID-19, in line with the approved indication of the drug. The mean age of patients was 40 years, with the most common age group being 30-45 years. Women comprised 40%, while men 60% of the study population. Hypertension and Diabetes were the two most common comorbidities noted in these patients. Fever was present in all patients at baseline followed by cough (84.6%), fatigue (55%), new loss of taste (38.1%). Commenting on these findings, Mr. Alok Malik, Group Vice President & Head, India Formulations, said, "It is encouraging to note that our interim

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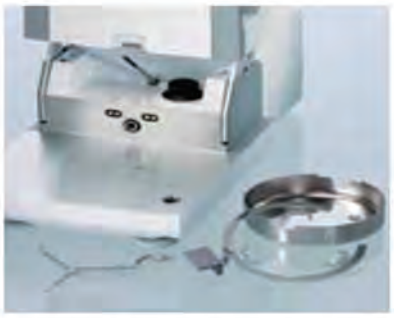

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data supports the safety and effectiveness of FabiFlu® in real-world settings. Since its launch last year, FabiFlu® has provided immense relief to millions of patients in India and the world, while also reducing the overall burden on healthcare infrastructure. We will soon submit the final study findings to the regulator and continue to deliver FabiFlu®'s multiple benefits to patients all over."

On June 19th 2020, Glenmark became the first company in India to receive restricted emergency use approval from India's drug regulator for FabiFlu®, making it the first oral Favipiravir-approved medication in India for the treatment of mild to moderate COVID-19. The approval was granted as part of accelerated approval process, considering the emergency situation of the COVID-19 outbreak in India. —End— About Glenmark Pharmaceuticals Ltd Glenmark Pharmaceuticals Ltd. (GPL) is a global research-led pharmaceutical company with presence across Generics, Specialty and OTC business with operations in over 50 countries. Glenmark's key therapy focus areas globally are respiratory, dermatology and oncology. It is ranked among the top 80 Pharma & Biotech companies of the world in terms of revenue (SCRIP 100 Rankings published in the year 2019). The company has been listed in the Dow Jones Sustainability Index (DJSI), under the category of emerging markets for the third consecutive year in a row. DJSI is one of the world's most respected and widely accepted sustainability benchmarks globally with only the top ranked companies in terms of Corporate Sustainability within each industry are featured in the index.

IISER Bhopal Scientists Invent Technology for Precision Engineering of Proteins

Bhopal, India: Indian Institute of Science Education and Research (IISER) Bhopal Researchers have invented a new technology that can deliver active molecules to specific sections of proteins.

Scientists from IISER Bhopal have been conducting studies on the 'engineering' of protein molecules for the past few years. Their serial technological breakthrough has gained a detailed insight into the chemical features of these molecular machines. With this understanding, they have designed the first-ever modular platform for the precision engineering of proteins.

The chemical modification of proteins is essential for understanding protein functions and developing therapeutics and diagnostics. The Research Team from the Departments of Chemistry and Biological Sciences at IISER Bhopal includes Dr. Vishal Rai, Dr. Ram Kumar Mishra, Dr. Sanjeev Shukla, Dr. Srinivasa Rao Adusumalli, Dr. Dattatraya Gautam Rawale, and Dr. Neetu Kalra, among others who have worked on this novel research.

The development of their Linchpin Directed Modification (LDM) platform has been described in three papers published in the Journal of the American Chemical Society (2018), Angewandte Chemie (International Edition - 2020), and Chemical Science (2021).

Protein modifications typically involve attaching specific chemicals to strategic sections of the proteins. Such protein modifications are commonly seen in nature,

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(From Left to Right) Dr. Dattatraya G. Rawale, Dr. Sanjeev Shukla, Dr. Srinivasa Rao Adusumalli, Dr. Ram K. Mishra, Dr. Vishal Rai, Dr. Neetu Kalra, Dr. Usha Singh

but the intricate machinery is challenging to replicate in the lab. The difficulty in attaching specific tags, markers, and therapeutic molecules to specific protein regions arises from the complexity of the protein structure and the non-specific nature of many of the modifiers.

Explaining the significance of this Research, Dr. Vishal Rai, Associate Professor and Swarnajayanti Fellow, Department of Chemistry, IISER Bhopal, said, "Our team believes that successful platforms for precision engineering of proteins depend on the core understanding of molecular and social behaviour of proteins in the chemical reactions."

Proteins are built of amino acids; there are 21 amino acids that make all the proteins. The research team has developed a technology that they call the "LDM platform." It is empowered by reagents made of three key components. A representative example involves FK that rapidly and reversibly attaches to an amino acid called lysine and FH that reacts slowly, but specifically to another amino acid – histidine.

Thus, FK first attaches itself to the lysine in the protein and delivers FH to a proximal Histidine of the protein. Moreover, the spacer controls the exact location of the site. FK then detaches and allows FH to be installed into the protein, thus modifying it.

"A key advantage of our LDM platform is that it does not modify the structure or functions of the native protein," explained Dr. Rai. For example, the enzymatic activity of myoglobin, cytochrome C, aldolase, and lysozyme C, are conserved even after labelling using the LDM reagent. Insulin, another protein, has also been shown to be absorbed by cells even after tagging with the LDM reagent.

The LDM reagents can precisely label biologically active molecules such as antibodies that can be delivered accurately at the designated cells. The research team has shown that the LDM molecule successfully delivers homogeneous conjugate of a monoclonal antibody and drug for selective inhibition of breast cancer cells.

"The LDM platform provides unprecedented control over precision in protein engineering

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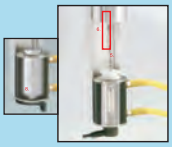
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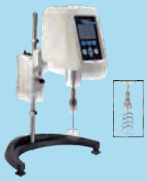
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RHEOLOGY VISCOSITY TEXTURE IN-LINE POWDER MOISTURE GAS

and a very powerful chemical toolbox for biology and medicine," said the lead researcher. One of the main applications being pursued in the IISER laboratory is the development of antibody-fluorophore conjugates and antibody-drug conjugates. The platform will help cancer patients with precise imaging-guided tumor surgeries and directed cancer chemotherapeutics in the coming years. In other words, the technology would empower us to get rid of the tumors without harming the patient's healthy cells.

Insulated Panels for COVID-19 Vaccine Storage Facilities made with BASF's Elastopir

Storage Facilities

Kuala Lumpur, Malaysia: United Panel-System M Sdn. Bhd, (UR), Malaysia's leading insulated panel, commercial and industrial refrigeration systems producer, now manufactures COVID-19 vaccine logistics facilities made with BASF's Elastopir® PH 1132/509/0, a high-quality polyurethane rigid foam insulation solution.

"As vaccines need to be preserved in super cold temperatures ranging from minus 70°C to plus 8°C to maintain their potency, the reliability of cold storages is extra important," said Dato Sri Dr.Bee Loh from UR. "Thanks to BASF's Elastopir solutions, which provides extra-high temperature stability for the interiors, coupled with United Panel's sound technological expertise for commercial refrigeration systems, we are able to produce high-quality COVID-19 vaccine storage facilities for our customers across Asia."

Sustainability is also an important benefit of BASF's Elastopir solutions. Elastopir PH 1132/509/0 is a n-pentane-blown foam, with a low global warming and ozone depletion potential. Additionally, the solution aids lower energy consumption, increasing the facilities' energy efficiency, an important consideration in many parts of Asia where electricity supply is hard to come by.

"It is heartening to know that BASF's Elastopir solution is playing a part to support the COVID-19 vaccination programmes in different locations," said Andy Postlethwaite, Senior Vice President, Performance Materials Asia Pacific, BASF. "Our collaboration with United Panel once again demonstrates our spirit to "go beyond," as we work together to produce the highest quality panels for the vaccine storage facilities."

Elastopir has superior fire performance, which enhances the protection of these facilities against fires. It was also recently used to produce mobile medical Intensive Care Unit (ICU) facilities by Rinac India Limited to support India's urgent need for more hospital beds during the pandemic.

Four Supply Chain Management Trends: Aspen Technology

Author

Roch Gauthier
Senior Director, Product Management
Aspen Technology Inc.

Resilient and Sustainable Supply Chains

According to Professor Yossi Sheffi at MIT, supply chain resiliency is "the ability of a company to quickly respond or bounce back from a significant disruption."

Supply chain resiliency has, in fact, become a priority for some governments.

At the same time, a renewed focus on sustainability has emerged in many chemical companies as they set new targets to reduce energy use, emissions, and waste while governments include green energy policies in economic recovery packages. The lesson from the past year is that sustainability and resiliency are two sides of the same coin.

The Aspen Supply Chain Management (SCM) planning and scheduling system used by FPCO to optimize its extensive supply chain.

Supply chain digital twins can help manufacturers achieve their resiliency and sustainability goals. For example, AspenTech's work with FP Corporation (FPCO), along with Time Commerce (an Aspen Implementation Services Partner), was recently recognized with a 2020 Green Supply Chain Award from Supply and Demand Chain Executive. FPCO is the largest maker of plastic food containers and related packaging materials in Japan.

FPCO utilized Aspen Supply Chain Management (SCM) planning and scheduling to economically optimize its extensive supply chain on an ongoing basis and consistently supply more than 10,000 types of food containers to supermarkets across Japan, support food infrastructure, and build a recycling-oriented supply chain with the goal of a sustainable society.

Managing Change through Sales & Operations Execution (S&OE) Digital Capabilities

As every manufacturing company knows, things do not always go as planned. Supply and demand

uncertainty brings forth inevitable daily events and disruptions that must be managed. This can include production quality issues, logistics delays, last-minute changes to customer orders, etc. For most organizations, the pandemic amplified supply-and-demand disruptions to a whole new level.

We are seeing a trend in the market related to manufacturers wanting to become much more agile. This is driving numerous customers to implement Sales and Operations Execution (S&OE) processes and related digital solutions. S&OE is a process that allows manufacturers to align their day-to-day activities on an ongoing basis to achieve their longer-term Sales & Operations Plans (S&OP) while also improving agility.

The October 2020 Forbes article Hexion Is Blazing New Trails in Improving Profitability, authored by Steve Banker from ARC Advisory Group, focuses on how Sales & Operations Execution helps Hexion specialty chemicals improve profitability through high operating leverage and increased productivity. The article provides some insights into how "AspenTech's collaborative platform allows the demand, inventory, production planning, capacity planning, and quality teams to interact and create better production schedules based on the inevitable disruptions that are occurring.

Extended Value Chain Integration and End-to-End (E2E) Optimization

Transportation fuels have historically been the biggest demand and end-use for crude oil. With the energy transition underway, demand for transportation fuels is expected to peak, driven by more efficient combustion engine technologies and the transition to electrical vehicles. As this happens, refiners will shift their attention from transportation fuels demands to chemical demands as a target area for future growth. This megatrend is referred to as crude-to-chemicals (CTC).

When looking at the CTC extended value chain, there are two key areas with integration opportunities. The first is the integration of the oil refining supply chain and the base petrochemicals supply chain. The opportunities here relate to exploiting process and molecular synergies to shift from producing fuels to chemicals.

The second is the integration of the base petrochemicals supply chain (e.g.

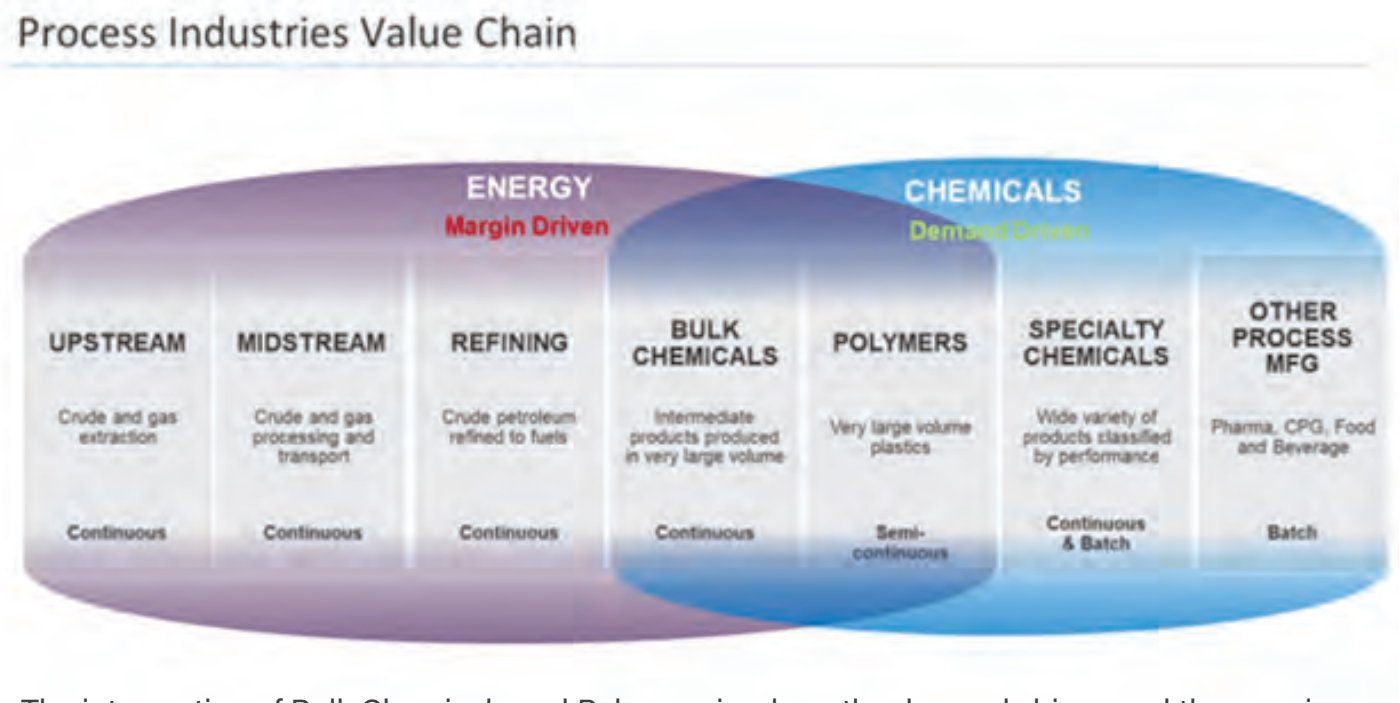
Sales and Operations Execution (S&OE) capabilities are vital because things don't always go as planned.

olefins) with the downstream derivative chemicals (e.g. polyolefins) supply chain. The opportunity here is linked to being more agile and specific in the monomers and polymers value chain planning integration and optimization to best respond to changing supply/ demand economic conditions across the extended olefins-to-derivatives value chain.

Managing and optimizing a crude/ olefins-to-polymers extended value chain is challenging, as it spans supply chains that have very different characteristics.

The upstream refining and bulk chemicals businesses are margin-driven supply chains in which the optimization opportunity consists of optimizing the operating conditions of complex continuous production processes, as well as exploiting feedstock supply and associated economics optionality.

The downstream polymers business is a demand-driven supply chain in which the optimization opportunity consists of looking at the broader business system (including changing demands for hundreds to thousands of individual finished products with



The intersection of Bulk Chemicals and Polymers is where the demand-driven and the margin-driven sides of the value chain meet and interact.

unique characteristics, the distribution network and associated modes of transportation, inventories optimized according to demand patterns and production cycles of different grades, and semi-continuous/batch/continuous production units) and determining the best way to balance supply/demand while maximizing the profitability of this overall system.

Many companies are already working on or prioritizing initiatives related to extended value chain integration and end-to-end optimization. Repsol Chemicals is one of them. Repsol Chemicals recently provided an overview of its "Control Tower end-to-end supply chain optimization" project at the November 2020 European Refining Technology Conference (ERTC). The AspenTech value chain optimization solution will support Repsol Chemicals in achieving its customer service objectives and becoming more agile to respond to market and operational changes, while doing so with full visibility into the end-to-end integrated margin across the olefins-to-polymers value chain with the required accuracy and granularity.

What-if Scenarios Analysis Leveraging Mathematical Optimization at Scale

At the core of a supply chain digital twin there needs to be a representation of the manufacturing process. Multiple complexities may need to be factored into this model, such as production switching costs, utilities, minimum run sizes, and so on. Modeling becomes even more challenging when you factor in other production or tolling sites, as well as the dependencies across sites. As you extend backwards from production into suppliers, there are aspects that should be modelled here as well including different purchase minimums, costs, and lead times varying by supplier.

Finally, you have the downstream supply chain consisting of warehouses, distribution centres and customer ship-to locations. Things get complicated when you try to factor in duties and tariffs or product substitution options. As you can imagine, it can be very challenging to model these interrelated elements in a spreadsheet—rather than using a solution designed specifically for that purpose.

The other big limitation of a spreadsheet is that it wasn't designed to do mathematical optimization at scale to solve real-world problems—taking into consideration anywhere from tens of thousands to millions of variables and constraints. Using a solution designed specifically to do mathematical optimization at scale such as Aspen Supply Chain Management (SCM) is extremely valuable because:

An optimizer will find the best answer automatically, whether the goal is to maximize profit or minimize costs across the end-to-end system.

An optimizer will recommend options that a person or business wouldn't normally consider or didn't know were even possible. That's because it can easily deal with complexity in a way that a human mind cannot. ■

MyLab's starts shipping COVID-19 self-test kit, CoviSelf on Flipcart

Pune, India: Mylab Discovery Solutions, one of the leading bio-technology companies in India, announced the commercial launch of its COVID-19 self-test kit, CoviSelf, after receiving approval from the Indian Council for Medical Research (ICMR). It is the first test kit for COVID-19 that can be self-administered by citizens at home, in India. This indigenous test kit will be distributed through to 95% of the PIN codes in the county and will be available over-the-counter at pharmacies and drugstores across India. Individuals can also order it online through India's homegrown e-commerce marketplace, Flipkart. To ensure safe deliveries, Flipkart also offers contactless payments for consumers and will leverage its safe and sanitized supply chain. The company will roll out 1 million self-test kits starting today and based on consumer demand, it will make 7 million units available per week. The product should be available in retail within 2-3 days. The company plans to make the products available on the Government e-marketplace (GEM).

Priced at INR 250, CoviSelfTM offers a comfortable, easy-to-use and accurate alternative to the current test method. It can be used by individuals with or without symptoms and immediate contacts of confirmed cases as per the ICMR guidelines. Designed as the mid-nasal swab test, it can detect positive results in just 15 mins. Each unit contains a testing kit, instructions to use (IFU) leaflet and a bag to safely dispose of after testing.

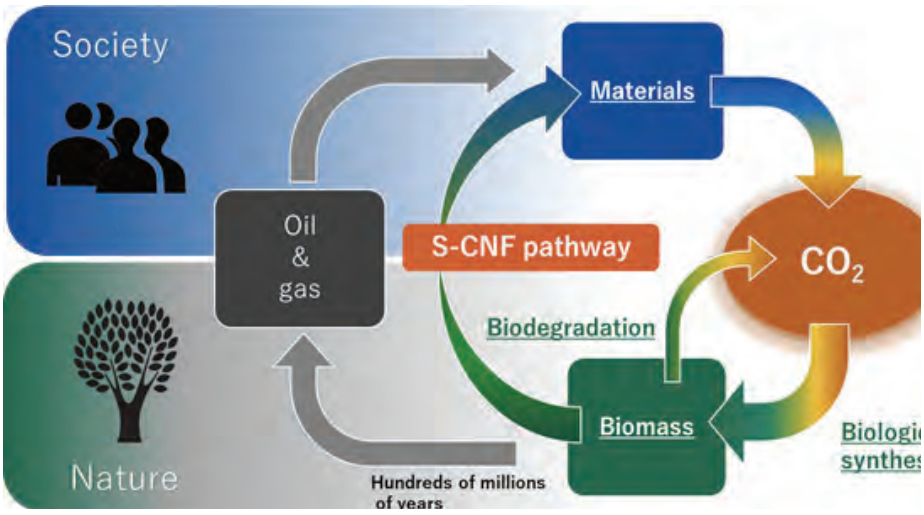
Speaking on this landmark milestone, Hasmukh Rawal, Managing Director of Mylab Discovery Solutions said, "Self-testing should slow down the spread of COVID-19 significantly. We aim to make CoviSelfTM available across the length and breadth of the country, especially for the people residing in rural areas who have limited options for testing."

Yokogawa Bio Frontier Commences Sales of S-CNF, a High-Performance Nanocellulose Material

Tokyo, Japan: Yokogawa Bio Frontier Inc., a subsidiary of Yokogawa Electric Corporation, announces that it has commenced sales of 100% plant-derived sulfated cellulose nanofiber (S-CNFTM). The company is initially providing samples to prospective customers, and will subsequently scale up production in preparation for the commercial sale of this highly versatile plant-derived S-CNF material to customers mainly in the chemical and materials industries.

Cellulose nanofiber is a fibrous biomass material that is derived from cellulose, an important structural component of plants. It is produced by extracting the cellulose from materials such as wood pulp and defibrating it to form very fine nanosized fibers. Companies in the materials industry have shown a great interest in cellulose nanofiber as it is a strong and lightweight material that is resistant to deformation when exposed to heat and

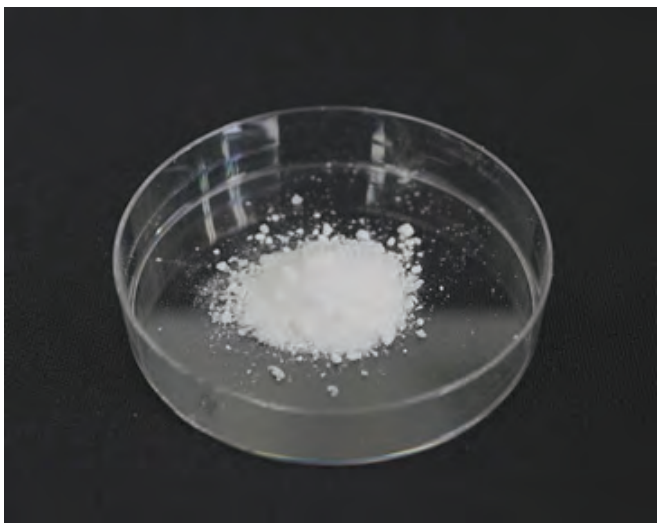
provides a highly effective barrier against oxygen and other gases, and its production and disposal have a low environmental impact.



Caption: Carbon-recycling through S-CNF

In addition to having the same characteristics as standard cellulose nanofiber, S-CNF in a gel form can be dried to produce a powdered substance that has approximately 1/100th the volume and weight of the gel. This powder costs significantly less to transport and store, and its physical properties can be restored by blending it with water. By adjusting the blending ratio, the physical properties of the cellulose nanofiber can be altered to suit specific applications. Furthermore, the process employed by Yokogawa Bio Frontier to break down fibers and produce S-CNF consumes less energy than other cellulose nanofiber production processes, and this is expected to make a significant contribution in reducing production costs.

Moving forward, Yokogawa Bio Frontier will work toward the commercial production of S-CNF and develop this business through the sale of this product and the licensing of its commercial production process principally to companies in the chemical and materials industries. The company will also look into joint research and development activities with customers using S-CNF. Yokogawa Bio Frontier will strive to promote the widespread use of plant-derived materials that will lessen our dependence on fossil resources and contribute to the realization of a carbon-neutral society.



S-CNF in powder form

S-CNF will be exhibited at the Kansai Sustainable Material Expo, which is to be held June 23-25 at the Intex Osaka exhibition center.

Some major target markets for S-CNF are chemicals, petrochemicals, automobiles, construction materials, ceramics, textiles, and other material industries, Food products, pharmaceuticals, and paper processing.

Some major target markets for S-CNF Applications are Filler for plastic/rubber materials, etc, Film and bottle packaging, Functional additives for cosmetic products and paints and Thickeners, emulsifiers.

Glenmark Pharmaceuticals launches Rufinamide Tablets USP, 200 mg and 400 mg

Mumbai, India: Glenmark Pharmaceuticals Limited launched Rufinamide Tablets USP, 200 mg and 400 mg, a therapeutic equivalent of Banzel®1 Tablets, 200 mg and 400 mg of Eisai, Inc. Glenmark was one of the first ANDA applicants to submit a substantially complete ANDA for Rufinamide Tablets USP, 200 mg and 400 mg, with a paragraph IV certification and received final approval on May 16, 2016. Commenting on the launch, Sanjeev Krishan, President, Glenmark North America said, "We are very pleased to be one of the first generic companies in the US to offer lower cost alternative to Banzel® Tablets, 200 mg and 400 mg.

The launch is our commitment to provide quality and affordable healthcare to our markets for patients." According to IQVIATM sales data for the 12 month period ending April 2021, the Banzel® Tablets, 200 mg and 400 mg market2 achieved annual sales of approximately $285.3 million*. Glenmark's current portfolio consists of 172 products authorized for distribution in the U.S. marketplace and 45 ANDA's pending approval with the U.S. FDA. In addition to these internal filings, Glenmark continues to identify and explore external development partnerships to supplement and accelerate the growth of its existing pipeline and portfolio.

Cadila Pharma Launches Posaconazole For Treatment Of Fungal Diseases

Ahmedabad, India: Pharma major Cadila Pharmaceuticals has launched a new triazole antifungal drug Posaconazole, which has been found to be effective against a wide range of invasive fungal diseases. The drug has also been recommended as a second-line treatment for Mucormycosis or black fungus as it is commonly known.

Posaconazole is approved for prophylaxis against Aspergillus and Candida infections in immunocompromised patients at high risk for these infections and oropharyngeal candidiasis (OPC). To be made available under the brand name Posacad, the drug is presently available in suspension and tablet forms, while the injectable form is in the pipeline and is expected to be launched soon.

"Several studies have confirmed that compared with other azole antifungals, Posaconazole is much more effective against many Mucorales species that are responsible for the deadly Mucormycosis infection in COVID-19 patients. In addition to approved indications, posaconazole has been used with success as salvage therapy for invasive mold infections and endemic mycoses in patients who are refractory to or intolerant of other antifungal agents.", said Mr O.P. Singh, President of Sales and Marketing at Cadila Pharmaceuticals.

There has been a rapid increase in Mucormycosis cases in India, especially Gujarat, in the second wave of the COVID-19 pandemic as a post-COVID complication.

The National Task Force on COVID-19 for treatment and management of COVID-related Mucormycosis has recommended Posaconazole, among other drugs for the treatment of Mucormycosis.

Importantly, Posaconazole is much more active than other azoles against many Mucorales species that are responsible for deadly Mucormycosis in COVID 19 patients and the combination of Posaconazole with other antifungal agents may be synergistic. "Hence it is a potential candidate either as a single or combination drug for difficult-to-treat fungal infections," added Mr O.P. Singh.

Cadila Pharmaceuticals has ramped up production of Posaconazole to meet the increased demand on account of spurt in fungal diseases.

"We have put in place the systems to ensure supply of the drug to hospitals on a priority basis. We aim to reach over 1,000 hospitals through our 4,000-strong distributor network in the next few weeks," said Mr Singh.

Posaconazole works by stopping the growth of fungi and has an excellent safety profile. Serious side effects are rare, even in the case of prolonged use.

PLI Scheme To Help India Become Aatmanirbhar In APIs

The production-linked incentive (PLI) schemes announced by the Government of India (GoI) for key raw materials such as bulk drugs and formulations, with a total incentive outlay of Rs. 210 billion will help the country become Aatmanirbhar. As per ICRA note, it will reduce import dependence and boost domestic production of high-value products; and increase the value addition in exports. High value-added pharmaceutical products are generally R&D intensive and difficult to manufacture and these include products such as complex generics, patented products, and biologics among others. Further, the GoI has also announced the promotion of the bulk drug parks scheme with a financial outlay of Rs. 30 billion for three select states, which will provide infrastructure assistance to the active pharmaceutical ingredient (API) players.

According to Gaurav Jain, Vice President, ICRA: "The Phase-I of the PLI scheme (announced in July 2020 and approvals accorded through April 2021) for API players focuses on reducing the increased dependence on imports for four target segments, by setting up greenfield plants with prescribed minimum value addition. As per industry estimates, India imported approximately Rs. 250 billion worth of key starting materials (KSMs), drug intermediates (DIs) and APIs in FY2020, with 65-70% of such imports from China. ICRA expects the imports from China to reduce by approximately 25-35% once such capacities are fully commercialised".

The PLI-II scheme (announced in February 2021) focuses on the production and diversification into high-value pharmaceutical products (formulations/ KSMs/ DIs/ APIs/ Others) with a thrust on exports. The PLI scheme covers R&D expenses incurred for product development as part of the eligible investments in addition to provision to change the initially committed product mix up to five times during the scheme's tenure. This will provide the much-needed flexibility for R&D-

based investments, given the risks associated with successful product commercialisation. With the total approved outlay of Rs. 150 billion across categories to be disbursed over the FY2023-FY2028 period, the scheme is expected to generate incremental sales of Rs. 2.94 trillion (including exports of Rs. 1.96 trillion) over the six-year scheme period.

"Overall, ICRA expects the above measures to strengthen the business profile of R&D-based Indian pharmaceutical companies and thus an increase in the scale of revenues through foray into production of high value-add pharmaceutical products, along with backward integration for input materials and reduce import dependence. With the entire capital expenditure being reimbursed by the GoI in the form of PLI over the period of the scheme, it will lead to an increase in scale and market share for select Indian pharmaceutical companies, while ensuring a steady domestic supply of key input materials," Mr Jain reiterated.

Vuram launched a Live Tracking App 'Trackable' for COVID Vaccine Distribution

Chennai, India: Vuram, a leading hyper-automation services company, has launched an innovative app for the live tracking of COVID essentials such as vaccines, oxygen cylinders, PPE, and masks. Trackable is the first-ever Appian live tracking app, and Vuram's team behind the app won first place in the recently concluded Appian World 2021 Online Hackathon. Appian World 2021 Online Hackathon is a platform for participants to bring their software vision into reality faster by building a custom app and contesting for prizes.

At a time when the entire world is ramping up its efforts to roll out vaccines to combat the spread of the deadly virus, Vuram has given a facelift to the technology supporting the distribution, delivery, and administration of vaccines by building Trackable.

"Coming up with an idea to solve the growing needs associated with this critical time was the most important focus. While the solution is currently focused towards COVID vaccine distributions, we also wanted to ensure the solution remains highly customizable for any evolving use cases as well," says Michael Sujith, lead developer of the Trackable application.

Trackable is built using the Appian platform's Process models, SAIL, Objects, and a custom live tracking component built exclusively for this application. Trackable features three modules: the Administrator, Support agent, and Delivery driver module to offer separate views and access controls for each type of user.

Live Tracking with Street View: To facilitate better coordination between drivers and the agents Trained facial Recognition model powered by Microsoft Azure: To track the drivers' attendance and to ensure goods are handled only by authorized personnel. Demand management for inventories: To prioritize deliveries using automated business rules and ensure equated delivery across regions. Demand Analysis, a core component that can predict sales trends based on excess, in-stock, and out of stock inventory. Offline multilingual feature availability for the delivery driver module. The Administrator module

features the navigation pattern, which is one of the latest features on Appian.

Comprehensive dashboard to see the status of drivers (active/inactive), orders currently in progress, and live map showing the location of all drivers in a single view. Detailed view of order status such as loaded, in transit, and delivered, along with the current location when in transit. View order details like SKU, quantity, delivery location, invoice, previous conversations with the driver, customer signature, and photos for delivery proof.

Telephony integration that enables single-click call and SMS facility from within the application. Manage stock inventory and warehouse distribution efficiently from the dashboard.Gain insights on how a product is performing in real-time across different months and years to ensure new orders placed are backed by previous trends.

Besides tracking vaccines and essentials like oxygen cylinders, PPE, and masks, the application can also be customized to suit a myriad of industries such as Retail, Supply Chain, Manufacturing, based on the ever-evolving requirements and business use cases these industries face. A live tracking delivery product with a short go-to-market timeline can boost a variety of businesses.

"Custom component building is at the heart of this application, and we focussed on making them more creative to provide an improved user experience. We are happy that we have managed to make it to the top in just a month. On behalf of Vuram, I thank the Appian Hackathon team for their efforts in conducting the event, and my hearty congratulations to all the winners," said Santosh Kumar, co-developer of Trackable. ■

"Under current circumstances everyone is coming up with digital version. Even newsletters are coming out which are useful because their frequency is much more. We can even go for lesser pages and bring out information in newsletters. It's a yes for digital reading"

Dr. P. Reddanna
Executive President,
Federation Of Asian Biotech Associations

"Pharmabio World has been able to enable people by providing contemporary news and information from the healthcare discipline through education, knowledge-share, and more recently introducing entrepreneurs contributing their voice on novel latest technologies, research and development, and products that are altering conditions to lead better lives. The print magazine so far has been a visual treat for a wider audience. Although the rudimentary processes of hand-hold-magazine feel is missed, I completely endorse the electronic/digital alternatives for simple reasons and an optimistic view that the accessibility of the knowledge and information should be the contemporary life. I completely endorse the digital version of Pharmabio World with strong wishes to its success"

Dr. Sreedhara R VOLETI
CEO, ASPIRE-BioNEST

"One of the major consequences of this lockdown has been a shift of trend from conventional offline services to digital resources. Media has experienced the same trend as well. The shift from offline magazine and newspaper distribution to online stories publishing, I think digital media has got an extra point for covering every household even in the pandemic situation. That too without the fear of getting exposed to the virus "

Rajat Garg
CEO, Co-founder, myUpchar

ZUMUTOR BIOLOGICS INC

"Just gone through the digital edition, extremely professionally done, liked everything. Only one feedback, see if its possible to zoom page wise, I have seen it possible in other digital magazine.

Again, good job done on this."

Sunit Maity, PhD

Director , Product Development, Zumutor

BOSON ENERGY
THE IMBY COMPANY

"It is a welcome change, may be long overdue!

(a) Better content delivery – in digital edition, dense diagrams in smaller fonts, could be included, as readers could zoom in to read those. Therefore, it becomes possible to deliver more and precise content

(b) more creative in designing the book : the publishers would not be bound to keep the layout be fixed in A4, A3 format or so. They shall have the full flexibility to design the layout without trying to fit in the contents to the physical limitations of traditional boundary of print-edition once selected or of the font size. Each edition could carry the size needed to best deliver the message of the current content."

Aditya Sharma

Senior Vice President Asia | Boson Energy SA

"I really loved the magazine. It surprisingly delighted me by giving the experience of reading a paperback magazine. In fact, sometime back I had twitted tagging most publications saying, "Why don't you make newspaper PDFs easily available. We (the readers) are ready to pay for PDFs but not the typical e-paper which is so low on readability with multiple ads popping on the screen and causing major distraction."

You have taken that 'wish' of the readers to another height. So, I greatly enjoyed it.

I will also share the link through social media handles over the weekend and I am sure people will love it."

Gauri Chaudhari

Co-Founder Brand Innerworld

Supply Chain Challenges in Pharma Industry

Vijay Anand
Managing Director
Kronos Logistics India Pvt Ltd

The global pharmaceutical has witnessed significant growth in the last decade. At the end of 2020, the total global pharmaceutical market was valued at about 1.27 trillion US dollars. It has increased three-fold from 2001 when the market was valued at 390 billion US dollars

Pharma companies are now rearranging their operations and recovering from the COVID-19 impact. The market is likely to reach 1.7 trillion US dollars in 2025 at a CAGR of 8% from current levels.

Such robust growth was witnessed in India pharmaceutical Industry as well, as per IBEF India's domestic pharmaceutical market is estimated at 42 billion US dollars in 2021 and likely to reach 65 billion US dollars in 2024 and further expand to reach 120 billion USD dollars by 2030.

India's biotechnology industry comprising biopharmaceuticals, bio-services, bio-agriculture, bio-industry, and bioinformatics. The Indian biotechnology industry was valued at US$ 64 billion in 2019 and is expected to reach US$ 150 billion by 2025.

India's drugs and pharmaceuticals exports stood at US$ 17.57 billion in FY21 (From December 2020 to April 2021).

Medicine spending in India is projected to grow 12% over the next five years.

Challenges In the Pharmaceutical Supply Chain in India

Every business has challenges, but the challenges prevailing in the pharmaceutical Industry is extremely complicated. Pharma Industry is still relying on supply chain and manufacturing paradigms that have been around for many years. With various stakeholders involved and complex network design, it's extremely difficult to align everything for an efficient supply chain.

If we analyze the cost distribution of a pharma product it roughly costs about 30% for the supply chain & distribution alone. Where in R&D and primary manufacturing costs only 25%. Therefore, the current supply chain and distribution cost is extremely high compared to other costs. And it is likely to go up further northwards due to the following factors

- **Freight Cost**

Post covid outbreak, freight costs across all modes of transport have gone up skyrocketing by 3-4-folds when compared to 2019 levels. And there is no reliability or consistency in prices as well as service providers like Airlines, Shipping lines, truckers do not give long term rate contracts anymore, and literally, freight rates keep changing on weekly basis.

On one side the fuel costs are going up and on the other side, there is heavy equipment or inventory shortage which keeps destabilizing the supply chain plans and service providers are struggling to maintain the momentum.

Sea freight movements are extremely chaotic now and stressful due to various global issues like container shortage, backlogs in various ports, 2nd covid wave outbreak in key Asian ports, rerouting of shipping vessels, blank sailing, and avoidance of calling certain seaports is hitting the shipping movements terribly

The Airfreight movement is okay as most of the Airlines are surviving only on cargo revenue today as tourism post covid outbreak went for a toss. However, airfreight costs have gone up skyrocketing. For e.g., what used to cost INR 150 per kilo as airfreight cost to the USA per kilo in 2018-2019 has gone up to INR 450 per kilo now

Trucking costs have gone by 30-40% due to the increase in fuel cost. Combined with the shortage of drivers due to the covid outbreak has sent the trucking industry to an extreme difficult situation.

Overall, cost across all modes has gone up, and the situation is likely to continue for another 4-6 months period.



▪ Technology Investments

Pharmaceutical companies must ensure precise on-time delivery, compliance, and stability. They must ensure the cargo will turn up on time in the right condition.

Managing perishable products, degradation of the medicines as they move along the supply chain, maintaining temperature control has a heavy cost attached to it.

Many pharma companies are moving to adopt newer technologies to the fullest potential and trying to integrate various processes. Transparency and visibility are going to be a key driving factor in the ensuing years for productivity and growth. The non-visibility of inventory causes serious threats of counterfeits, loss of sale, challenges to trace products, and cannot predict the demand scenario.

Pharma companies are forced to invest in new technologies to stay afloat in their business. Managing cold storage facilities is very resource-intensive and not budget-friendly, some of the products must be stored at a very low temperature to ensure that the potency and formulation remain intact. This would need pharmaceutical supply chains equipped with specialized reefer containers for movement and the use of cold storage facilities for storage adds additional cost.

The task of bringing medicines to market is a race against time. Since the onset of the pandemic, the cold storage demand from pharma companies has increased, also flexible cold storage facilities are required now to meet the vaccine demands without any excess or wastage of vaccines. Unlike drugs, all vaccines need to be transported at cold temperatures between 2 and 8 degrees Celsius and many vaccines lose potency when exposed to higher temperatures.

Therefore, technology investment now is key to be successful and it also enables to be prepared for the future disruptions

▪ Compliance & Regulation – Choosing the right service provider

It requires a strategic approach to tackle the logistics issues like prioritizing, monitoring, minimizing, and controlling logistics risks, and its imperative that pharma companies shift the logistics cost to "Supply Chain as a Service (ScaaS)".

Due to increasing regulation and compliance requirements, the pharma industry is going through an enormous change and it needs a good service provider who can understand the pharma ecosystem. It requires a service provider who can respond to demand, provide multimodal options, cost-effective risk-based models, provide flexibility, visibility, and transparency.

The service provider with technical expertise, understanding of the regulation and compliance requirements is the need of the hour. Post pandemic, the traditional way of managing logistics is not going to be sufficient. Only an expert service provider can deliver the plans for the unexpected, reduces waste, cut costs, and can improve delivery times.

Good supply chain management can yield a 25-30% reduction in total supply chain costs. The traditional model is a highly fragmented model and is not going to help anymore as it will increase the cost further. Most global companies are now investing in an ecosystem internally to handle the complex requirements of pharmaceutical companies.

Pharma companies should have a holistic approach in identifying the service partner rather than comparing on a transactional basis.

An expert service provider who follows and deliver "Supply chain as a service" (ScaaS) offers companies end to end supply chain solutions & services from strategy to product delivery and in turn frees up the valuable company time to focus on customers and new product development and allows the company to focus on their core competence area.

Pharma companies that leverage the Supply chain as a service can quickly improve their commercial position by utilizing a lower and variable cost structure. Pharma companies can scale up their service that provides a competitive advantage in both the short and long term.

New software technologies, innovations, and digitization by the expert service providers help the pharma companies to meet their end-to-end operations, bridges the gap, and provides visibility and transparency with real-time information.

In the shorter run, choosing an expert service provider may cost more for the pharma companies but in the long run, it brings enormous value to the table and builds sustainability, and gives a competitive advantage for them. ■

The Long-Run Aim Is To Make The Vaccine As Available As Ice-Cream: Pawanexh Kohli

Pawanexh Kohli, *has incubated and headed India's national centre for cold-chain development and doubled as the first ever chief advisor on supply chain to the Department of Agriculture. He talks about the urgency and overall importance of vaccine boost in our nation, to cater every citizen's wellbeing.*

Pawanexh Kohli
Former CEO of NCCD & ex- Chief Advisor of Department of Agriculture

Whatever has happened since my first concerns expressed on 19-March last year, has only validated that perspective and my thoughts on the matter have not changed. We still lag in the approach to the problem, in my opinion incorrectly seeing vaccination as a medical problem, whereas it ought to be reviewed from the lens of supply chain and backed with robust logistics. Developing a Vaccine was a challenge for medical scientists, the treatment of patients is a medical problem, but vaccination or ensuring vaccines in arms of people is a Supply Chain challenge.

Unlike in confined diseases where specific individuals are to be protected, in the case

of a pandemic, the approach of planners ought to be to stump the spread of the virus. There is a fine distinction between protective measures and eradication measures – and hence their Supply Chain strategy must be expansive and ensure it is all encompassing. The more piecemeal is the global approach on vaccination, the more scattered will be the effect and that will give even more opportunity for the virus to undergo a dangerous vaccine escape mutation.

In India, we also need to review whether tactics adopted in western countries are suitable for here. With higher undernourished and impoverished people, we imitated the route of assigning risk of infection by age rather than indigenizing the risk to our situation. Are the undernourished on our streets or an impoverished rickshaw puller not at higher risk of illness with lesser access to medical care, and of spreading the disease, than other categories?

Many of these are not only undernourished but have undiagnosed comorbidities, and such a category may not exist in such numbers in parts of the world that identified their senior citizens as those at highest risk. We also have the youngest demographic in the world, yet we also mimicked the tactic of targeting our senior citizens first – whereas our seniors are in fact are less exposed (largely homebound in extended families and not clustered in old-age centres) and their infection is typically by way of their younger more exposed family members. A different approach could have been considered in India.

More so because, like I said, in a pandemic the vaccine is not merely to protect individuals from sporadic risk, but to stop the spread of the rampant disease. Optimally, both should be a simultaneous agenda, but the key priority has to be to stop the virus from multiplying. Therefore, the primary aim can be to vaccinate the spreaders. Both the primary and secondary purposes can be met by implementing vaccination-for-all in target areas, ensuring herd immunity in that geography. Now that critical work force has been vaccinated, it is time to change tack - to target multiple geographical zones (districts) and make each covid free, and as vaccine supply increases, to incrementally expand these ‘covid free zones’ until the entire geography of the country is a free zone. Until sufficient quantum of vaccine is produced to cover a target zone within predetermined time-span, it may be better to hold back and resort to standard preventive practices.

Despite having the most lauded and networked practice of general elections, where we plan for 902 million voters over 4 months, we could not replicate

that experience – even partially – for vaccination. As of today, India cannot even declare a single village to have achieved herd immunity through vaccination.

So far, we proceeded with a discriminated and staggered dosing system, while the virus has stayed indiscriminate in its systemic spread. The vaccination strategy must change, otherwise we run the risk of seeing many more mutations and then only pray the virus will mutate into a lesser disease sooner than later.

Supply chain planning requires matching production with maximum effect – identifying the desired effect is critical – then ensuring that there are sufficient outlets for the effect to manifest – vaccination centres. Then making sure these are manned and local risks are thought through. Then scheduling the execution and then finally rolling in the logistics to execute. Avoid hospitals as vaccination centres and set these up away from hospitals - in the long-run aim to make the vaccine as available as ice-cream – a shop in every village and hundreds in cities. Vaccines must be propagated as matter of pride, an honour-code, much like we do with voting/food/water, induce more people for a shot by offering short term insurance against Covid (if they pay for each dose) – consider that this virus is here for good, and plan accordingly. ■

A Vanguard in the Sphere of Advanced Robotics

Subrata Karmakar *from ABB India Ltd with over 27 years of experience in the field of Robotics, Instrumentation, Design, Simulation, Artificial intelligence & Digital engineering in an exclusive interview with PharmaBioWorld shared a unique prospective in embracing Automation and Robotics, ABB's stance in R&D, GoFA cobots, Logistics and many more.*

Subrata Karmakar
President
Robotics & Discrete Automation business

What are some big challenges faced in India while competing with the world's top robotics markets like Japan and China, what are your scope of adapting and keeping up with gradually shifting trends of automation?

Robotics is an extremely flexible and adaptable form of technology. The scope, therefore, to build systems that support unique functions and capabilities that suit the Indian market is infinite.

Countries like Japan and China might be a step ahead of us in terms of system readiness which makes process applications much easier. Nevertheless, India is not too far behind.

The uniqueness of advanced robotics is

that it can be installed and operated with minimum pre-requisite training. Although, larger corporations and organizations have already started adopting automation. The true success of robotics in India would be measured by MSMEs adopting these systems equitably.

We are living in an era of historic transformation. While the way we live and work has changed more in the past year than in the previous 30, the underlying trends haven't changed. They have simply accelerated with the pandemic. The technology is here today however customers are still hesitant to invest in automation. At ABB, we are helping them realise and unlock the benefits of automation for their business and society and thereby, helping them achieve improved results.

What kind of job roles can achieve successful desired result with the usage of robots in the field?

Robots are well-suited to repetitive tasks, given their level of accuracy, speed, and ability to work non-stop each day. At the same time, they are also flexible enough to switch between jobs, as needed. Over the years, technological advancements have brought robots a long way from their big, heavy-duty predecessors, designed primarily for the automotive industry. Today, robots have smaller footprints, far greater flexibility and integrated vision, and most importantly, carry out tasks on shop floors and otherwise that may be hazardous for humans.

Robots are increasingly moving beyond traditional manufacturing and into logistics and warehouses, laboratories, workshops, and in small production environments. Apart from physical or logistics-related work, robotics with the help of machine learning is also now advancing to the field of design and creativity. With Industry 5.0, cobots will be capable of working alongside humans in planning, designing, and executing functions and tasks at advanced levels. The development of collaborative technologies means robots are also increasingly well-suited to laboratories and medical facilities, as they don't require safety fences to operate safely and efficiently alongside people. ABB recently launched its new range of cobots including – GoFA and SWIFTI cobots.

ABB's GoFA cobots are engineered for first time users and SMEs, helping businesses automate processes involving heavier loads and longer reaches to assist workers with repetitive and ergonomically challenging tasks. The SWIFTI cobots are designed for intermittent collaborative work with people at industrial speeds (up to five meters per second). ABB's YuMi collaborative robot, first launched in 2015, also works alongside people from assembling electronics to testing ATM machines and testing Covid-19 samples.

Robots today are increasingly incorporated as components of medical devices in laboratory environments, supporting anything from R&D in the pharmaceutical industry or universities to healthcare testing in medical facilities. Today's robots can perform multiple tasks, are easy to program, and may even be able to manage other laboratory equipment.

In addition, it is important to note that companies need to prepare and train the workforce to continue to embrace automation. Ensuring workers have access to lifelong learning to develop the skills needed to keep pace with technology will be important as we delve deeper into automation.

Has the pandemic accelerated or slowed the automation in manufacturing?

COVID is the biggest catalyst for change in the industry in a generation, encouraging companies to accelerate investment in automation. In a survey conducted by ABB Group in Jan 2021, eight out of ten workplaces (84%) said that they will introduce or increase the use of robots in the next 10 years, citing the pandemic for accelerating their investment plans for automation.

Meeting consumer expectations for promptly delivering tailored products is a big part of competing in today's manufacturing world. This means producing more quickly and flexibly, at reasonable cost, with minimal wastage and maximum consistency. At, ABB Robotics, we are helping our customers embrace this change, thereby making them more competitive.

New sectors of the economy, especially SMEs, are embracing automation for the first time, while new applications such as flexible manufacturing, cobots and new customer segments such as healthcare, FMCG, retail, construction, logistics are accelerating.

What are some key initiatives taken by the company to boost 'Sustainability Strategy 2030'?

Sustainability is increasingly important to ABB and our customers. With our 2030 sustainability strategy, we are actively enabling a low-carbon society as well as working with our customers and suppliers

to implement sustainable practices across our value chain and the lifecycle of our products and solutions.

As part of this strategy, we have identified areas where we can reduce our scope 1 and 2 CO_2 emissions by at least 80 percent and we continuously work on opportunities to do more. Today, close to 40 percent of our sites have already stopped sending waste to landfills. Also, by 2030, we will systematically improve circularity in our supply chain through our supplier sustainability framework, which focuses on environmental, social, and governance performance.

The social, economic, and environmental benefits of robotics are positive and should be embraced – more importantly, should be made aware of. Automation has a clear role in supporting the development of a smarter and better world, enabling sustainable profit, people and planet.

What are some new products in the pipeline and how much does your R&D and its principles enhance the road ahead?

We plan to accelerate in existing segments including automotive OEMs, drive new automation solutions such as machine-centric robotics and flexible manufacturing concepts, and leverage our existing expertise in new segments like logistics and healthcare. We are also expanding our portfolio of products with new versions of track systems and cobots, along with new and improved solutions with machine-centric robotics, and flexible manufacturing systems.

We are focusing especially on our software and digital portfolio. We already monitor ~9000 installed robots remotely and are constantly adding new digital services on ABB AbilityTM.

A key element of ABB's long-term growth strategy is to continue to invest and innovate in service robotics, bringing our automation expertise to new areas such as healthcare and building on our automotive and electronics sector focused business.

We are constantly investing in the R&D of new software solutions to build a strong digital future for manufacturing companies. New digital solutions incorporated into our robots such as AI and machine learning offer huge scope to enable our customers to fully realize the potential of automation and increase their flexibility.

Apart from our own R&D, we partner with industry-leading companies such as Microsoft, HPE, Ericsson and Dassault Systèmes to enable further leaps in innovation and growth. Moreover, at a Group level, we partner with more than 70 universities.

What is your personal mantra for success in this growing robotics race of staying at the forefront?

ABB is a pioneer in robotics, machine

automation and digital services. We are providing innovative solutions for a wide range of industries, from automotive to electronics to logistics. At ABB Robotics, we are not just witnessing this transformation, we are leading from the front – with due credit to 50 years of experience in robotics and automation combined with a team of experts who are pushing the boundaries of technology. What sets us apart is that we provide our customers with domain expertise in specific applications, as well as strong implementation and service support. Our customers, therefore, have the best of both worlds thanks to our diverse portfolio.

How has the Food and Beverages industry, that integrate factory automation for packaging, material handling robotics, shipping, etc. upgraded its new trends in Robotics and Automation?

The levels of complexity involved on F&B shop floors combined with the requirement for high output speeds has major implications for automation at all stages of the operation. Only machine learning and real-time data transfer are likely to help match the required speeds. AI, automation, and robotics can maximize flexibility at a range of pinch-points in the production and distribution process, thereby opening up opportunities and minimizing risks to the security of supply.

The focus on technological advances has seen ABB's IRB 360 FlexPicker become the most reliable delta robot available due to the world leading motion control and state of the art integrated vision incorporated into PickMaster software With nearly 20 years of picking experience, ABB ensures successful applications across all areas of food and beverage production from meats, fish, dairy, bakery, confectionary, juices, wine, coffee, tea to fruits and vegetables. In these areas, ABB can provide function packages for picking applications which enables simplified entry into robotic automation for those companies with limited experience of robotic automation.

A large range of robots designed for maximum reach, payload and cycle time requirements has resulted in ABB palletizing robots becoming the solution of choice for many global blue chip companies as well as smaller food processors who want to keep ahead of their competition by utilizing the most cost efficient, versatile and reliable products available.

All of these core robots are complemented by a range of software products, end of arm tooling and function packages. These enhancements to the base robots enable a flexibility of choice to suit all requirements never before seen in the robotic automation marketplace. ■

Competence In Thriving In The Cold Chain Industry

Sunil Nair, *the CEO of Snowman Logistics Ltd coming with his three decades of experience in the Supply Chain & Logistics, spoke with The PharmaBioWorld discussing critical highlights about the Cold Chain Industry, its latest technologies, importance of dealing with India's volume and need for government's upliftment for the sector.*

Sunil Nair
CEO
Snowman Logistics Ltd

Please share an overview of the integrated temperature control logistics services in India?

The Cold Chain market is expected to increase around 17% including the Pharma industry, and if to loosely quantify it is guestimated to be somewhere around a 70-75 crore market sector, basis various research documents publicly available.

Talking about the Cold Chain logistics in the country, it is still largely dominated by the food industry and we are at par with most of the advanced technologies available around the world. But the volume which should be there and the application of this cold chain infrastructure in the country is still at a very nascent stage. When we talk about volume, we are not

even 10% of what China does in the Cold Chain sector today.

But the indications are quite promising in terms of the next 5 to 7 years prediction, the volume is going up by 18 to 20 % yearly. But when we compare with other countries like China, Malaysia, Thailand, we are far behind in terms of the capacity creation that is there on the ground. After some major changes talked about in the FDA, many Pharma products may undergo distribution through Cold Chain network and the sector shall have greater visibility to the Pharma sector. The overall Pharma and food industry are still evolving in terms of world capacity. But in terms of technology and capability, we are already there and adopting latest technology and handling practices in India.

How do you benchmark the sector against some of the other countries? And in your view, which is one of the best models around the globe.

Comparing on the basis of Technology, we are already advanced with the latest cold storages, latest trucks in usage. Since most of the refrigeration equipment and material handling equipment are imported, they are usually the world renowned brands.

We face a lot of issues while dealing with inadequate and decentralized volume. Volumes are in different pockets and hence the overall network is not optimized. For example, there are a lot of Pharma companies in Baddi, Himachal Pradesh. Many pharma products are being distributed all over the country, but they have limited inventory to take backhaul and hence the transportation is inefficient in the overall system. This is a challenge and should get addressed over a longer term.

In 2012, there was a new food safety law enacted called FSSA, this Act had consolidated seven different Acts and made it into one Act , that is stringent and effective. After the government changed, it took a couple of years to be enforced on the ground.

Earlier a brand would only be responsible if anything goes wrong with the product, but today even the distribution company is responsible if they have not handled the product properly. Distribution and logistics companies are bound to preserve the documents and records of storage and transportation for any scrutiny by FSSAI, if need arise.

This accountability on the distribution company demands better technology and visibility throughout the distribution network. At the same time, the brand orders are also now responsible to use a Cold Chain to distribute the product.

In the last 3-4 years, in the organized sector, there has been almost doubling of. The organized sector, in spite of so much of capacity addition, is clocking utilization close to 80%.

What are the gaps that need to be addressed when it comes to the situation and deliver the product?

I don't see a gap when it comes to the supply side but it can be found on the demand side. As the demand is in pockets, you are manufacturing in one pocket, but you are consuming in another pocket, there are no return logistics and backhauling happening, hence your assets are highly underutilized and that increases your cost. This is not recognized by the customer because the customer is only using the resources on one-way distribution. It creates a lot of issues in terms of optimizing that cost. Hence it affects the logistics companies, there are no large logistics companies in the country.

To some extent, we could address this through our network of warehouses. Our warehouses helps us accumulate volume and offer return loads to the trucks.

The government will have to come up with some strategy where manufacturing and consumption are equally distributed around the country. A lot of strategic and speeding up of process should be executed to fill those gaps or the overall cost of the cold chain industry will remain inefficient.

How do companies like Snowman enhance their business model to optimize the cost to a certain extent?

Since we have the presence of Cold Storages across the country, we have some flexibility in terms of backhauling and using it for reverse transportation. But there are issues too. So if the size of the problem is 100 for other cold chain operators, we would have addressed only 50. However, with our IT technologies, we are trying to create more visibility on demand and supply, and deploy resources accordingly. This is on major agenda with us for now.

What are the steps that need to be taken to address the challenge?

Snowman has been establishing its footprint across the country which is very important for growth. Today we are present in 15 cities and in the coming months, it will be 17 cities and 28 cities in the coming few years, all based on strategic locations.

Our return Logistics in the backhauling is efficient to manage rise in volume and cold storage acting like hubs. Then we move towards a lot of inventory to consumption centers.

The government should also come forward and create a lot of manufacturing locations like they have for various industrial areas.

Tell us about your tie-up with Dr. Reddy's for the vaccine distribution.

This is another example of how the overall distribution network should work and how the companies are looking at it now. We

store their vaccine, we take orders, make invoices on behalf of them. We pack the vaccines and deliver them.

Dr. Reddey's QA department in their office can see the temperature of each chamber in our warehouse. They can monitor the location of our trucks, speed, and temperature, leveraging digitalization very well.

Each chamber is biometric access controlled, they know who is stepping in and out of their chambers. We have created visibility to that extent. Our goal is to create a distribution system that is more robust, reliable and sustainable.

Contingency planning is quite essential. Like in our case, if there is a refrigeration temperature that goes beyond the stipulated range, an alert is generated in the respective people who are supposed to address the concern.

If my refrigeration system completely fails for some reason and you need some hours to bring it back, there is an ultimate parallel system to switch on, so that temperature is maintained.

What are available opportunities in the Cold Chain industry?

Cold Chain has huge potential in the future with the Pharma industry growing 18 to 20%.

The high CAPEX business model and the entry of new players is going to be minimal and it needs a particular scale for you to make a good business to model out of it and companies like Snowman who have already achieved scale, we are over 107450 pallet position today. As we double our capacity we can see our business model becoming a financially attractive model.

This is the best time to get into the Cold Chain for India as the last 15-20 years it has been on a slow track but it has fast-tracked.

The whole world is looking at India, knowing that we are the first or second largest consumption centers in the world. Most of the multinationals that came in this country in the last 5-7 years have gained aggressive growth clients within the country, whether it is the food or Pharma manufacturing companies. In the next 4 to 5 years, the Cold Chain will get different recognition in the country and will be more visible with logistics.

What are the capacity expansion plans of Snowman Logistics?

So we have invested 70 crores this year, and we are going to invest 425 crores in the next three year's time. We have earmarked 200 crores for Pharma infrastructure and the technology and the rest will be for Food. We are already present in 15 and will expand to 28 in the next three years' time aiming to reach any part of the country in 24 hours' time. Then we are ready for any company to come in or to launch their product. We'll also be

expanding our e-commerce verticals, to reach eCommerce companies who are into Food and Pharma-related products.

What kind of support is the Indian government offering to the Cold Chain industry and what do you expect?

The Indian government largely launches its Capex support and subsidies to farmers and post-harvest activities and not to independent Cold Chain companies. It is important that they extended it to complete Cold Chain whether it is Pharma or Processed Food.

Today it is only for Agri based for which there is hardly any investment coming in. So for the country's Cold Chain expansion, they have to generalize it. Let the capacity get created first.

Once the capacity is there, I'm sure the Agri produce will start flowing through that network. But if you restrict now and only put Apple and Grapes in your warehouse and not processed foods, then who shall pay for it. Allow us to store everything and anything and keep that grant of subsidy whatever is possible. Once the capacity is created, the larger capacity, even the cost per unit will decrease. Even with lesser revenue per unit, cold storages would be able to accommodate fruits and vegetables. ■

Ramping Up Outreach In The Commercial Refrigeration Market

M Srinivas Reddy, *the Senior General Manager of Blue Star Ltd has an exceptional 27 years of experience in driving and implementing Business Excellent Programs. In a talk with PharmaBioWorld, he shares his thoughts about Star's manufacturing footprint, challenges and solutions and other keen points of establishing itself in arena of Commercial Refrigeration.*

M Srinivas Reddy
Senior General Manager
Commercial Refrigeration
Blue Star Limited

Overview of commercial refrigeration market in India on market and how is it evolving?

Commercial Refrigeration market in India is steadily evolving with Refrigeration becoming essential for several businesses engaged in dealing with perishables of any kind. Be it Hospitality, Pharma & Healthcare, Processed Foods, Dairy & Ice cream, Horticulture, Floriculture, Sericulture, Seeds, Marine, Retail etc, Refrigeration enables scaling up and distribution of perishables. Recent debates around cold chain for vaccine distribution in a country of our size, is one example in the context. Some businesses run and sustain only if the cold chain is in place.

Higher consumption, rise in disposable

incomes, change in consumption habits driven by lifestyle, compelling need to arrest wastages across the value chain, and conservation of dwindling natural resources, are some of the key drivers for growth of Refrigeration industry in general. There are other futuristic challenges of food and nutrition security, facing the world and India alike. The key questions like whether we would be able to feed the rising population are being debated in the context of colossal wastages across value chain and limited natural resources available for production. Refrigeration is one of the measures available to mitigate some of the challenges associated with food wastage across the value chain. In India, various estimates peg the wastage at around 30% of fruits and vegetable production. In other words, there is a huge value loss in economic terms. Agriculture being the mainstay of the country, with around 60% of the population directly and indirectly dependent on Agriculture, one can imagine the gravity associated with such wastage. Of course, all stakeholders including the government are working at various levels in terms of building awareness and policy advocacy and measures.

However, the current market is highly fragmented with multiple product categories and diverse end-user applications, spanning several segments. Given the lower level of market penetration (around 4 to 5%) and the current market size, this category is highly imports dependent. India is far behind developed economies and even other ASEAN peers in Commercial Refrigeration adoption where adoption levels vary from 60 to 70%.

To what extent is our country dependent on imports for commercial refrigeration solutions? What is the kind of demand do you anticipate for the commercial refrigeration solutions especially from the pharma industry? How do you benchmark this sector in India against some of the other countries? Which country in your opinion has the best model that we can emulate?

The Commercial Refrigeration sector is heavily dependent on imports of components, predominantly due to lack of manufacturing eco-system. Wider product variety, driven by diversity of end-user applications, is one of the reasons necessitating dependence on imports, apart from scale issues.

The manufacturing eco-system is slowly evolving with market growth. However, the industry will continue to depend on imports for compressors and other critical components till manufacturing scale in the country reaches a certain critical mass.

Pharma industry is on a growth trajectory, with India evolving very well in the Pharma eco-system. The success of Pharma segment is attributable to an integrated strategy by several players of becoming strong in manufacturing and in Research

& Development as well to support growth. Usually, the demand for Refrigeration in Pharma industry cuts across value chain, starting from storage of inputs to in-process to finished goods storages to distribution till the last mile, depending on the need. Certain products, such as Vaccine, Life Saving drugs etc, are 100% cold-chain-centric, while certain products may not need cold chain.

The demand for Refrigeration is witnessing an uptick in the Pharma segment with new trends of 3P Logistic providers building modern integrated infrastructure for pharma storages & distribution and also driven by investments under Aatmanirbhar Bharat. We are excited on sustained growth opportunity in the Pharma sector.

Blue Star holds around 60 to 70% of the market share in the Pharma and Healthcare sectors with its Cold Chain solutions such as Modular Cold Rooms, Medical Freezers (-25 Deg C), Pharma Refrigerators (+2 to +8 Deg C), Ultra-low Freezers (-40 Deg C to -86 Deg C), and Blood Bank Refrigerators, amongst others.

Tell us about the latest products launched by Bluestar for the pharma cold chain & planned investments for future growth.

To further support the Pharmaceutical and Healthcare sectors, we launched a new range of commercial refrigeration products and solutions which are ideal for storing vaccines. These comprise specifically designed, temperature-controlled refrigerators and transporters, which are integral for building a robust ecosystem for vaccine distribution in India.

Ice Lined Refrigerators (+2°C to +8°C): Ideal for vaccination programs due to their ability to maintain a desired temperature even without power for up to as long as 48 hours, ensuring lower spoilage of vaccines while in storage through inevitable power cuts.

Vaccine Transporters (+2 to + 8°C): Perfect for transport of vaccines to remote corners of the country since they maintain desired low temperatures even while in transit by working off the battery of any four-wheel vehicle.

We will be continuously exploring new opportunities as the Commercial Refrigeration market gains scale and size. Given our strength in R&D, we continuously evaluate new developments in technology, components, refrigerants, and compressors and adopt them into our portfolio, while factoring aspects of sustainability and circular economy.

It is our intent to become a full-fledged end-to-end player in Commercial Refrigeration in general. For Pharma sector, our range is complete to cater to any Refrigeration need.

Share some insights into the existing Greenfield facility being set up in Wada. What strategic role will this facility play in the growth plan of company?

We are the market leaders in Modular Cold Rooms, Deep Freezers, and Storage Water Coolers. Blue Star's manufacturing footprint spans five state-of-the-art manufacturing facilities. The Company also has one of the best AHRI-certified R&D facilities in India with the largest talent pool of engineers. This has helped the Company in incorporating cutting edge technologies in all its new product developments.

The Company's manufacturing facilities at Wada and Ahmedabad are dedicated to manufacturing its wide range of commercial refrigeration products.

The Company is in the process of setting up a new plant at its existing facility at Wada to expand the manufacturing capacity of its deep freezers and storage water coolers, to cater to the rising demand for commercial refrigeration products as well as leverage on the Atmanirbhar Bharat Abhiyan. With the new plant, Blue Star will be doubling its production capacity for deep freezers. This new plant, being constructed on a built-up area of around 19,300 sq m, will have a capacity to produce around 2,00,000 deep freezers and 1,00,000 storage water coolers per annum. It is in the advanced stages of completion and is likely to be commissioned towards the end of this year. The new facility is expected to support Blue Star's aggressive growth in Commercial Refrigeration in the years to come.

What are the major challenges & opportunities for existing players and new entrants in this domain to establish as a strong contender in this domain?

Today, the challenges vary from lack of market scale to multicity of end-user applications requiring deep domain knowledge to lack of adequate skill capital in Refrigeration space to lack of strong manufacturing eco-system. Having a product to offer is just not enough. Refrigeration being central to customer business, the ability to offer optimal solutions to customers is the differentiator because the needs vary from customer to customer, connoting customising the solutions. To elaborate, domain knowledge required to offer Refrigeration solutions in the Hospitality industry is different from the Pharma industry, while the core technology may fundamentally remain the same.

After-Sales-Service plays a very critical role not only for attending service calls on time but also in ensuring trouble-free performance during equipment life cycle with periodic preventive maintenance service checks.

Blue Star initiated its 'Gold Standard' service program in 2017 and as a part of this journey, expanded its reach to

tier-2, 3 and 4 towns extensively. We currently serve more than 3900+ taluks/ tehsils. There are 150+ service crew vans inducted across India to commute our service technicians to various customer sites within our targeted response time. Blue Star is the only brand to introduce refrigerated vans at six key locations to be used as standby at customer premises during major repairs.

We have Service Specialist Groups, who are highly skilled in multi-technologies, to deep dive and crack any epidemic issues in the system performance. Our customer rate us high for our commitment to efficient and timey service delivery and our engineers are respected for their expertise in Refrigeration.

Indian pharma sector has shown phenomenal growth in the last decade but the corresponding infrastructure & facilities have not grown at the same pace. In your view what are the challenges that our country will have to address especially in terms of building indigenous commercial refrigeration systems.

I believe the Pharma sector has grown on the strength of sustained investments in infrastructure in manufacturing, R&D and distribution over the years.

The question is whether the existing Healthcare infrastructure is adequate to handle unexpected healthcare situation such as a pandemic. The critical need is to allocate and attract significant investments in building adequate public healthcare infrastructure, to be able to reach healthcare support to the farthest points in the country with equal efficiency and speed.

Your expectations from the Government (What kind of support is Indian Government offering to develop the commercial refrigeration capacities since these will play titular role in the supply chain as well as exports of pharma products?

Blue Star plays a leading role in advocacy areas related to the cold chain development in the country. We collaborate with relevant stakeholders on skill development in the Commercial Refrigeration domain by way of regular technical trainings to technicians at our modern training centres. This will help build capacity in the sector in the long run.

Given the country's scale and strength in manufacturing and R & D capabilities, India has a great potential to become a 'Global Pharma Hub' , with right policy and regulatory framework.

The PLI scheme for the Pharma industry is not extended to Commercial Refrigeration products and solutions providers. ■

The Evolution of Law and Ethics in Pharma Sector - The Issues Relating to Compensation

The concluding article in this series explores relevant aspects with regard to compensating victims of clinical trials. The author attempts to reflect upon several other desirable changes within the pharma field.

R. S. Raveendhren
Advocate, High Court of Madras & Legal Expert in the Institutional Ethics Committee of SRM Medical College Hospital & Research Centre.

NEW DRUGS AND CLINICAL TRIALS RULES, 2019:

In the absence of an exclusive statutory framework, the compensation for the participants of clinical trials in cases whereSerious Adverse Events (SAE) including death has taken place has remained majorly unaddressed. In a positive move, the Ministry of Health and Family Welfare had notified the New Drugs and Clinical Trials Rules in March, 2019.

For years, India has been rallying imposing of very strict obligations on the part of the clinical trial sponsors to provide for compensation to the participants that have suffered adversely and even death in the trials. The present 2019 Rules stipulates that the compensation for grievous injury will henceforth be determined by the Drug Controller General of India after recommendations from the expert committee. The decision shall no longer rest with the Ethics Committee. The Act in a way purports that the Ethics Committee was in no position to adequately assess the damage caused.

The 2019 Rules also makes it compulsory that

- Sponsors are to provide free medical management to the study participants who have experienced injury or
- Till the time it is established unequivocally that the injury is not related to the study

The Rules have finalized compensation formulae for SAE and death (based on certain factor such as age, etc.)that also brings about clarity and defines the limit of financial liability on the part of the sponsors in case of certain injuries.

Here is why the Ethics Committee is ill equipped for deciding on the compensation:

- Casualty assessment is a complicated field requiring a lot of medical expertise.
- A lot of trial participants already have underlying diseases that could result in death allowing the Committee to blame the death on other causes even if the death is a direct result of the clinical trial.
- Apart from lack of medical knowhow, they also lack expertise in law and actuarial science.
- It has also been pointed out that the Committee is most of the times closely associated with the institute where the trial is taking place often raising doubts of conflicting interests.

A chain of committees but to no effect:

The need for adequate compensation to the participant of clinical trial that have suffered adversely including death puts a strict obligation on the government to make laws and accompanying rules that zealously guard its people from exploitation by the global pharma industry. It is the government's duty to protect its most vulnerable section of the citizens.

In 2003, the Government of India constituted an Expert Committee under the Chairmanship of Dr. R. A. Mashelkar, Director General of CSIR to undertake a comprehensive examination of drug regulatory issues, spurious drugs, penalties under the Act and to recommend measures to control the production and sale of spurious drugs.

The Committee promptly submitted its report with several recommendations. A rather sad fact is that none of the recommendation of the Mashelkar Committee was so much as acknowledged leave alone justified with action.

The role of the Committees:

Subsequent to the Mashelkar Committee, three more committees were constituted. All the three have categorically expressed displeasure at the general state of affairs relating to the clinical trials in India. The Fourth Committee that was set up in 2013 made recommendation for improving existing framework for compensation to the victims.

The Health Ministry,taking cue from the Ministry of Law introduced the Drugs and Cosmetics (Amendment) Bill, 2013 to regulate clinical trials and to provide compensation to victims of clinical trials. The bill did not see the light of the day since the Union chaired by the Prime Minister took a decision to withdraw the 2013 bill in the year 2016.

The bill was subsequently examined by another Parliamentary Standing Committee which recommended several changes. It felt that though the regulatory framework for ensuring quality, safety and efficacy of medical products including medicines, medical devices, in-vitro medical devices, stem cells, regenerative medicines and clinical trial/investigation is provided in the Drugs and Cosmetics Act, 1940, it will not be appropriate to carry out further amendments in the present Act.

The reason given was that newer areas such as stem cells, regenerative medicines, advanced medical devices and clinical trial investigation cannot be

effectively regulated by the existing law.

This is true because the Drugs and Cosmetics Act, 1940 is a vintage piece of legislation that was brought out by the British. It could have not foreseen the tremendous amount of developments that we have made in the last eighty and odd years.

That the Act is inadequate is sufficiently known. Even the courts of law have been constrained to judicially intervene to protect the precious rights of the citizens. This is precisely it is not an overstatement at all to say that the Judiciary has played a substantial role in the policy evolution in the sector.

This is a good time for the government to pay serious attention to major lacunae that prevail such as:

(a)The absence of division between trials involving simple medicinal drugs and special medicinal drugs for gene therapy;

(b)Lack of punitive measures;

(c) Absence of grievance settlement mechanism in clinical trial process

(d) Lack of competence to provide a system of compensation

(e) No provision for appeal for trial participants against the decision of Drugs Controller General of India

(f) Lack of transparency in sharing data relating to the trial

(g) Absence of regulatory mechanism for biomedical and health research

(h) No clarity in laying downjurisdiction to prosecute in case of SAE or death.

Reflection:

Science and technology can diametrically transform life and its quality but if law does not keep pace, it can create imbalances that can adversely affect the life of the citizens. An emerging economy, India first of all needs to have a robust statutory framework that encourages a scientific temper as well as protects the fundamental rights of itspeople. Nothing less than a brand new piece of legislation governing all the modern aspects of the pharma sector is the need of the hour. Are the rulers listening?! ■

Fast Performance, Extreme Durability in Weighing Applications

METTLER TOLEDO's XSR Precision Balances were conceptualized to simplify workflows while maintaining accuracy. Their robust design protects against dust and dirt, and a built-in notepad reduces time spent on data handling and transfer — improving repeatability, reducing risk of errors, and promoting long life.

Without good data, scientific advance is impossible. Academic laboratories thus depend on reliable measuring equipment that generates precise, accurate results, and simplifies their export for record-keeping or further analysis. METTLER TOLEDO's XSR Precision Balances meet researchers' needs easily, ensuring accuracy, lasting performance and maximum efficiency.

Along with the latest in high-performance weighing sensors, the XSR balance features SmartPan™, an innovative weighing pan that eliminates the effects of air turbulence. Improved sample stabilization yields results up to twice as fast as a standard weighing pan; high-quality data can be achieved in almost any environment.

The XSR balance's robust design also includes overload protection to safeguard the weighing cell. In addition, integrated StatusLight™ and LevelControl functionalities ensure that measurements are not made unless the balance is ready to weigh, while customizable tolerance profiles and MinWeigh warnings notify users when inappropriate actions are taken.

And manual reporting is a thing of the past. Task parameters and results displayed on the integrated notepad can quickly be transferred to PC via USB or Ethernet, eliminating transcription errors. As lab work can be repetitive, the XSR was conceptualized to provide a comfortable weighing experience. A high-resolution color display makes figures easy to read; the glove-compatible screen ensures accurate and fast touch response. Moreover, ErgoStand™ allows standing operators to adjust the screen to reduce neck strain. XSR Precision Balances are made to last. To prolong balance life, the design simplifies maintenance:

The terminal is fully detachable and has a pre-mounted protective cover which, combined with the full metal housing, protects the XSR against dust, dirt, liquids and harsh chemicals. Smooth surfaces and dishwasher-proof parts make the entire balance easy to clean, while rugged construction limits its repair costs. Delivering reliable weighing performance, and with clever features to support efficient, consistent data-generation, XSR Precision Balances are a truly ergonomic solution to researchers' needs — and to furthering scientific progress.. ■

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Uflex Closes FY 2020-21 On A High Note With Various Ingenious Products

UFlex Ltd, India's largest multinational flexible packaging company and a global player in polymer sciences, today declared its annual results for fiscal 2020-21 and quarter ending March 2021. With packaging taking the center stage in pandemic affected last year, UFlex rose above the challenges to post exemplary performance and achieved the highest ever production & sales volumes, revenue and profitability in the quarter as well as in FY2020-21.

Token for Paint Industry

Ashok Chaturvedi, Chairman & Managing Director, UFlex Limited stated, "Our business network has weathered the disruption whilst also demonstrating resilience to cope with the ever-changing demands of the sector. We commissioned three of our projects in FY2020-21, a BOPET film line in Russia and Poland each; and a new BOPP film line in Egypt with 42,000 TPA capacity, thus gaining an even wider reach globally."

"The pandemic did not dampen our focus on ESG practices and we continue to accentuate our efforts on this front. After the success of post-consumer multi-layer mixed plastic waste and PET bottle waste recycling lines at Noida in India, we are in the process of replicating these at our overseas locations, at an even larger scale. At our Mexico facility, we are setting up plant to upcycle post-consumer PET bottles waste into high recycled content polyester PCR films, for flexible packaging applications and also propose to set up facilities to recycle post-consumer multi-layer mixed plastic waste to make

Engineering - Application on Multi Track Machine

molded, injection molded and extrusion molded components, both of which shall contribute to a circular plastic economy. In Poland, again, we are setting up plant to recycle post-consumer multi-layered mixed plastic waste to make various molded components."

UFlex also displayed its commitment towards sustainability and innovation by developing a host of new cutting-edge offerings for a better future.

New sustainable laminate structure with reduced plastic use - With sustainability and green packaging driving our innovations, the Flexible Packaging business made progress in introducing a new laminate structure with reduced thickness of 3.0 gsm as compared to current 10 gsm extrusion thickness, without compromising on its barrier and other functional properties. The new laminate offers good machinability and increased laminate yield. The technology used has helped reduce the plastic content by over 10%. One of our patrons earlier using 58 GSM three-ply packaging structure for snack packaging has switched to the new structure, thus moving a step closer to their sustainability goals.

Improved packaging structure for Paper Boat Swing 150 ml juice range– Global supply chains have been disrupted ever since the outbreak of COVID-19 hurting various sectors. With uncertainty looming over the end of the pandemic phase, more and more companies are reducing their dependence on imports. Besides helping them de-risk their supply chain, this move also helps save cost. Realizing the need to be atmanirbhar, UFlex has developed a flexible packaging structure for Paper Boat Swing 150 ml artificial juice range by replacing BON, which had to be imported earlier, with ISOPET which UFlex manufactures in-house. Overcoming uncertainties on supply chain operations, it enjoys reduced turnaround time of 7 days as against 110 days of earlier

process. This has helped the Paper Boat enjoy substantial cost benefits. Moreover, the revised structure stands at par with similar qualitative attributes which the old structure of the pack offered.

Revamped structure for fast-food packaging – For little hunger & quick bites, noodles form the instant serving in many households worldwide. However noodle brands still have a long way to go to improve their handling and shelf-appeal at the retail stores. Understanding the pain areas of the brand Ching's Secret for packaging of hakka noodles that faced issues like pack puncture, noodles poking from the pack and dearth of instant connect with the consumer, UFlex developed a new polymer recipe with 15 micron TFP PET and special texture coating with register spot gloss & metal reflective shiny effect. The new structure is high dart puncture resistant and the surface of the pack reflects a combination of sheen along with an engrained noodle-like matte effect. This development has helped Ching's Secret present their packs more confidently on the retail shelves.

Spout packaging format for decoction coffee – Sealing the aroma of a perfectly brewed decoction coffee, the spout pouches developed by UFlex for packaging of filter coffee decoction by Araku Beverages is a move to make decoction coffee available as fresh and strongly flavoured as made at home. The stand-up spout pouch allows retaining the authentic flavour and aroma of decoction coffee for a longer time and lets easy dispensation at the consumer's end. In addition to this, the pack offers excellent shelf appeal and strengthens the brand image for Araku. This product, due to its packaging, is gaining huge interest in South India.

Aseptic Liquid Packaging Business

Radico collaborated with Asepto to launch blended whiskey in new aseptic packs- Radico Khaitan partnered with Asepto to launch its whisky brand 'Triple Eight' in Karnataka in new-age aseptic packs imbibing iconic foil stamping feature, thus giving the packs a unique identity amongst its consumers.

Chemicals Business

High quality UV LED Flexo ink series for narrow web printing – The Chemicals business introduced FLEXGREEN NW series inks, high-quality UV LED curable Flexo inks which have been developed specifically for the narrow web printing industry. These inks deliver superb printability, outstanding ink transfer and low foaming features for the most steady and smooth press performance. Designed to be used on a wide range of plastic and paper substrates, this series includes process colours, pantone bases, whites and coatings. UFlex series of UV LED Flexo Inks offer enhanced

scratch and scuff resistance properties, less maintenance on press, faster make-readies, and overall superior print consistency. These inks are most compatible for use in packaging, labels etc.

FLEXMATT paper effect OP ink – Another new product launched was FLEXMATT paper effect OP Ink, a toluene and ketone free single component coating HRK10529 that gives an excellent paper/sand feel effect on PET, BOPP and PVC substrates. This coating that can be applied on surface with gravure printing machines provides a striking and tactile, slight edgy paper feel to product packaging. Customers wanting to up their game and make their products stand out will find the use of this ink beneficial.

Holography Business

Token for paint industry – An innovative product application from Holography business of UFlex to help brands engage with their customers, this holographic token placed inside each paint container is intended for trade promotions which can be redeemed at any paint retailer or wholesaler for cash prizes. UFlex has developed a special grade lamination film which has non-repellent properties with good adhesion and remains durable for a longer period, and prevents the paper inside the token from getting soiled. This application implies both side critical lamination process and is widely used in the paint industry.

Patch embroidery with hot melt film for textile industry – The Indian bridal wear industry is growing at a swift rate and is anticipated to become the largest wedding market in the world. The wedding trousseau industry however needs to keep reinventing itself with latest trends and value offerings. Adding variety to the high-end bridal industry, UFlex has crafted a new product application for hot melt film where various shapes and designs are cut through laser cutting machines and then applied onto garments by 'heat & pressure process.' This is followed up with embroidery on the edges of the patch. With this addition, the Hot Melt portfolio is anticipated to witness growth in demand by upto 15% as normalcy returns and Indian wedding market see a spike.

CPP glitter film for décor– Used as lamination film on premium decorative boxes, this new product launch from Holography offers multiple applications on fancy and rigid boxes used for jewellery boxes, luxury clothing packaging and wedding boxes.

Engineering Business

Three new applications established in multi-track machines for sachet market – In order to match pace with the growth of single serve sachet market also known as the 'coin market', the Engineering business has adapted its Multi-track machines to

establish three new applications in one machine, which allows to pack two solids (sugar and noodle seasoning) and one liquid product (ketchup). The advanced Multi-track machine, which has already bagged a few commercial orders, meets the parameters of secured packing, product flow, accurate filling of weight and cost effective packaging thus delivering enhanced performance in sachet packing.

Solvent-less Laminator with registered lamination: The new Solvent-less Laminator is designed to meet the requirement of registered lamination of window metalized film that finds its use in giving customers a choice of see-through window without compromising on the barrier properties of the pack. This unique feature like 'show window' for the pouch allows brands to promote the sale of their premium products and consumers to see the product content inside. The machine is drawing interest from Converters around the globe leading to fast commercialization.

Non-stop turret based slitting machine for BOPP pancake: The Engineering business also developed Toroslit 2250, which is a non-stop turret based slitting machine. The machine efficiently slits large quantities of BOPP film pancakes at a speed of 700 meters per minute.

Packaging Films Business

Ultra-high barrier transparent AlOx BOPP film B-ULX for dry food packaging: B-ULX, a transparent ultra-high barrier transparent Alox BOPP film offers Alox protection on one side and heat seal-ability on its reverse. This film delivers excellent barrier (<1.0 gm or cc/m^2/day) against gas, oxygen, moisture; offers good resistance to mineral oil and arrests the aroma. In addition to its strong barrier properties, the film renders excellent optics that helps with product visibility, clear vacuum coating and good seal functionality. This film has high application for packaging dry edible food items like nuts, trails, beverage powder, cookies, chips, crackers and cookies that need to be protected. Making the film chlorine-free throws a unique opportunity for brands to position itself as sustainable.

Sustainable transparent high heat resistance BOPP film with exceptional oxygen blocking: With many brands focussing on easily recyclable packaging structures as part of their sustainability mission, UFlex' developed high barrier BOPP film B-THB with a mono-material structure is a successful replacement to conventional BOPET film. B-THB has functionally modified treated layer on one side and heat resistance surface on another side with excellent oxygen barrier properties. The film exhibits strong jaw release property (to strengthen end seals), good optics and machinability; strong seal finish in stand-up pouches & 3D bags and arrests the challenge of inside gusseted film sticking to itself. Beyond these virtues,

the film is fully recyclable and helps brands and converters meet their sustainability goals. This film is best used for packaging formats like 3D pouches and stand-up pouches to pack snacks & confectionery items.

Outstanding barrier metallized BOPP film B-UHB-M suited for aluminum foil replacement: B-UHB-M is an outstanding barrier metallized BOPP film with properties of ultra-high surface energy on one side and heat seal-ability on the other. With exceptional barrier properties (<0.1 gm or cc/m^2/day) that prevent the packed contents from oxygen, moisture, aroma and mineral oils, the film has efficaciously replaced aluminium foil, is recyclable and uses a chlorine-free solution, thus enhancing its sustainability levels. It also offers excellent metal adhesion (doesn't suffer from delamination issues), flex-cracking resistance (doesn't form cracks on rough handling) and can be dispensed at high speed (without breakages). B-UHB-M is of great use to Converters in packaging dry fruits, beverages, snacks like chips, crackers, cookies and confectionery packaging.

Direct embossable polyester film F-EMB to boost aesthetics: F-EMB is a specialty BOPET film with embossable layer having specialty polymer on one side. This emboss-able layer feature of F-EMB eliminates the process of additional polymer coating before embossing and its high clarity complements well with holography jobs through soft embossing route. The film possesses good mechanical, surface and thermal properties and ensures excellent processing with chemical resistance. All these attributes lead to high quality output with deep, sharp and clear impressions during the course of embossing. It serves as a base film for Converters in holography jobs, direct embossing and metallizing and used a lot more for manufacturing of decorative packaging, glitters, hot stamping, cosmetic packs, book cover laminations & corrugated box lamination.

UFlex is India's largest multinational Flexible Packaging materials and solutions company and a leading global player in Polymer Sciences. Since its inception back in 1985, UFlex has grown from strength to strength to evolve as a truly Indian Multinational with consumers spread across the world. UFlex today has state-of-the-art packaging facilities at multiple locations in India with installed capacity of around 1,35,000 TPA and has packaging film manufacturing facilities in India, UAE, Mexico Egypt, Poland, Russia, and USA with a cumulative capacity of 4,23,600 TPA.

Integrated within its core business of Flexible Packaging & Packaging Films are allied businesses like Aseptic Liquid Packaging, Engineering, Cylinders, Holography and Chemicals which further gives UFlex a superior edge over competition. UFlex offers technologically

superior packaging solutions for a wide variety of products such as snack foods, confectionery, sugar, rice, other cereals, beverages, tea & coffee, dessert mixes, noodles, wheat flour, soaps, detergents, shampoos, conditioners, vegetable oil, spices, marinades & pastes, dairy products, frozen food, poultry, anti-fog, pet food, pharmaceuticals, contraceptives, garden fertilizers, plant nutrients, motor oil, lubricants, automotive and engineering components etc.

All UFlex plants are accredited with ISO 9001, 14001, HACCP & BRC certifications. UFlex caters to markets spanning across the globe in over 140 countries like USA, Canada, South American countries, UK and other European Countries, Russia, South Africa, CIS, Asian and African nations. Some of UFlex' clients on the global turf include P&G, Nestle, PepsiCo, Coca-Cola, Mars Wrigley, Tata Global Beverages, Mondelez, L'Oreal, Britannia, Haldiram's, Amul, Kimberly Clark, Ferrero Rocher, Perfetti, GSK, Agrotech Foods, Johnson & Johnson amongst others. ■

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