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CHAIRMAN
Maulik Jasubhai Shah

PUBLISHER & CEO
Hemant Krishna Shetty

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Registered Office: 26, Maker Chambers VI, 2nd Floor, Nariman Point, Mumbai 400 021, INDIA.
Tel.: 022-4037 3737 Fax: 022-2287 0502
E-mail: sales@jasubhai.com

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Biopharma SHAKTI scheme to strengthen domestic biopharmaceutical sector

New Delhi: With a view to strengthen the domestic biopharmaceutical sector and enhance global competitiveness in biologics and biosimilars, the Government has announced the Biopharma SHAKTI scheme with an outlay of ₹10,000 crore over five years with an objective to build a globally competitive domestic ecosystem for biologics and biosimilars to support affordable healthcare in India and enable India to emerge as a global biopharma manufacturing and innovation hub. The contours of the scheme are under deliberation.

The Biopharma SHAKTI aims to focus on following components:

- Biopharma Discovery Grant Fund & Discovery & Development Equity Fund
- Biopharma-focused NIPER Network + National Biopharma R&D Network
- India Clinical Trial Sites Network (1,000 accredited sites)
- Fermentation-based Bulk Drugs & Building Blocks Manufacturing Incentive
- Biopharma Delivery Devices & Packaging Manufacturing Ecosystem
- Biosimilars & Emerging Biologics Manufacturing Initiative
- Regulatory Strengthening for Global-best Drug Review Standards and Approval Timeframes

Under the scheme, it is envisaged to enable faster, globally credible approvals by strengthening the CDSCO through creation of a dedicated Scientific Review Cadre of reviewers and specialist positions for advanced fields like gene therapy. It is also envisaged to expand India's clinical research footprint by creating a nationally accredited network of 1,000 clinical trial sites under ICMR.

The Biopharma SHAKTI initiative envisages to build the ecosystem for domestic production of biologics and bio-similars. Further by supporting research and development, strengthening clinical trial infrastructure and promoting collaboration between academia, research institutions and industry, the Scheme seeks to encourage domestic innovation and manufacturing capabilities in the biopharmaceutical sector. Such initiatives are expected to contribute towards reducing import dependence over time and enhance India's participation in the global biopharmaceutical market.

Minister of State for Chemicals & Fertilisers Smt. Anupriya Patel, while welcoming the Union Budget 2026-27, said that "this budget marks the beginning of a new era in the Health and Pharma sector. From the ₹10,000 crore 'Biopharma Shakti' initiative to three new National Institutes of Pharmaceutical Education and Research (NIPERs) and a new NIMHANS in North India, this Budget reflects the Government's strong commitment to 'a Developed and a Self-Reliant India.'

NIPER Raebareli signs MoU with Roche Pharma India to strengthen pharmaceutical education and research

New Delhi: National Institute of Pharmaceutical Education and Research Raebareli (NIPER Raebareli) signed a Memorandum of Understanding (MoU) with Roche Pharma India to foster academic collaboration and advance pharmaceutical education and research in India. The MoU was signed in the presence of Shri Manoj Joshi, Secretary, Department of Pharmaceuticals under the Ministry of Chemicals and Fertilizers, at Shastri Bhawan, New Delhi.

This strategic partnership aims to bridge the gap between academic learning and real-world industry practices by equipping students and faculty with valuable insights into the evolving pharmaceutical and regulatory landscape. Under the MoU, Roche and NIPER Raebareli will collaborate on initiatives such as a certificate programme in regulatory affairs for students and industry professionals, guest lecture series by industry experts on emerging trends including AI-driven pharmaceutical research, drug development and healthcare innovation to strengthen practical industry understanding.

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The collaboration aligns with the Government's #ViksitBharat vision and the #BiopharmaShakti mission, supporting India's transition from volume-led pharmaceutical growth to value-driven innovation and reinforcing the country's global leadership in the biopharmaceutical sector.

India-Brazil merchandise trade at $10.8 billion in FY26 so far: Rubix Data Sciences

Major Products Exported by India to Brazil		
Product	Share in FY2022	Share in FY2025
Insecticides and pesticides	19%	16%
Refined petroleum products	20%	13%
Pharmaceutical products	5%	6%
Auto components	4%	5%
Heterocyclic compounds	2%	3%
Others	50%	57%
Total	100%	100%

Source: Rubix Data Sciences

Mumbai: India and Brazil have set their sights on more than doubling bilateral trade to USD 30 billion by 2030, with Brazilian President Luiz Inácio Lula da Silva's latest visit catalysing new momentum across energy, pharmaceuticals, and critical minerals, according to an analysis by Rubix Data Sciences.

Brazil is India's largest trading partner in Latin America, with total goods trade reaching a peak of USD 16.6 billion in FY2023. While trade has since moderated to USD 12.2 billion in FY2025 and USD 10.8 billion in FY2026 (April–December 2025), the latest agreements signal a shift toward scaling trade through strategic sectors and long-term supply chain integration.

Corporate and investment linkages are also expanding rapidly. India hosted 77 Brazilian trade missions between July 2023 and August 2024, more than double earlier levels, spanning aerospace, defence, healthcare, and manufacturing. Embraer has established an India office and is exploring local production, while Tramontina is investing INR 800 million in a manufacturing facility in Karnataka to serve domestic and export markets.

Trade data highlights growing diversification. India's exports to Brazil rose sharply from USD 6.5 billion in FY2022 to USD 9.9 billion in FY2023 and stood at USD 5.4 billion in FY2026 (April–December 2025). Pharmaceuticals are emerging as a key opportunity, with their share increasing from 5% to 6% of exports, supported by new regulatory cooperation between India's CDSCO and Brazil's ANVISA to facilitate faster approvals and expand access for Indian generic drugmakers in Brazil's large healthcare market.

Zydus and Lupin sign licensing agreement for co-marketing innovative Semaglutide Injection in India

Ahmedabad, Gujarat: Zydus Lifesciences Limited (Zydus), an innovation-led life-sciences company with subsidiaries/affiliates in India and across the globe, has entered into a Licensing and Supply Agreement with global pharma major, Lupin Limited (Lupin) to expand access to innovative Semaglutide Injection (15 mg/3 ml) with patient-friendly reusable pen device in India.

Under this agreement, Lupin will have semi-exclusive rights to co-market Zydus' innovative Semaglutide Injection in the Indian market under the brand names Semanext® and Lupin's Livarise®. Zydus will market the product under the brand names SEMAGLYN™, MASHEMA™ and ALTERME™. Lupin will pay Zydus upfront licensing fees and milestone payments on achieving pre-defined milestones.

Semaglutide is indicated for the treatment of adults with insufficiently controlled type 2 diabetes mellitus as an adjunct to diet and exercise as monotherapy, when metformin is considered inappropriate due to intolerance or contraindications, in addition to other medicinal products for the treatment of diabetes. It is also indicated as an adjunct to a reduced calorie diet and increased physical activity for chronic weight management in adults with an initial body mass index (BMI) of 30 kg/m^2 or greater (obesity) or 27 kg/m^2 or greater (overweight), in the presence of at least one weight-related comorbid condition (e.g., hypertension, type 2 diabetes mellitus, or dyslipidemia).

World Regional Anaesthesia and Pain Medicine day workshop focuses on strengthening patient safety standards

The workshop covered foundational ultrasound principles, postoperative pain management, and comprehensive scanning across upper limb, lower limb, truncal, and abdominal regional blocks.

Mumbai, India: BD (Becton, Dickinson and Company) recently participated as Knowledge Partner at the World Regional Anaesthesia & Pain Medicine (RAPM) Day Workshop. With the objective of reinforcing patient-safety practices in Regional Anaesthesia, BD India/South Asia focused on enabling real-time, hands-on learning for clinicians to advanced spinal anaesthesia solutions and supporting faculty-led live training sessions with clinically relevant tools and resources.

A joint academic initiative of the Indian Society of Anaesthesiologists (ISA) and Institute of Medical Sciences at Banaras Hindu University (IMS BHU), the workshop was organized with the aim to strengthen clinical competency in Ultrasound-Guided Regional Anaesthesia (USGRA) through a high-impact blend of scientific lectures, expert-led demonstrations, and immersive hands-on scanning sessions.

Delivered under the academic umbrella of ISA, AORA (Academy of Regional Anaesthesia of India), and ESRA (European Society of Regional Anaesthesia and Pain Therapy), the workshop covered foundational ultrasound principles, postoperative pain management, and comprehensive scanning across upper limb, lower limb, truncal, and abdominal regional blocks.

Commenting on the RAPM day workshop, Atul Grover, Managing Director, BD India/South Asia, said, "BD is proud to be a knowledge partner for the academic initiative spearheaded by Indian Society of Anaesthesiologists and IMS, BHU. We are committed to advancing patient safety and elevating anaesthesia practice across the country by strengthening continuous medical education through partnerships with esteemed medical institutions nationwide. In alignment with our purpose of advancing the world of health, this initiative aims to promote medication safety practices to reduce procedural errors and improve patient outcomes."

Sun Pharma announces US FDA acceptance of supplemental Biologics License (sBLA) Application for ILUMYA®

Mumbai: Sun Pharmaceutical Industries Limited has announced that the US Food and Drug Administration (FDA) has accepted for review the supplemental Biologics License Application (sBLA) for ILUMYA for the treatment of adults with active psoriatic arthritis. The FDA regulatory action date for this sBLA is expected by October 29, 2026.

If approved, this would mark a new indication for ILUMYA following its US FDA approval in 2018 for the treatment of adults with moderate-to-severe plaque psoriasis who are candidates for systemic therapy or phototherapy. Scalp and nail plaque psoriasis sBLAs were approved in April 2024, and December 2025, respectively.

"For many people living with psoriatic disease, joint symptoms often add another layer of burden," said Rick Ascroft, CEO, Sun Pharma North America. "As we continue to strengthen Sun Pharma's innovative portfolio, we look forward to working with the FDA throughout the review process. As the only HCP-administered IL-23 biologic, our ambition is that ILUMYA becomes a differentiated first choice advanced systemic treatment for active psoriatic arthritis," he added.

PsiQuantum and National Cancer Center Japan announce partnership to accelerate drug discovery for healthcare

Palo Alto, California: PsiQuantum has signed a collaborative research agreement with the National Cancer Center Japan, a leading cancer treatment and research facility, to advance applications in oncology and healthcare for utility-scale quantum computers.

Under the newly formed collaboration, PsiQuantum will work alongside the National Cancer Center Japan to advance fault-tolerant quantum algorithm development and collaborate with the National Cancer Center Japan and other leading pharmaceutical companies in Japan in the development of clinically

relevant quantum applications. The partnership will also utilize PsiQuantum's software suite, Construct — a secure, end-to-end platform for designing, analyzing, and optimizing algorithms for fault-tolerant quantum computing.

"PsiQuantum is proud to work alongside the National Cancer Center Japan as we explore what utility-scale quantum computing will be able to deliver in designing new treatments for the benefit of researchers and patients," said Sam Pallister, PsiQuantum's Vice President for Quantum Applications.

"We are thrilled to partner with PsiQuantum on leveraging quantum computing technology to address some of the most pressing challenges in healthcare," said Dr. Takayuki Yoshino, Director for the Department of Global Oncology at the National Cancer Center Hospital East in Kashiwa, Japan.

L&T Technology Services launches NVIDIA-Powered AI lung digital twin platform for advanced respiratory diagnostics

San Jose, California: L&T Technology Services Limited, a global leader in AI, Digital & R&D Consulting Services, has announced its next-generation, AI-powered digital twin platform for lung navigation, surgical planning and respiratory diagnostics.

The platform combines LTTS' industry-leading MedTech expertise across medical imaging, AI-driven diagnostics, and connected healthcare systems with NVIDIA AI infrastructure to enable greater precision and enhanced outcomes.

LTTS' lung digital twin solution integrates directly with CT imaging workflows and leverages deep learning models to reconstruct a comprehensive 3D digital twin of the lungs. This redefines visualization of critical anatomical structures including airways, blood vessels, lung lobes, and lesions, enabling clinicians to explore patient-specific lung anatomy in an immersive digital environment and simulate procedural pathways for bronchoscopy and biopsy planning.

The platform is powered by NVIDIA Physical AI infrastructure, including NVIDIA Omniverse and OpenUSD for interactive 3D digital twin visualization of lung anatomy and supporting immersive exploration of complex structures; NVIDIA TensorRT to drive optimized AI inference performance across high-speed clinical workflows, and NVIDIA MONAI to enable advanced medical image segmentation, enabling automated identification of airways, vessels, tumors and lung lobes.

LTTS' scalable digital twin platform transforms static CT scans into dynamic, simulation-ready lung models, allowing clinicians to analyze anatomical relationships, plan surgical pathways and navigate bronchoscopic procedures with enhanced accuracy.

BioDuro and Cenra launch joint venture to expand resilient global API manufacturing capacity

Irvine, California: BioDuro, a globally trusted Contract Research, Development, and Manufacturing Organization (CRDMO), has established a joint venture with Cenra API Solutions, also as known as Chunghwa Chemical Synthesis & Biotech Co., Ltd. (CCSB), a leading pharmaceutical chemical manufacturer in Taiwan since 1964, to add significant commercial-scale active pharmaceutical ingredient (API) manufacturing capacity at Cenra's campus in Taipei, Taiwan, to BioDuro's global network.

The joint venture will see BioDuro's strengths in early-stage drug development integrated with Cenra's expertise in commercial scale GMP API manufacturing, providing global clients with an end-to-end API solution from early development through to commercial-scale manufacturing.

The Taipei campus houses 10 GMP API production lines with a total reactor volume of more than 350,000 liters to support annual API output of up to 200 metric tons. The facility has been successfully inspected by several major international regulatory agencies, including the U.S. FDA, EMA, Japan's PMDA, and Taiwan's TFDA.

"By combining BioDuro's integrated CMC expertise with Cenra's nearly six decades of GMP manufacturing excellence and enviable international regulatory history, our joint venture strengthens both companies' global supply chain resilience and minimizes the risks of technology-transfers," said Armin Spura, Ph.D., CEO of BioDuro.

"BioDuro serves more than 1,500 global customers annually with industry-leading R&D and manufacturing capabilities," added Wayne Hsiao, President of Cenra API Solutions. "We are excited to join forces to deliver highly integrated solutions and greater value to customers around the world."

Samsung Biologics enters tie up with Lilly to establish new Gateway Labs site in Korea

Incheon, S.Korea: Samsung Biologics, a leading contract development and manufacturing organization (CDMO), has entered into a collaboration agreement with Eli Lilly and Company (Lilly) to establish a Lilly Gateway Labs (LGL) site in Korea.

The new Gateway Labs site will serve as a hub to support early-stage and emerging biotechnology companies, as they advance scientific research toward development and manufacturing. The facility will feature flexibly designed laboratory space and research infrastructure, collaborative space, and operational support, with capacity for up to 30 companies jointly selected by Lilly and Samsung.

Under the collaboration agreement, Samsung Biologics will develop and operate the new facility, with Lilly Gateway Labs providing customized scientific engagement to support resident biotech companies and catalyze collaboration across the Korea life sciences sector. Located within Samsung Biologics' Bio Campus II site, the facility is expected to be completed in July 2027.

Beyond supporting individual companies, the site is expected to contribute to Korea's broader biotechnology ecosystem by attracting global innovation activity, fostering talent development, and strengthening the country's position as a hub for early-stage life science research.

By connecting domestic and international biotech startups with global industry expertise, the initiative aims to accelerate the translation of scientific discovery into development and manufacturing within Korea, supporting long-term growth of the national bio-industry.

Novo Nordisk announces over 400 million euro expansion in Ireland manufacturing unit

Bagsværd, Denmark: Novo Nordisk has announced an investment of 432 million euro (approx. DKK 3.2 billion) in its facility in Monksland, Athlone, Ireland. This tabletting facility will provide significant additional manufacturing capacity for current and future Novo Nordisk GLP-1 treatments.

The investment is a major strategic milestone for the company, which further reinforces Novo Nordisk's long-term commitment to Ireland and global healthcare innovation. It provides Novo Nordisk with additional manufacturing capabilities for oral products, enhances supply, and allows Ireland to serve as a critical hub for servicing markets outside the US. The investment will support the upgrade and retrofit of the existing facility and enhance Novo Nordisk's capacity to manufacture oral GLP-1s.

The plant's existing 260 employees will focus on delivering the highest-quality oral treatments to patients in an efficient and environmentally sustainable way. The entire project at the site, covering 45 acres (18 hectares), will create up to 500 construction jobs. The construction projects, which have already begun, will be finalised gradually from the end of 2027 through 2028.

Kasper Bødker Mejlvang, EVP CMC & Product Supply, Novo Nordisk, said, "This investment, a historic milestone for Novo Nordisk in Ireland, marks our continued commitment to Ireland and our highly skilled employees in Athlone while allowing us to make a difference for millions of people living with serious chronic diseases." ■

Big Pharma's New Bet: Why Nutraceuticals Are the Next Growth Engine

Amit Srivastava
Founder and Chief Catalyst
Nutrify Today

The pharmaceutical industry is witnessing a seismic shift. Global pharmaceutical companies are now making significant investments in nutraceuticals after decades of concentrating solely on prescription drugs. This move represents a fundamental shift in the development, provision, and consumption of healthcare solutions. **Amit Srivastava, Founder and Chief Catalyst, Nutrify Today**, shares that it shows a greater understanding of how illness patterns are evolving, how consumer behaviour is changing and the growing recognition that prevention may be more profitable and effective than therapy.

Numerous convergent drivers are driving pharmaceutical firms towards nutraceuticals. As more people seek out proactive rather than reactive health solution, the 'Global Wellness Institute' projects that the global wellness market will reach $5.6 trillion in 2022. The dietary supplement industry alone accounts for $256 billion of this market demonstrating the high demand for preventative wellness goods among consumers.

This trend has grown much faster since the pandemic. A poll by the Council for Responsible Nutrition in 2023 revealed that 74 per cent of Americans now take nutritional supplements, up from 65 per cent 10 years previously. The main reasons people take them are for immunity, gut health, and overall health.

At the same time, the old pharmaceutical model is facing more and more problems. Patent cliffs endanger income sources when popular pharmaceuticals lose their exclusivity. Deloitte's research shows that the average return on investment for pharmaceutical research and development has dropped to only 1.2 per cent, and it costs more than $2.6 billion to produce each drug that is approved.

Nutraceuticals, on the other hand, have a strong value proposition for any CFO since they let companies enter the market faster, have fewer regulatory hurdles, and have more customers.

Today's consumer is much more informed and proactive about health than ever before. People aren't waiting to get sick; they're asking what they can do today to stay healthy tomorrow. This change from sick-care to self-care is a huge market opportunity that drug companies can't ignore.

Beyond Vitamins

Beyond simple multivitamins the nutraceutical industry has advanced significantly. Modern products include state-of-the-art research in fields like as targeted

bioactive chemicals, personalised nutrition and gut microbiota modification. According to Grand View Research, the global nutraceuticals market is expected to increase at a compound annual growth rate of 8.9 per cent from 2023 to 2030, reaching $722.49 billion. Strong R&D capabilities, clinical trial knowledge, high production standards and well-established distribution networks are just a few of the significant benefits pharmaceutical businesses provide to this market. The category as a whole is being elevated by this combination of nutraceutical innovation and pharmaceutical rigour.

Businesses are creating evidence-based formulas supported by clinical research that address anything from sports performance and healthy ageing to metabolic wellness and cognitive health. A new generation of goods that connect food and medicine is the end consequence.

The Benefit of Regulation

In most nations, nutraceuticals have a quicker route to market than medicines which typically require lengthy clinical trials and regulatory approvals that take 10 to 15 years. This enables businesses to react swiftly to changing consumer preferences and health trends. Leading pharmaceutical entrants however are raising the bar for the entire industry by adopting pharmaceutical-grade quality standards to the manufacturing of nutraceuticals rather than taking short cuts.

This strategy tackles trust - a crucial customer issue. A Pew Research Centre survey from 2023 found that 62 per cent of Americans are worried about the effectiveness and safety of dietary supplements. By filling these trust gaps pharmaceutical businesses that enter the market with a reputation for quality and efficacy can command premium pricing and customer loyalty.

The Economics are Clear

From a business point of view, nutraceuticals have good profit margins and business models that bring in money over and over again. Precedence Research says that the Asia Pacific region would have the fastest growth rate, at 9.2 per cent, through 2032. This is because people in India and China are becoming more health-conscious and have more money to spend.

People buy these things all the time, which makes subscription-based revenue streams that pharmaceutical corporations want. Nutraceuticals also let pharmaceutical businesses connect with customers earlier in their health journey, which can lead to long-term brand ties that may even lead to prescription pharmaceuticals if needed. This lifecycle approach to consumer health is a strategic shift from episodic sick-care to ongoing wellness partnerships.

The Consumer Wins

The Journal of Nutrition released a study that found that well-made nutraceuticals can lower the risk of chronic diseases by 20–30 per cent. When combined with healthy lifestyle choices, this can have big health advantages.

More money spent on research leads to better research, greater quality standards, and more effective formulas. Using pharmaceutical production methods makes sure that the products are consistent, pure, and potent. These are important factors that have hurt the nutraceutical industry's reputation.

Competition from well-funded pharmaceutical companies also encourages innovation in the industry, forcing all companies to make better goods with more proof. This increasing tide lifts all boats, making the nutraceutical business more mature and trustworthy.

Looking Ahead

The pharmaceutical industry's investment in nutraceuticals is not a fleeting trend; it is a strategic realignment for the future of healthcare. The World Health Organisation says that 80 per cent of chronic diseases might be avoided by changing your lifestyle, such as eating the right food and taking the right supplements. This shows how nutraceuticals can help prevent diseases.

As chronic lifestyle diseases keep spreading around the world and healthcare systems struggle with rising costs, strategies that focus on prevention become not just appealing but also necessary. Companies that want to make this change work will have to respect the intelligence of nutraceutical consumers, put money into real innovation instead of just marketing, and understand that the future of health isn't just about treating disease — it's about giving people the tools they need to live healthier lives from the start.

For customers, this change means they will be able to buy items that are more studied and of greater quality, making preventive health not only a goal, but a reality. That is a bet worth taking. Customers may now expect to have access to better-quality, more studied products, making preventive health not only a goal but a reality. It's a wager worth taking. ■

Bridging Bharat & India: How Digital Engineering Solutions are Narrowing Urban–Rural Economic Divide

Mr. Nagendra Nath Sinha
Managing Director
Rodic Digital & Advisory

India's economic landscape has long been divided between the globally integrated 'India' of metros and the ambition-fuelled 'Bharat' of smaller towns and villages. Traditional magnets like Mumbai and Bengaluru are ceding ground to Tier-2 cities. The Smart Cities Mission has channelled ₹1.47 lakh crore into connectivity, with improved Tier-2/3 infrastructure potentially contributing $500 billion to GDP by 2030. Yet growth is hindered by developmental gaps: uneven infrastructure, delayed projects, and fragmented planning. ***Nagendra Nath Sinha, Managing Director, Rodic Digital & Advisory,*** through this article, emphasizes on the solution, which is Digital engineering, a comprehensive ecosystem spanning physical infrastructure, digital platforms, connectivity networks, and essential services systematically narrowing the urban-rural divide.

Digital engineering first narrows the connectivity layer, the base of the divide. BharatNet, the world's largest rural broadband initiative, has laid nearly 6.9 lakh km of optical fiber and connected over 2.18 lakh gram panchayats with high-speed internet, taking broadband into villages for the first time. Common Service Centres and village Wi-Fi hotspots ride on this fiber to offer e-governance, banking, and digital services at the panchayat level, turning connectivity into real access.

The expansion of 4G/5G, satellite internet, and PMWANI village Wi-Fi brings connectivity enabling online purchases, digital transactions, and remote working. This infrastructure reduces the physical distance between Bharat and India for core services like banking, documentation, and welfare.

Digital Public Infrastructure: The Great Equalizer

Digital Public Infrastructure such as JAM trinity, DigiLocker, ULPIN, UPI, CoWIN, ONDC brings essential services to rural people. UPI enables small kirana shops, farmers, and daily-wage workers to transact on the same platform as urban businesses. A UN analysis noted that mobile technology with Aadhaar-based ID led to 80% of adults having bank accounts by 2017, reducing gender and education gaps.

Moreover, Aadhaar-linked Direct Benefit Transfers cut leakages, ensuring subsidies reach rural citizens. Digital monitoring of PMAY, Swachh Bharat, Jal Jeevan, and NFSA ensures services reach eligible users. These systems work on basic smartphones, low bandwidth, and multiple languages designed for Bharat's adoption.

Transforming Service Delivery Through Digital Platforms

Parallelly, digitization powers platforms like UMANG, integrating 2,300+ government services in multiple languages. Programs like MGNREGS, PMAY, and PMGSY run on IT platforms, improving transparency. E-learning platforms and PMGDISHA use low-bandwidth apps in local languages. Common Service Centres and similar public services network ensure equity in delivery of a multitude of digital services beyond public services viz. travel, ecommerce, banking, tele-education and telehealth and so on. ONDC-based platforms let farmers and artisans sell beyond local mandis. Mission Bhasini, mandates by BIS to enable vernacular Indic scripts on mobile and other electronic interfaces and work being done by MeITY to bring Indic languages AI models ensure that all Indians, irrespective of their languages can now engage with and contribute to modern IT infospace.

Bridging the healthcare divide, telemedicine solutions built on secure video, electronic health records, and national health platforms like Ayushman Bharat Digital Mission and e-Sanjeevani connect rural patients with urban doctors are reducing the healthcare gap.

A great example is the Bhavya project in Bihar that exemplifies this transformation by implementing a statewide digital platform that tracks healthcare delivery, reveals systemic shortcomings, and enables data-driven policy changes. Live data showing doctors working erratic shifts led to the state government introducing model roster systems. This is digital engineering transforming not just service delivery, but governance itself.

Reengineering "Engineering" Through Digital Platforms

While digital platforms provide services, smart physical infrastructure ensures delivery. Traditional planning models are no longer tenable cost overruns reached 20.7 per cent, wasting ₹2.3 lakh crore. Building Information Modelling and Digital Twins transform infrastructure by replacing 2D drawings with integrated 3D models and creating real-time virtual counterparts with live IoT data for predictive maintenance. Computer vision, IOTs, mobile and drone platforms, geospatial frameworks, coupled with AI platforms not only hasten the decision making but also ensure that a variety of data sources contribute to optimal, resource efficient and more objective decision making often beyond capability of ordinary experts.

This ecosystem directly addresses infrastructure challenges through early clash detection, accurate assessments, and continuous monitoring reducing overruns, preventing wastage, and minimizing rework. Critically, it democratizes world-class capability: a ₹2,000 crore metro in Indore can leverage the same predictive systems as Mumbai's ₹40,000 crore network, levelling the playing field for Tier-2/3 cities.

However, challenges remain. India has fewer than 15,000 BIM-certified professionals against a need for 200,000. Procurement frameworks favour lowest-cost bidding over lifecycle value. Data standardization needs urgent attention. But these are solvable implementation challenges. The technology exists. Successful pilots exist. What's needed is mandated adoption, standardized protocols, and accelerated talent development.

The Path Forward: Integration and Scale

India's infrastructure embraces 'Infra 4.0'. Digital Twin applications now span metro networks, airports,

expressways, and smart-city utilities, enabling real-time tracking of structural health and operations. BIM has evolved from optional to essential, delivering measurable gains in quality, speed, and cost control. The nation's ambition to bridge Bharat and India relies not only on capital but on deploying it intelligently across the full digital stack from fiber optic cables and cell towers to payment rails and health platforms, from smart construction to vernacular AI. The question is not whether we can afford this comprehensive digital engineering approach; it's whether we can afford not to. When a farmer in rural Bihar can access the same digital payment system as a Mumbai trader, when a student in a UP village can attend the same quality online class as her Delhi counterpart, when a patient in Chhattisgarh can consult specialists through telemedicine that's when the economic distance between Bharat and India truly narrows.

Digital engineering, in its fullest sense, is making this vision a measurable reality. Widespread adoption of the same can make India's next development wave both rapid and equitable, bringing opportunity closer to people and narrowing the economic distance between Bharat and India. ■

Building Information Modelling and Digital Twins transform infrastructure by replacing 2D drawings with integrated 3D models and creating real-time virtual counterparts with live IoT data for predictive maintenance. Computer vision, IOTs, mobile and drone platforms, geospatial frameworks, coupled with AI platforms not only hasten the decision making but also ensure that a variety of data sources contribute to optimal, resource efficient and more objective decision making often beyond capability of ordinary experts.

GUEST COLUMN

Is India's Scientific Talent Ready for Global Leadership?

Amarjeet Singh Tak
Head – Research and Microscopy Solutions
ZEISS India

For many years, conversations around India's scientific capabilities were framed around one familiar word: potential. Today, that narrative is beginning to change. Increasingly, the discussion is about presence. Across global research and technology ecosystems, India is no longer seen merely as a support hub for innovation happening elsewhere. It is steadily emerging as a place where ideas are conceived, tested, and scaled for the world. Recent developments reflect this shift. Initiatives such as the India AI Impact Summit and the government's ₹1 lakh crore Research, Development and Innovation (RDI) Fund demonstrate a growing national focus on building a stronger scientific and innovation ecosystem. Together, they signal a broader ambition: positioning India not only as a participant in global innovation, but as a leader shaping it, emphasizes **Amarjeet Singh Tak, Head – Research and Microscopy Solutions, ZEISS India.**

One of India's greatest advantages continues to be the scale of its scientific talent pool. The country produces nearly 2.5 million STEM (Science, Technology, Engineering and Mathematics) graduates each year - the largest cohort globally. However, what is becoming more significant is the changing nature of this talent.

Emerging technologies such as artificial intelligence are attracting a growing share of young scientists and engineers. According to the Stanford AI Index, India has recorded one of the fastest growth rates in AI talent acquisition globally. Initiatives such as the IndiaAI FutureSkills program are further strengthening this momentum by investing in advanced research and doctoral training.

This shift indicates that India's talent ecosystem is

gradually evolving from volume-driven capability to deeper specialization in frontier technologies.

From Capability Centres to Innovation Hubs

India's role in the global R&D ecosystem is also undergoing a transformation. Today, the country hosts more than 1,700 Global Capability Centres (GCCs). Initially established as support or back-office units, many of these centres have evolved into full-scale innovation hubs. They now contribute to product development, advanced research, and strategic technology initiatives for global organizations.

This transition reflects a larger trend: multinational companies increasingly view India not just as a delivery hub but as a location where complex engineering, design, and research capabilities can thrive.

Building a Stronger Research Ecosystem

Talent alone cannot drive scientific leadership. It must be supported by a robust ecosystem that encourages long-term research and experimentation. Historically, India has faced challenges related to sustained R&D funding. The establishment of the Anusandhan National Research Foundation (ANRF), alongside the ₹1 lakh crore RDI Fund, marks an important step in addressing this gap. These initiatives aim to provide patient capital for deep-technology areas such as semiconductors, quantum computing, and advanced materials.

Encouragingly, the impact of a strengthening ecosystem is beginning to show in intellectual property creation as well. Patent filings in India have grown significantly in recent years, with a rising share coming from domestic innovators. This suggests a gradual shift from a culture of service delivery to one focused on technological ownership.

Today, India hosts more than 1,700 Global Capability Centres (GCCs). Initially established as support or back-office units, many of these centres have evolved into full-scale innovation hubs. They now contribute to product development, advanced research, and strategic technology initiatives for global organizations.

The Road Ahead: Quality over Quantity

Despite this progress, several structural challenges remain if India is to secure a lasting position in global scientific leadership. One persistent issue is the employability gap. While the number of graduates entering the workforce remains high, industry readiness in advanced technological domains is still uneven. Bridging this gap will require deeper collaboration between academia, industry, and policymakers to ensure education systems keep pace with evolving scientific demands.

Equally important is fostering a culture that encourages curiosity, experimentation, and critical thinking. As noted by eminent scientist Dr. R. A. Mashelkar, scientific breakthroughs often emerge from what he describes as a "culture of irreverence" the courage to question existing assumptions and challenge established norms. Encouraging such an environment will be essential for nurturing the next generation of researchers and innovators.

Moving from Frugal Innovation to Frontier Discovery

India has already demonstrated its ability to innovate at scale, particularly in areas such as healthcare, digital infrastructure, and agriculture. The next phase of global leadership will require moving beyond frugal innovation toward frontier discovery creating foundational scientific breakthroughs that influence technological progress worldwide.

With the right mix of policy support, industry participation, and sustained investment in research, India is well positioned to make this transition. The question, therefore, is no longer whether India can participate in global scientific leadership. The real opportunity now lies in helping define what that leadership looks like. ■

Occupational Safety & Health and Working Conditions (OSH&WC) Code, 2020 (37 of 2020): Salient Features

H. Vishvanathan
Former Dy. Director General, DGFASLI,
M/o Lab and Emp. Govt. of India
Proprietor, Meenakshi Safety Consultancy Services

The Code on Occupational Safety & Health and Working Conditions (OSH&WC) has been passed in both houses of the Parliament of India on 22/09/2020. The Code received the assent of the President on the 28th September 2020. It has been notified in the Gazette vide notification No 37 of 2020. The Code has come into effect on 21st Nov. 2025 vide Gazette notification 5145 dated 19th Nov. 2025. The OSH&WC Code proposes replacing 13 Central Acts related to Safety, Health and Working Conditions with a single Code. **H Vishvanathan, Former Dy. Director General, DGFASLI, M/o Lab and Emp. Govt. of India and Proprietor, Meenakshi Safety Consultancy Services, Navi Mumbai**, explains in detail the salient features of the code.

The Preamble of the Occupational Safety & Health and Working Conditions (OSH&WC Code) "is to consolidate and amend the laws regulating the occupational safety, health and working conditions of the persons employed in an establishment and the matters connected therewith or incidental thereto". The Code aims to provide a broader legislative framework to secure just and humane conditions of work with flexibility and to provide enabling provisions for making rules and regulations in tune with emerging technologies.

The OSH&WC Code, 2020 simplifies, amalgamates and rationalizes the provisions of thirteen enactments in the aforesaid areas with certain important changes. It consists of 14 chapters, having 143 sections and three schedules. It enables the Central Government to make Occupational safety and health standards under Sec. 18 for workplaces relating to factory, mine, dock work, beedi and cigar, building and other construction work and other establishments and includes 73 matters specified in the Second Schedule to this Code and

Rules under Section 23 and 24 of the Code relating to health, safety, working conditions and welfare for the employees and the State Government to make Rules under Section 138 relating to safety provisions and for the carrying out the various provisions of the Code.

Factories

- The Special provisions relating to Factories are about the Applicability of this Part of the Code are Approval and licensing of factories, Liability of owner of premises in certain circumstances, Power to apply the Code to certain premises, Dangerous operations, Constitution of site appraisal committee, Compulsory disclosure of information by occupier, Specific responsibility of occupier in relation to hazardous processes, National Board to Inquire into certain situations, Emergency standards, Permissible limits of exposure of chemicals and toxic substances, Right of workers to warn about imminent danger, Appeal against the order of Inspector-cum-Facilitator in case of factory, Power to make exempting rules and order.
- The Chapter XII deals with the procedure regarding the offences and penalties for non-compliance with the various clauses of the Code namely the general penalty for offences, punishment for causing obstruction to Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator, etc., Penalty for non-maintenance of register, records and non-filing of returns, etc, punishment for contravention of certain provisions, punishment for falsification of records, etc, penalty for omission to furnish plans, etc. Punishment for disclosure of information, penalty for wrongfully disclosing results of analysis.

Some of the important new features of the code are:

- It extends to whole of India.
- Applicable to all establishments employing 10 or more workers and includes IT establishments or establishments of service sector except that in respect of factories the threshold is 20 workers with the aid of power and 40 workers without the aid of power.
- It stipulates one registration, one return for all establishments having 10 or more employees.
- Submission of various returns and maintaining of various forms in digital also.
- Mandatory Issue of appointment letter to every employee
- Migrant workers can register themselves in the portal by self-declaring, with Aadhar details.
- In case of death or serious bodily injury to any person, out of the amount so paid as penalty by the employer a part may be given to the victim or the legal heirs of the victim by the Court.
- Constitution of National and State Level Occupational Safety and Health Advisory Board.
- Constituting of a Safety Committee in any class of establishment.
- Overriding power of the Central Government to regulate general safety and health of persons in the event of epidemic, pandemic situations.
- Power of the Central Government to make Standards, Rules related to Safety, Health, welfare and working conditions for uniformity in the adoption by the state Governments.
- Provision for Social Security Fund for unorganized workers.
- Third party audit and certification provision.
- Permitting Women to work beyond 7 PM and before 6 AM subject to the safety and security - with their consent for night work, to avoid misuse of the provisions.
- Independent director cannot be an occupier of the Factory.
- The Threshold for applicability made uniform under different Acts in respect of Ambulance Room, Safety officer, Welfare Officer, Safety Committee, Canteen, Crèche, Shelter, Rest Room, etc.

The Code applies to establishments employing at least 10 workers, and to all mines and docks. It does not apply to apprentices and other class of workers. Further, it makes special provisions for certain types of establishments and classes of employees, such as factories, mines, and building and construction workers, ports etc. All establishments covered by the

Code would be required to be registered with the registering officers.

Chapters

- Chapter I deals with the Preliminary, Short title, extent, commencement and application and Commencement and Definitions.
- Chapter II deals with the registration of certain establishments, appeal and notice by employer of commencement and cessation of operation.
- Chapter III deals with the duties of employer and employees, etc. namely duties of employer, duties and responsibilities of owner, agent and manager in relation to mine, duties of manufacturers, designer, importers or suppliers, duties of architects, project engineers and designers, notice of certain accident, notice of certain dangerous occurrences, notice of certain diseases, duties of employees, rights of employee and duty not to interfere with or misuse things.
- Chapter IV deals with the National Occupational Safety and Health Advisory Board, State Occupational Safety and Health Advisory Board, Occupational safety and health standards, Research related activities, Safety and occupational health surveys, Statistics, Safety Committee and safety officers etc. The National Occupational Safety and Health Advisory Board (hereinafter in this Code referred to as the National Board) shall be notified by the Central Government to discharge the functions conferred on it by or under this Code and to advise to the Central Government on the matters relating to—
  - Standards, rules and regulations to be framed under this Code;
  - Implementation of the provisions of this Code and the rules and regulations relating thereto;
  - The issues of policy and programme relating to occupational safety and health referred to it, from time to time, by the Central Government; and
  - Any other matter relating to this Code referred to, from time to time, by the Central Government.
- Chapter V deals with the Responsibility of employer for maintaining health and working conditions the employer shall be responsible to maintain in his establishment as may be prescribed by the Central Government.
- Chapter VI deals with the welfare facilities, the employer shall be responsible to provide and maintain in his establishment such welfare facilities for the workers as may be prescribed by the Central Government.
- Chapter VII deals with hours of work and annual leave with wages namely weekly and daily working hours, leave, etc., weekly and compensatory holidays, extra wages for overtime, night shifts, prohibition of overlapping shifts, restriction on double employment in factory and mine, notice of periods of work, annual leave with wages, etc.
- Chapter VIII deals with maintenance of registers and records and filing of returns these returns and registers could be filed online and maintained in soft.
- Chapter IX deals with Inspector-Cum-Facilitators and other authority namely, appointment of Inspector-cum-Facilitators, powers of Inspector-cum-Facilitators, powers and duties of District Magistrate, third party audit and certification, special powers of Inspector-cum-Facilitator in respect of factory, mines and dock work and building and other construction work, secrecy of information by Chief Inspector-cum-Facilitator or Inspector-cum- Facilitator, etc., Facilities to be afforded to the Inspector-cum-Facilitator, Powers of special officer to enter, measure, etc., in relation to mine and Medical Officer.
- The Chapter X deals with the Special Provision Relating to Employment of Women namely Employment of women in night subject to such conditions relating to safety, holidays and working hours or any other condition to be observed by the employer as may be prescribed by the appropriate Government.
- Chapter XI deals with Special Provisions for Contract Labour and Inter-State Migrant Worker, etc. in respect of Contract Labour and Inter-State Migrant Worker, Audio-Visual Workers, Mines, Beedi And Cigar Workers, Building And Other Construction Workers and Factories.
- Chapter XII deals with the procedure regarding

The OSH&WC Code, 2020 simplifies, amalgamates and rationalizes the provisions of 13 enactments in the aforesaid areas with certain important changes. It consists of 14 chapters, having 143 sections and three schedules. It enables the Central Government to make Occupational safety and health standards under Sec. 18 for workplaces relating to factory, mine, dock work, beedi and cigar, building and other construction work and other establishments and includes 73 matters specified in the Second Schedule to this Code and Rules under Section 23 and 24 of the Code relating to health, safety, working conditions and welfare for the employees and the State Government to make Rules under Section 138 relating to safety provisions and for the carrying out the various provisions of the Code.

the offences and penalties for non-compliance with the various clauses of the Code.

- Chapter XIII deals with the miscellaneous provisions namely relating to Delegation of powers, Onus as to age, Onus of proving limits of what is practicable, etc., Common licence for contractors, factories and to industrial premises and person, Effect of law and agreements inconsistent with this Code.

Repealed Acts

With the enactment of this Code, the following Safety and Health and Working Conditions Acts would be repealed

1. The Factories Act, 1948.
2. The Mines Act, 1952.
3. The Dock Workers (Safety, Health and Welfare) Act, 1986.
4. The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.
5. The Plantations Labour Act, 1951.
6. The Contract Labour (Regulation and Abolition) Act, 1970.
7. The Inter-State Migrant workmen (Regulation of Employment and Conditions of Service) Act, 1979.
8. The Working Journalist and other News Paper Employees (Conditions of Service and Miscellaneous Provision) Act, 1955.
9. The Working Journalist (Fixation of rates of wages) Act, 1958
10. The Motor Transport Workers Act, 1961
11. The Sales Promotion Employees (Conditions of Service) Act, 1976
12. The Beedi and Cigar Workers (Conditions of Employment) Act, 1966
13. The Cine Workers and Cinema Theatre Workers Act, 1981.

For any Enquiries on Conducting of Training or Gap Analysis Study on the OSH&WC Code 2020 and Rules made thereunder you may kindly contact us.

Email:hvishvan@yahoo.com,
hvishvan@meenakshisafety.com
Mobile: +91 9082783567/+91 9869287053

The author presented a paper on OSH Code during Health Safety & Environment Conference on 3rd February 2026, held during Chemtech 2026, in Mumbai, during 3-6 February 2026.■

Chemtech World Expo 2026: Photo Feature

The 32nd edition of Chemtech World Expo 2026, held during 3-6 February 2026, in Mumbai was a huge success. The four-day international exhibition also included concurrent conferences on Engineering Procurement and Construction (EPC), Specialty Chemicals, Health Safety & Environment; Industry Automation & Control and Pumps Valves & Fittings; Bio-X India (featured in February 2026 edition of Pharma Bio World); Refining & Petrochemicals; Agrochemicals & Fertilizers; WaterEx; Surface Engineering & Corrosion Control; SCALE and Student Outreach Program.

The event witnessed:

- 700+ Global Exhibitors from 15 countries
- 25,000+ Business Visitors from 50 countries
- 9 Concurrent technical Conferences
- 100+ ClimateTECH Startups (SCALE)
- 1000+ Engineering & Science Students from 56 cities of India
- (Student Outreach Program)

In this edition, we bring to you glimpses of the event held during the 3-6 February 2026 and testimonials from industry leaders, who participated in the event.

Mr. Nadir Godrej

STUDENT OUTREACH PROGRAM 2026

Dr. R A Mashelkar

Dr. Rajesh S. Gokhale

Prof (Dr) Aniruddha B Pandit

Inaugural session of BioX India Conference on 4th February 2026: (L-R) Mr. Nadir Godrej, Chairperson, Godrej Industries Group and Chairperson and Managing Director, Godrej Industries; Mr. Maulik Shah, Chairman & Chief Executive, Jasubhai Group & Chemtech Foundation; Dr. P.M. Murali, Chairman, Jananom Group & President, Council of Presidents, ABLE; Mr. Hemant Shetty, CEO, Jasubhai Group & Chemtech Foundation; Dr. Rajesh S. Gokhale, Secretary, Department of Bio Technology, Government of India & Chairman – Central Advisory Board, Bio-X India World Expo & Conferences 2026, during the lighting of the lamp at the inaugural session of Bio-X India World Expo & Conference 2026.

Inaugural Session of Agrochemicals & Fertilizers Conference on 5th February 2026: (L-R) Mr. U K Bhattacharya , MD - STEAG Energy Services India, Former Director Projects, NTPC, Core Advisory Committee Member –ChemTECH, Dr. Siba Prasad Mohanty, Managing Director, Hindustan Urvarak & Rasayan Limited (HURL), Ms Ritu Goswami, Director (Technical), Rashtriya Chemicals & Fertilizers Limited

Inaugural Session of WaterEX Conference on 5th February 2026: (L-R) Mr. Suryam KV , Senior VP- Water, Centre of Excellence-Research & Technology, Reliance Industries Limited, Dr Arup Kumar Misra, Chairman, Assam Pollution Control Board, Mr Ajay Popat, Senior Advisor, Ion Exchange India Limited

Inaugural Session of SCALE Conference 2026

Inaugural Session of Surface Engeening Conference on 5th February 2026: (L-R) Mr. Sujoy Choudhury, Chief Strategy Officer, Haldia Petrochemicals Limited, Mr. Rajeev Mathur, Director, HCG Group, Core Advisory committee member, ChemTECH, Shri Shyam Jagannathan, IAS, Director General of Shipping & Additional Secretary to the Govt. of India, Ministry of Ports, Shipping and Waterways, Govt. of India, Shri Rajiv Agarwal, Director Technical, EIL, Cmde. Manoj Joseph , Principal Director, Naval Architecture, Naval Headquarters, Indian Navy

Inaugural Session of Refining & Petrochemicals Conference on 4th February 2026: (L-R) Dr. Arup Misra, Chairman, Assam Pollution Control Board, Ms. Sukla Mistry , Former Director Refinery, Indian Oil , Core Advisory Committee Member ChemTECH, Mr. Saumitra Priya Srivastava, Director- Marketing , Indian Oil Corporation Ltd, Mr. R K Srivastava , Former Director Exploration and CMD - ONGC , Independent Director - Essar Oil & Gas , Distinguished Professor , Core Advisory Committee Member, ChemTECH

Inaugural Session of IAC + PVF Conference on 4th February 2026: (L-R)Mr. Anil V. Parab, Whole-time Director & Member of L&T Board, Heavy Engineering & Manufacturing , Larsen & Toubro (L&T), Mr. U K Bhattacharya , MD, Steag Energy Services Pvt Ltd, Former Director Projects, NTPC, Core Advisory Committee Member ChemTECH, Mr Ranjay Sharan, President, Nuclear Energy Business -Reliance Industries Limited Advisor – RIL (Nuclear), Former Director Projects, NPCIL

India-Russia Round Table Meeting "Doing business with Russia"

Inaugural session of Health Safety & Environment Conference on 3rd February 2026: (L-R) Mr R K Srivastava , Former Director Exploration , ONGC , Core advisory committee member, ChemTECH; Dr. Alok Sharma , Director R&D, IOCL & Chairman, Central Advisory Board, Health, Safety & Environment Conference 2026; Mr. U K Bhattacharya , MD, Steag Energy Services Pvt Ltd, Former Director Projects, NTPC, Core Advisory Committee Member ChemTECH; Mr. Luc Herwin, Group Head - EHS, Larsen & Toubro and Mr. Rajeev Mathur, Director, HCG Group, Core Advisory committee member, ChemTECH.

naugural Session of Engineering Procurement & Construction Conference on 3rd February 2026: (L-R) Shri Neeraj Lal, ED-Asset Manager B&S Asset, ONGC; Mr Arvind Kumar, Director (Refineries), Indian Oil Corporation Ltd; Mr. Subramanian Sarma; Deputy MD & President, Larsen & Toubro Group; Mr Maulik Jasubhai, Chairman & Chief Executive, Jasubhai Group & Chemtech Foundation; Mr. B Narayan- Group President Projects & Procurement, Reliance Industries; Mr. Vinayak Pai, MD, Tata Projects and Ms Sukla Mistry, Former Director – Refineries, IOCL & Patron – Refining & Petrochemicals World Expo, ChemTECH.

Inaugural Session of Specialty Chemicals Conference & Release of Exhibitors Directory on 3rd February 2026: (L-R) Mr. Zareer Langrana, Former ED & President, Global Chemical Business, Tata Chemicals; Dr Raman Ramachandran , Director & Dean, KJ Somaiya Institute of Management; Mr. Artemyev Alexey Yuryevich, Deputy Director of the Department of Chemical Industry of the Ministry of Industry and Trade of the Russian Federation; Mr. Ashwin C Shroff, Executive Chairman, Excel Industries Limited; and Mr. Rajendra Gogri , CMD, Aarti Industries.

ChemTECH has long been a catalyst for meaningful business engagement and strategic alliances for the chemical and energy value chain. It is gratifying to see successful inaugural HSE Conference at ChemTECH 2026 in Mumbai, themed "Delivering HSE excellence with a unified approach." The conference effectively underscored the need to break silos and align leadership intent, technological innovation, and frontline execution for sustainable growth. Well done and keep it up."

Dr Alok Sharma,
Chairman, Technical Advisory Group, Health Safety & Environment Conference 2026;
Director(R&D), Indian Oil Corporation Ltd

It was an honour to deliver one of the keynote addresses at the recent HSE conference during the ChemTECH and Health, Safety & Environment World Expo 2026 in Mumbai. Participating in this prestigious platform and engaging with industry leaders, experts, and stakeholders was truly enriching. I sincerely appreciate the organisers and the ChemTECH team for the invitation and for curating such an impactful event that fosters dialogue, innovation, and collaboration across the HSE community. The insightful discussions and the collective commitment to advancing safety excellence made the experience deeply meaningful. My heartfelt thanks to everyone involved for the warm hospitality and the opportunity to contribute."

-Luc Herwin,
Group Head - EHS, Larsen & Toubro

It was a delight to be part of the Inaugural Session of the ChemTECH EPC Conference during Chemtech World Expo 2026 and quite inspiring to hear interesting perspectives on the theme "POWERING THE NEXT EPC GROWTH WAVE – REDEFINING EXCELLENCE." The 4 days Conference started on the positive note, with renewed optimism for Indian industry, especially in light of the recent India–US developments that are strengthening global collaboration and industrial momentum. Acknowledge the remarkable journey of the Jasubhai Group, creating a powerful global platform connecting stakeholders across chemicals, EPC, energy, pharma, automation, and allied sectors. Overall an impactful Chemtech World Expo 2026."

Neeraj Lal,
ED-Asset Manager B&S Asset, ONGC

ChemTECH WORLD EXPO 2026

BIO-X India – World Expo & Conference 2026 convened a dynamic cross-section of industry leaders, innovators, researchers, startups, and policymakers to reflect on and shape the future of biotechnology in India. The discussions underscored the accelerating momentum in areas such as biomanufacturing, healthcare innovation, and emerging bio-based technologies. Platforms like BIO-X play a critical role in fostering dialogue, enabling partnerships, and facilitating the translation of scientific innovation into impactful applications. ABLE was pleased to partner with Chemtech in powering this initiative and contributing to strengthening India's position as a leading global biotechnology hub."

-Dr. P. M. Murali,
President, Council of Presidents, Association of Biotechnology Led Enterprises (ABLE)

It was an honour to be a part of Chemtech 2026 held during 3-6 February 2026. I was associated with both Health Safety & Environment and WaterEx conferences, and it was wonderful to moderate panel discussions with experts during the event. Chemtech is a great platform and has played an instrumental role in bringing the experts and leaders from the industry to discuss and deliberate on the challenges, advancements and the future of the industry. The message is loud and clear – we need to gear ourselves to move towards the goal of achieving HSE excellence and focus on innovation, collaboration and sustainability to secure India's water future. I extend my heartfelt congratulations to the Chemtech team for organizing another successful edition of Chemtech 2026. My best wishes for your future events."

- Mr. Mukesh Mohan,
ED-HSE, IndianOil Corporation Limited

ChemTECH has consistently served as a powerful platform for fostering business partnerships, meaningful dialogue, and strategic collaboration across the chemical process industry and the energy value chain. It was a privilege to Chair and participate in the Industry Automation & Control Conference at ChemTECH 2026 in Mumbai, themed "Industry 4.0 and Beyond." The conference underscored the transformative role of Industry 4.0 in driving technological innovation, enhancing operational excellence, and strengthening frontline project execution. The scale of the event was truly impressive, with 700+ exhibitors showcasing cutting-edge technologies and 9 technical conferences facilitating deep industry engagement. Such gatherings reaffirm the industry's collective commitment to innovation, digital transformation, and sustainable growth."

-Anil V Parab
Whole-Time Director & Sr. EVP (Heavy Engineering and Manufacturing) Larsen & Toubro Limited

Indo-German Pavilion

Russian Pavilion

Indian Oil

23,678 VISITORS FROM 50 COUNTRIES

UK Pavilion

Durr CTS Innovative Air Abatement Solutions for Chemical and Pharmaceutical Industries : Choosing the Right Emissions Control Options

Durr CTS Private Limited based in Pune, India, a wholly owned subsidiary of Dürr CTS GmbH, Germany, is a leading global supplier of air pollution control solutions which includes Regenerative Thermal Oxidizers (RTO), Recuperative Thermal Oxidizers, Direct Fired Thermal Oxidizers along with other innovative applications such as solvent recovery systems. ***Mr. Kailash Thakur, Sales Head, Durr CTS Pvt Ltd*** through this article, explains in detail about the three solutions and its advantages.

Durr CTS products are widely accepted in various end use industries such as chemicals and petrochemicals, pharmaceuticals, tires, flavours and fragrance manufacturing among others. In India, Durr CTS head office is located in Pune, with sales and service offices in Ahmedabad and Chennai.

With more than 60 years of experience in industrial environmental technology, Dürr CTS was formerly part of the Dürr Group. In 2024, Dürr CTS generated annual revenue of more than 400 million euros. Since November 2025, the company has operated independently. Ownership is divided between Stellex Capital Management (75 per cent) and the Dürr Group (25 per cent).

As the emissions arising out from the chemicals and petrochemicals plants such as particulate matter, SOX, NOX, VOC, acid gases are becoming more complex day by day, choosing the most economical option to control these emissions present several unique challenges. As with any add-on control system, the goal is to minimize the annualized total costs while maintaining proper operation. The types of industrial exhaust streams that present particular pollution-control challenges include:

- Emissions from multiple sources, which are often spread out over a wide area
- Emissions from batch operations
- Unpredictable fugitive emissions

For hydrocarbon emissions, the most commonly applied form of destruction technology is thermal oxidation. In this process, hydrocarbons are converted to carbon dioxide and water vapor at an elevated temperature. Durr CTS Oxi.X product range mentioned below are well suited to handle these types of hydrocarbons:

- Recuperative thermal oxidizers (Oxi.X TR)
- Regenerative thermal oxidizers (Oxi.X RE)
- Direct Fired Thermal Oxidizers (Oxi.X DF) capable of efficiently treating liquid and gas waste streams

Figure 1: Recuperative thermal oxidizers (Oxi.X.TR)

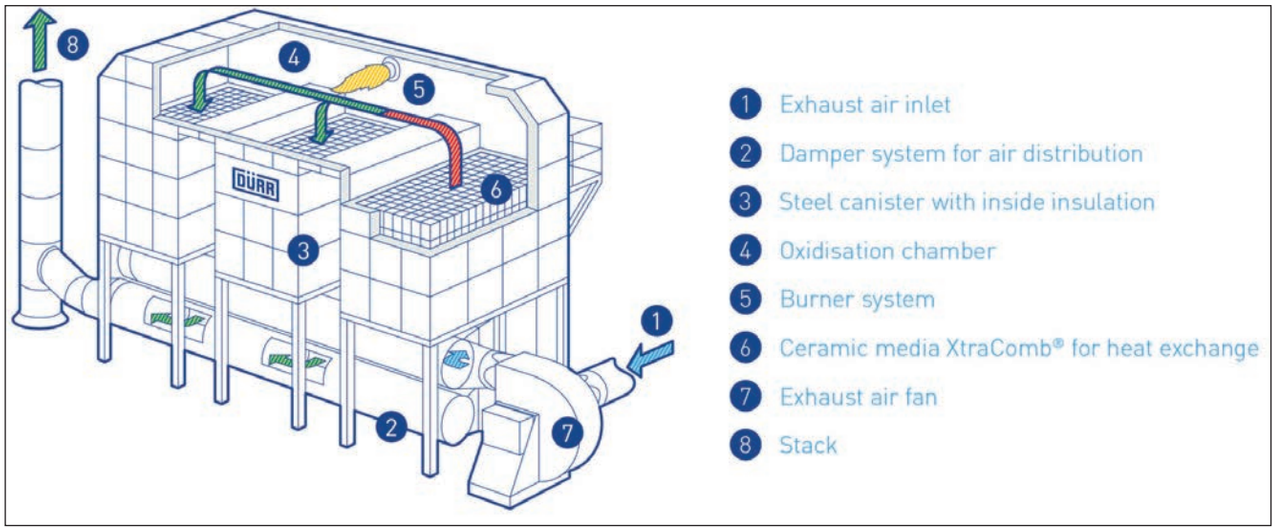

Figure 2: Regenerative thermal oxidizers (Oxi.X.RE)

Recuperative thermal oxidizers (Oxi.X.TR): This type of oxidizer includes a combustion chamber with a primary heat exchanger to recover waste heat from the hot incinerated exhaust air and use it to preheat the incoming emissions-laden air stream (Figure 1). These oxidizers typically include a shell-and-tube heat exchanger that are capable of up to 70 per cent primary heat recovery. With an oxidation temperature of about 750°C, such systems often yield sufficient waste heat for secondary heat recovery, even after primary heat recovery. This heat is typically employed for process heating, or to generate steam or hot water. Oxi.X TR are typically best suited for those applications where the excess heat that is generated can be used to offset the relatively high operating (fuel energy) cost for the unit.

Regenerative thermal oxidizers (Oxi.X.RE): This type of oxidizer consist of a purification chamber located above separate chambers (generally 3 or more) (Figure 2). These energy-recovery chambers are filled with ceramic heat exchange media. The hydrocarbon-laden air enters the inlet header and is directed to one of the energy-recovery chambers through an inlet control valve. The air passes through the heat exchange media, absorbing heat. It then enters the purification chamber at a temperature very close to the oxidation temperature, typically, 840 to 950°C. If the incoming gas contains sufficient concentration of solvents, the energy content of those organics provides the necessary heat to raise the temperature of the exhaust stream to the combustion set point. The purified air leaves the unit by passing through the heat exchange media in an adjacent chamber. The heat in the air is transferred temporarily to the heat exchange media. The clean air is discharged through a stack to the atmosphere. The temperature of the air as it leaves the unit is typically only 40-50°C greater than the temperature of the polluted air entering the RTO, signifying good heat recovery and, thus, a very low fuel gas requirement. During operation, multiple chambers of an RTO operate in an alternating sequence, so that at least one chamber is always operating in inlet mode while the second is in outlet mode. The third chamber, necessary for elevated destruction efficiency, is on purge mode.

The advantages of a RTO include very high thermal and destruction efficiency, NOx emissions very low as produced by other oxidizers, lower susceptibility to attack from hydrocarbons, and lower overall operating costs. The disadvantages of an RTO include large size (resulting from the need for very large ceramic heat exchange surface), more expensive installation and higher capital cost, and more moving parts. Despite these disadvantages, many features of the RTO make it an ideal technology for the Chemical Process Industry. Multiple emission sources, such as process vents or small batch operations that have been ducted together, can usually be treated with an RTO. Additionally, the RTO can handle a wide range of air volumes, typically as low as 20-25 per cent of design. Generally, recycle capabilities can be installed to ensure that even with reduced inlet flow below 25 per cent of the design, the unit will operate at steady state with continued design destruction efficiencies.

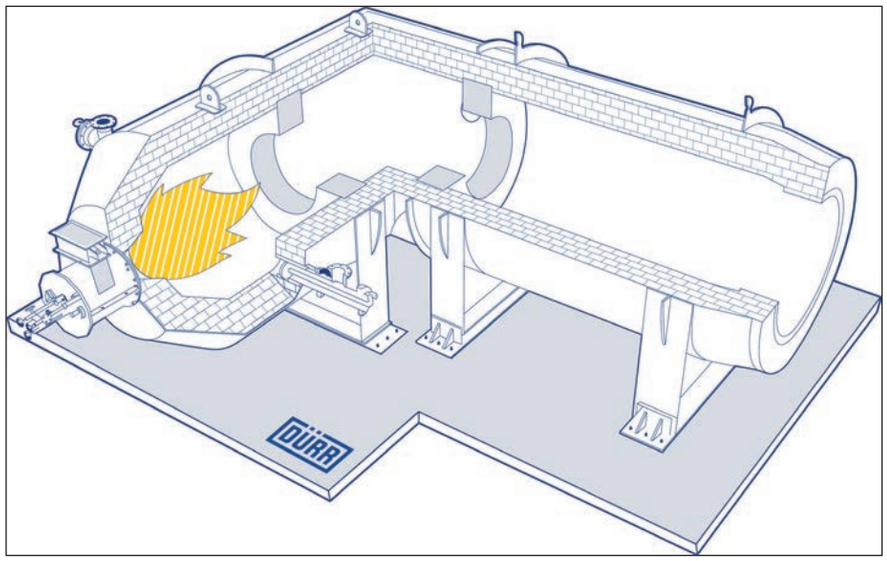

Figure 3: Direct Fired Thermal Oxidizer (Oxi.X DF)

Direct Fired Thermal Oxidizer (Oxi.X DF) - This type of oxidizer offers a cost-effective and able method for the treatment of exhaust air or liquids in the chemical, petrochemical and pharmaceutical industries (Figure 3). Because they feature direct combustion with no exchange of air, Oxi.X DF systems normally achieve a destruction efficiency of 99.9 per cent. Typically, such systems are used for:

- Exhaust gases with fluctuating flow rates and pollutant concentrations high enough to be within the explosive range.
- Exhaust gases with an oxygen content of 0-21 vol.%
- Exhaust gases burning only with a backup flame, self-burning lean gases and self-burning rich gases
- Exhaust gases containing halogenated compounds, nitrogen and/or sulfur (this group includes all toxic and carcinogenic substances)
- Residual liquids and waste solvents, plus wastewater with dissolved or emulsified organic and/or inorganic substances difficult to remove.
- Waste and residual liquids that contain or form salts and/or salt-binding substances.

In Oxi.X.DF, the combustion chamber is insulated with a refractory lining and designed to withstand extremely high temperatures. It provides a safe environment in which to oxidize multiple types of gas, liquid and waste pollutants. This combustion chamber and burner form the heart of the system. Generally, Oxi.X.DF system uses a multi-fuel burner with natural gas or oil as primary fuel source. Liquid and exhaust gas streams are added as auxiliary fuel and oxidized at temperatures ranging between 850 and 1000°C. In an Oxi.X.DF system, all of the liquid wastes, exhaust gases and combustion air are fed into the system through the burner that is located at the back of the combustion chamber. If the waste streams contain very low oxygen levels, the system is specially designed to meet the combustion air requirements for the specific waste streams.

The Oxi.X.DF system has been proven to safely and reliably process exhaust streams laden with extremely difficult or dangerous materials. Numerous add-on enhancements (such as heat recovery), safety devices (such as flame arrestors), water seals, steam generators, NOx-removal systems, lower explosive level (LEL) monitoring, and dilution air injection can also be considered during system design.

A major advantage of the system is its ability to operate at oxygen concentrations as low as 5 per cent, often firing successfully using the waste fuel itself, or with very little support fuel (such as residual liquids or solvents) while simultaneously minimizing the formation of NOx. ■

Author

Kailash Thakur
Sales Head
Durr CTS Pvt. Ltd.

Entrepreneur Manu Patolia, launches his book 'From Startups to Success'

'From Startups to Success', a new book by engineer, entrepreneur, and mentor Manu Patolia, offers aspiring founders a practical and inspiring roadmap to building enduring businesses.

Drawing from a remarkable life journey that began with arriving in the United States in 1969 with just seventy-five cents, Manu Patolia's book 'From Startups to Success' demonstrates that true entrepreneurial success is driven not by luck, but by discipline, clarity, courage, and character.

Blending personal experiences with actionable frameworks, 'From Startups to Success' serves both as a motivational narrative and a hands-on guide. The book walks readers through every critical stage of entrepreneurship — planning, execution, leadership, funding, systems, team building, sustainable growth, and exit planning — while emphasizing the importance of integrity, faith, and long-term thinking.

"From Startups to Success is deeply personal to me — it brings together my own journey, failures, learnings, and hard-earned insights with practical, step-by-step guidance for anyone who dares to dream of building a sustainable enterprise," says Manu Patolia. "I have written this book not just as a story, but as a hands-on playbook that helps aspiring entrepreneurs avoid common pitfalls and build with clarity and confidence."

Born in the small village of Taravada, Gujarat, Manu Patolia's early fascination with the Shetrunji Dam construction sparked a lifelong passion for business and enterprise. He went on to earn a B.S. in Civil Engineering from Texas A&M University and a Master's degree in Construction Management and Business from the New Jersey Institute of Technology (NJIT). A licensed Professional Engineer in New York and New Jersey, Patolia successfully balanced major construction projects while managing retail and hospitality businesses on an absentee basis.

Over the years, he founded and scaled multiple companies across manufacturing, printed circuit boards, nutraceuticals, and pharmaceuticals, building a diverse entrepreneurial legacy that forms the backbone of the book's real-world lessons.

Speaking about the vision behind the book, Preeti Chaturvedi, Founder of The Sunflower Seeds, said, "We were drawn to Manu's story because it represents the kind of grounded, values-driven entrepreneurship the world needs today. 'From Startups to Success' is not about shortcuts or hype — it is about building with intention, systems, and integrity. Our goal at The Sunflower Seeds was to shape this book into a timeless guide that can empower founders, students, and business leaders to think long-term and build businesses that truly last."

***Pharma Bio World* presents an exclusive extract from the book –**
'From Startups to Success' by – Manu Patolia

Entrepreneurship is not merely about starting a business, it is about beginning a life journey filled with courage, resilience, vision and sacrifice. It is a calling, a deep inner drive to create something meaningful in a world that offers both challenge and opportunity.

For me, this truth became real early in life. I was born in Taravada, a small village in India, where opportunities were scarce but dreams remained abundant. Even in those humble surroundings, I sensed there was a larger world waiting beyond the familiar fields and dusty roads of my childhood. A world that would demand far more from me than I could imagine, yet offer more possibilities than I could ever dream.

In 1969, I arrived in the United States as a young man with nothing more than ambition in my heart and determination in my pocket. I had no wealth, no network and no safety net. Only a dream of building a better life. When I landed at San Francisco airport, I discovered that the person who was supposed to provide my arranged exchange funds had no money to give. And so, my American story began with just seventy cents in my pocket, no friends, no knowledge of the culture and no clear sense of what lay ahead. Undeterred, I pursued higher education with relentless focus, earning a bachelor's degree in Civil Engineering from Texas A&M University, followed by a master's degree in Construction Management from the New Jersey Institute of Technology (NJIT), and ultimately securing my Professional Engineer's License (PE) in both New York and New Jersey.

Yet even with these achievements, I soon realized that working for someone else could never fully satisfy the deeper fire within me. My path was never meant to follow. It was meant to create. I felt a powerful pull toward entrepreneurship, to build something of my own, grounded in timeless lessons from the greatest classroom of all: hard work, perseverance, faith and the courage to fail forward.

Over the years, I worked in management roles on major projects, including serving as head of planning, scheduling and cost control on a multi-billion-dollar nuclear power plant project. Eventually, I ventured fully into entrepreneurship, building and selling multiple businesses–among them retail stores and a hospitality venture, both operated absentee.

The book also closely aligns with India's evolving startup ecosystem and the national push for innovation.

"My belief strongly resonates with the vision of Hon. Prime Minister Shri Narendra Modi, whose Startup India initiative has ignited a nationwide movement by empowering young innovators," Patolia adds. "This book is my humble contribution to that vision — to encourage entrepreneurs to start small, think big, act with discipline, and transform ideas into lasting success for themselves and for India."

Explaining the decision to publish the book, Sanjiv Gupta, Managing Director, Simon & Schuster India, said: "What stood out to us was the depth of real-world experience and the clarity of thinking Manu brings to entrepreneurship. This is not a theoretical business book — it is built on decades of execution, resilience, and learning. We believe 'From Startups to Success' will resonate strongly with India's fast-growing entrepreneurial community and become a valuable reference for founders who want to build sustainable, principled enterprises."Written for first-time founders, students, professionals, and growth-stage entrepreneurs, 'From Startups to Success' is a timely resource for anyone seeking to convert ambition into impact — grounded in experience, guided by values, and focused on long-term success. ■

FORM IV

Statement about ownership and other particulars about newspaper **PHARMA BIO WORLD** to be published in the first issue every year after the last day of February

1.	Place of Publication	Mumbai
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I Hemant K Shetty, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Date: 28th February 2026

Signature of Publisher

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