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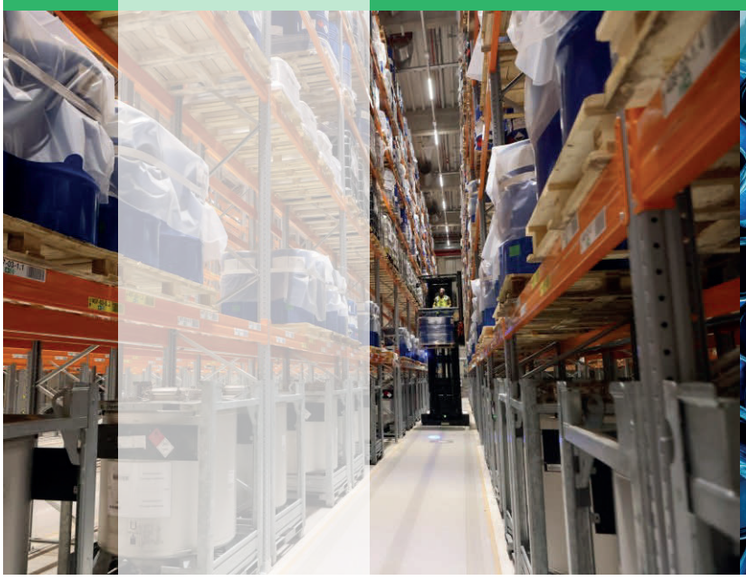

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Resetting the Framework

Trade and Competitiveness in the UK Chemical Sector

The Chemical Business Association (CBA) is positioning itself at the center of a rapidly changing UK chemical supply chain, navigating trade uncertainty, sustainability pressures, and growing demands on logistics and distribution. Under the leadership of Tim Doggett, Chief Executive of the CBA, the Association has expanded its influence and sharpened its focus on resilience, competitiveness, and longterm industry viability. In this interview, Christene Smith of CHEManager speaks with Doggett about the evolving priorities of the UK chemical supply chain, the impact of trade and policy decisions, and how sustainability, biobased chemistry, and supplychain transformation are reshaping the sector's future.

CHEManager: The Chemical Business Association (CBA) represents the entire chemical supply chain. What are the most pressing challenges your members are facing right now, and how have those priorities evolved over the past year?

Tim Doggett: It's fair to say that the CBA represents the full chemical supply chain – from manufacturers and distributors to logistics, storage, and service providers. Our members span from small SMEs to large multinationals, each with an equal voice. This unique breadth gives us a real-time view of what's happening across the UK and global chemical landscape.

Today, we face a system under mounting strain. It's not one issue but a convergence of multiple pressures – new and long-standing – creating a perfect storm. Decades of globalization, offshoring to China and emerging economies, rising regulation, and escalating costs have reshaped competitiveness and weakened domestic manufacturing resilience.

Added to this are global forces – geopolitical conflicts, energy volatility, climate change, technological disruption, and shifting demographics – all redefining how businesses operate. At home, UK firms face higher employment costs, regulatory uncertainty, and limited policy clarity, undermining confidence and investment.

The past decade's shocks – from COVID-19 and Brexit to global conflicts and trade disruptions – have only intensified these challenges. As a result, members are increasingly focused on risk management, continuity, and resilience in an uncertain global environment.

© Chemical Business Association (CBA)

Tim Doggett, CEO, CBA

Trade remains a major source of uncertainty for the sector. Which trade-related issues are currently having the greatest impact on UK chemical businesses, and where do you see the most urgent need for action?

T. Doggett: The UK chemical supply chain is highly interconnected and dependent on imports, leaving businesses exposed to trade disruption. Almost a decade after the Brexit referendum,

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companies are still grappling with practical challenges and lasting impacts.

UK REACh remains a prime example, adding major costs, duplication, and complexity. Having already spent over £500 million to comply with EU REACh, the industry now faces further expense under the Alternative Transitional Registration model, raising questions about its value – especially if UK policy continues to mirror EU rules.

Meanwhile, the US's "Liberation Day" tariffs and shifting trade rulings have brought disruption and ongoing administrative burden. These pressures demand calm, coordinated action and renewed collaboration, making this an opportune time to rebuild closer EU trade ties while diversifying global partnerships.

Discussions around a reset in UK–EU relations continue. From a chemical supply chain perspective, what would a meaningful and practical reset actually need to deliver?

T. Doggett: The Brexit referendum and subsequent negotiations largely overlooked business realities, driven instead by a political urge to "get Brexit done." Promises of seamless trade were never realistic, and SMEs have been hit hardest by the outcome. The EU remains the UK's largest trading partner, and supply chains continue to operate across borders, not within them.

Since leaving the EU, the UK has seen both divergence and course correction—UKCA markings being a costly example. With the government ruling out a return to the Customs Union or Single Market, any reset must reduce barriers, friction, and duplication while supporting cross-border operations.

For the chemical sector, that means simplifying a highly regulated, documentation-heavy system and focusing on sensible alignment, especially in data, registration, and compliance. Mutual recognition could add real value. Mobility of specialized talent also matters for smooth operations.

Ultimately, a genuine reset will come through incremental steps—prioritizing alignment, cooperation, and stability to create a more predictable environment where businesses can operate, invest, and compete effectively.

Sustainability and circular economy are high on the industry agenda. Where are chemical companies making real progress today - and where are they still struggling to turn ambition into action?

T. Doggett: The chemical supply chain is central to the sustainability and circular economy transition. With 96% of manufactured goods relying on chemical inputs, the sector plays a crucial enabling role in achieving global goals. Across the industry, businesses are improving efficiency, cutting emissions, and driving continuous improvement.

Through initiatives such as the CBA's Responsible Care Programme, members continue to go beyond regulation in areas like health, safety, and environmental performance. Innovation is thriving, from start-ups developing new solutions to established companies investing heavily in emerging technologies and resilient partnerships.

Yet scaling these innovations commercially remains difficult, requiring major investment, policy stability, and infrastructure in an uncertain economic climate. Companies must balance long-term transformation with short-term resilience amid supply chain disruption and rising costs.

Structural pressures also persist: extended global supply chains, Scope 3 emissions, security of supply, and uneven international policy all add complexity. The direction, however, is clear—sustainability and circularity are non-negotiable. Delivering them at scale will demand coordinated system change, supportive infrastructure, and alignment across the value chain, from producers to consumers.

Logistics and distribution are under increasing pressure. How are supply chains adapting, and what does this mean for the way chemical products are moved and managed?

T. Doggett: Advances in logistics have been fundamental to enabling globalization. The introduction of the 40 ft shipping container, major port infrastructure, and giant container ships made global trade faster and more efficient. For years, supply chains were built on just-in-time efficiency and cost optimization, but recent volatility has forced a shift toward a more resilient, "just-in-case" approach.

Businesses are now prioritizing flexibility—diversifying suppliers, building redundancy, and holding more inventory to safeguard continuity. This adds cost, but it's increasingly essential. Greater visibility is also key: knowing where products are, how they move, and where risks lie helps manage disruption.

The environment is growing more complex, with rising regulatory, administrative, and compliance demands. Skills shortages in logistics, transport, and warehousing add further strain, while persistent cost pressures—from energy to labour—continue to challenge margins.

Logistics and distribution remain undervalued despite being critical to the chemical supply chain's functioning. What this all points to is a more complex operating model, where resilience, visibility, and flexibility are just as important as efficiency.

The CBA has undergone significant development in recent years. How has the organization evolved, and what role does it now play within the sector?

T. Doggett: I joined the CBA during the Covid pandemic, as Brexit negotiations unfolded and before further global shocks such as the invasion of Ukraine. It has been "action stations" from my first day, supporting members through significant disruption and change. We've seen staff retirements that created both challenges and opportunities, promoted from within, and invested in new talent to strengthen our "CB-A Team."

The founding ambition of 1923—to create "a powerful merchant organization of great value to its members"—still resonates. Yet trade associations must evolve to stay relevant. We aim to move beyond the traditional model to remain agile, distinctive, and genuinely impactful for the chemical supply chain. Our strength lies in representing the full supply chain, giving us a realtime, wholesystem view in an increasingly complex environment.

We've deepened engagement with government to ensure policies reflect operational realities and maintain an influential presence across departments. Internationally, we're expanding participation and leadership in global initiatives, recognizing shared challenges across borders. Collaboration remains central, working closely with partners such as the ACA, ICTA, and TAF, where I serve as Director and Honorary Treasurer.

Member support continues to be a priority—through guidance, market intelligence, and new platforms for collaboration. We're investing in initiatives such as Generation STEAM, People & Skills Hub, 5050Vision, and Future Council, while supporting broader programs including Generation Logistics and Business of Science.

The CBA's transformation has been recognized with several TAF Awards since 2023, including Best Association Transformation and Diversity & Inclusion for Generation STEAM. Today, as "The Voice of the Chemical Supply Chain," we take our responsibility seriously ensuring the sector is visible, understood, and heard at a time of global change. The chemical supply chain remains vital to the UK economy.

Looking ahead to the next 3–5 years, what will separate successful businesses from those that struggle in the chemical supply chain?

T. Doggett: Five years after the pandemic, it is clear that "normal" has not returned. This new reality demands a different mindset. In the coming years, success will depend on how well businesses adapt to a more complex operating environment and understand their supply chains.

Ongoing geopolitical uncertainty, regulatory change, cost pressures, and sustainability demands signal a long-term shift in how the sector operates. Progressive companies that plan strategically, rather than reactively, will be best placed to succeed.

Market consolidation will continue as businesses seek scale and resilience, while opportunities in emerging economies grow in importance. Climate change and supply security are also driving shifts toward reshoring and friendly-shoring.

Skills and leadership will also be critical. Navigating this environment requires strong decision-making, a clear understanding of risk, and the ability to respond quickly to changing conditions.

Government also has a key role to play in creating the conditions that enable companies to operate, invest, and compete effectively, which means providing greater clarity, consistency, and stability in policy and regulation.

More broadly, improving how the UK - EU relationship works in practice will remain a vital factor, particularly for a sector that depends so heavily on cross-border trade, relationships and integrated supply chains.

Ultimately however, crises do provide opportunities and the businesses that recognise the scale of change that is occurring and act accordingly will be in the strongest position. Those that wait, or assume a return to previous conditions, may well risk falling behind.

■ www.chemical.org.uk

The State of the Specialty Chemicals Industry

How Resilience, Reliability, and Innovation are Reshaping Specialty Chemicals Manufacturing in the US

Specialty chemical manufacturers rarely have their names on the finished product, yet our work is everywhere. From life-saving pharmaceuticals and advanced electronics to modern agriculture, energy systems, and next-generation materials, specialty chemicals provide the critical inputs that allow innovation across the manufacturing ecosystem. As industries evolve and supply chains continue to shift, the role of specialty chemical manufacturers has become even more central—supporting the technologies, infrastructure, and products that power modern economies.

Today, the operating environment for specialty chemical manufacturers is changing rapidly. Companies are navigating shifting markets, policy uncertainty, and evolving global supply chains while continuing to invest in innovation, operational strength, and long-term partnerships. Conversations across the sector point to a consistent picture: despite uncertainty, the industry remains disciplined, resilient, and focused on execution.

Industry surveys and conversations with manufacturers across the sector reveal a consistent picture: despite uncertainty, the specialty chemical industry remains resilient, disciplined, and focused on execution.

Four themes consistently emerge. The importance of trust in supply chains, the industry's role as an innovation enabler, the need to operate in an environment where change has become constant, and continued investment in advanced manufacturing and new technologies.

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Trust, Reliability, and Long-Term Partnerships in Complex Supply Chains

In today's supply chain environment, trust has become one of the most valuable assets a manufacturing partner can offer.

Over the past several years, global disruptions—from geopolitical shifts to logistics challenges—have underscored the importance of dependable partnerships. Companies are increasingly prioritizing suppliers that demonstrate reliability, transparency, and operational discipline.

Industry feedback consistently reinforces this trend. Many manufacturers report that strengthening partnerships and ensuring operational reliability are top priorities, including investments in structurally sound equipment and continuous improvement.

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Jenn Klein, President & CEO, SOCMA

While cost remains a major factor in securing new business, execution credibility is just as important. Across the sector, companies consistently report that cost competitiveness opens the door, but dependable performance and operational reliability ultimately determine whether a partnership succeeds.

In contract manufacturing, the first months of a partnership often determine whether a relationship will succeed long term. Many manufacturers describe the early stages of a new partnership as the real "test drive," when customers evaluate whether technical expertise, asset reliability, and operational performance match expectations.

Available capacity may be common across the market, but dependable capacity is far more valuable. When challenges arise, it is transparency, preparation, and communication that separate strong partnerships from transactional relationships.

"The operating environment for specialty chemical manufacturers is changing rapidly."

Trust is not built in spreadsheets or negotiations. It is built through consistent performance when markets tighten, and partners rely on one another to deliver.

Enabling Innovation Across the Manufacturing Ecosystem

Specialty chemical manufacturers rarely operate in isolation. Instead, they serve as critical enablers of innovation across the broader industrial economy.

Products developed by specialty chemical companies support advancements in pharmaceuticals, electronics, agriculture, advanced materials, energy technologies, and many other sectors. These materials allow other manufacturers to scale new technologies and bring products to market.

Today, several structural trends are accelerating demand for specialty chemicals.

Foreign direct investment continues flowing into U.S. manufacturing, particularly in areas such as semiconductors, batteries, and advanced electronics. Supply chain resilience efforts are also encouraging greater domestic production in pharmaceuticals, defense technologies, and other strategic industries.

At the same time, the expansion of data centers, artificial intelligence infrastructure, and advanced computing technologies is creating new demand for specialized materials and advanced chemistries.

Industry survey data also shows that many manufacturers are seeing growth opportunities spread across multiple end-use sectors rather than concentrated in a single market.

This diversification is a defining strength of the specialty chemical sector. By supporting multiple industries simultaneously, manufacturers reduce concentration risk and maintain the agility needed to respond to shifting market demands.

In many ways, the specialty chemical industry functions as the connective tissue of the manufacturing ecosystem—providing the specialized inputs that allow innovation to scale.

Adapting to an Environment Where Change Is the New Normal

If there is one constant in today's manufacturing environment, it is change.

Specialty chemical manufacturers are navigating a complex landscape shaped by shifting trade policies, regulatory developments, labor pressures, and global economic volatility. For many companies, these factors are not temporary disruptions—they are simply the conditions under which business must operate.

Trade policy remains an ongoing variable. Manufacturers continue to manage tariffs and evolving regulatory frameworks that influence global supply chains.

At the same time, companies are adapting to broader market uncertainty. Many manufacturers report that forecasting demand has become increasingly challenging, reflecting the difficulty of predicting how quickly opportunities will convert into firm orders.

Manufacturers are closely monitoring several indicators to guide operational planning, including the pace at which new opportunities convert into confirmed business and the trajectory of raw material pricing.

"Trust is not built in spreadsheets or negotiations."

Interestingly, plant capacity itself is not the primary constraint for many companies today. Many manufacturers report stable production capacity across their operations.

Instead, the challenge lies in identifying new business opportunities and managing demand fluctuations in an unpredictable environment.

In this context, operational discipline matters more than ever. Companies are focusing on execution, efficiency, and flexibility to ensure they can respond quickly when market conditions shift.

Continued Investment in Advanced Manufacturing and New Technologies

Despite ongoing uncertainty, the specialty chemical sector continues to invest in the future.

Industry data indicates that capital investment remains steady and targeted toward strengthening operational performance. Many manufacturers report strong confidence in investments that improve efficiency, enhance reliability, and reinforce core competencies. Others are pursuing facility expansions supported by committed customer demand.

"If there is one constant in today's manufacturing environment, it is change."

Importantly, these investments are not driven by speculative growth. They are grounded in operational strength and long-term partnerships.

Manufacturers are focusing on improving production efficiency, upgrading equipment, and strengthening the reliability of their assets. These investments help companies deliver consistent quality while managing costs and maintaining flexibility.

Technological innovation is also playing an increasing role in manufacturing operations. Emerging tools—including advanced data analytics and artificial intelligence—are helping companies optimize production processes, improve yields, and identify operational deviations more quickly.

In addition, sustainability continues to shape investment decisions across the sector. Many companies are pursuing improvements in energy efficiency, waste reduction, and resource optimization as part of broader operational strategies.

These efforts reflect a long-standing characteristic of specialty chemical manufacturing: the ability to continuously improve complex processes while meeting evolving customer expectations.

A Sector Positioned for the Future

Taken together, industry data and feedback from manufacturers tell a clear story about the current state of the specialty chemical sector.

- Capital investment remains steady.
- Growth opportunities are diversified across industries.
- Supply chain relationships remain strong.

Manufacturers are competing on reliability, operational discipline, and technical expertise—and those qualities are proving to be powerful advantages in a complex global market.

North America continues to offer a stable and transparent operating environment for advanced manufacturing. Companies that execute effectively, scale efficiently, and maintain strong partnerships are well positioned to capture emerging opportunities.

The specialty chemical industry has long been defined by resilience and adaptability. In an era where change has become the new normal, those characteristics are proving more valuable than ever.

And as manufacturing continues to evolve, specialty chemical companies will remain at the center of that progress—enabling innovation, strengthening supply chains, and supporting the industries that power the global economy.

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North America at a Crossroads

Why the USMCA Review Matters for the Global Chemical Industry

In an era defined by geopolitical fragmentation, supply chain realignment, and intensifying global competition, regional trade agreements are no longer simply market-access tools, they are strategic platforms for industrial policy, investment certainty, and regulatory alignment. Nowhere is this more evident than in North America.

The North American chemical industry is one of the most deeply integrated manufacturing ecosystems in the world. Feedstocks, intermediate chemicals, and finished products routinely cross borders multiple times before reaching end markets. Chemistry and plastics underpin approximately 96% of manufactured goods. From automotive components and construction materials to pharmaceuticals, semiconductors, and clean energy technologies, chemical inputs are foundational to modern economies. As governments across North America pursue emissions reductions and advanced manufacturing strategies, chemical and plastics value chains will play a pivotal role. Investment decisions in one country are influenced by regulatory frameworks, energy policies, and trade certainty in the others.

Since replacing NAFTA in 2020, the United States-Mexico-Canada Agreement (USMCA) has reinforced tariff-free trade across the region, strengthened rules of origin, and introduced modern provisions on intellectual property, digital trade, and good regulatory practices. It demonstrated that open markets and high standards are not mutually exclusive; that regulatory cooperation can coexist with sovereign policymaking; and that regional integration can strengthen rather than weaken global competitiveness. For the chemical industry – a capital-intensive, innovation-driven, and trade-exposed sector – the Agreement has helped preserve a stable operating environment during a period marked by global volatility.

Against this backdrop, a cohesive North American market of over 510 million consumers represents a strategic advantage but only if the region continues to act as an integrated production platform.

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Review, Not Renegotiation

USMCA includes a built-in review mechanism, with the first formal joint review scheduled to commence in the coming months. While some trade agreements become vehicles for wholesale renegotiation, the three North American chemical associations have been clear: this review should focus on implementation and enforcement, not reopening core market-access commitments.

This distinction matters. Investment in chemical manufacturing often involves multi-billion-dollar decisions with decades-long time horizons. Policy uncertainty, particularly around tariffs, rules of origin, or regulatory divergence, can delay or redirect capital flows. In a world where governments are deploying aggressive industrial policies to attract advanced manufacturing, predictability is itself a competitive advantage.

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Greg Moffatt, President and CEO, CIAC

The Chemical Sectoral Annex: A Blueprint for Regulatory Cooperation

One of the most innovative components of USMCA is the Annex on Chemical Substances; a ground-breaking, industry-informed framework designed to enhance regulatory cooperation across the three countries.

Unlike traditional trade provisions focused solely on tariffs, the Chemical Annex addresses behind-the-border measures that significantly affect trade and investment. It encourages transparency in chemical risk assessment processes, information sharing among regulators, and alignment where appropriate. The objective is not to dilute standards, but to reduce duplication, improve efficiency, and foster supply chain resilience.

For globally active companies, regulatory fragmentation can be as costly as tariffs. Divergent testing requirements, inconsistent classification systems, and asynchronous approvals can delay product commercialization and create unnecessary compliance burdens. By contrast, greater regulatory cooperation supports innovation, accelerates time-to-market, and strengthens environmental and safety outcomes.

American Chemistry Council (ACC), National Asocation of the Chemical Industry of Mexico (ANIQ), and Chemistry Industry Association of Canada (CIAC) have jointly recommended improving enforcement of USMCA commitments and accelerating implementation of the Chemical Sectoral Annex. Building on that foundation, we have outlined a set of clear priorities for the 2026 Joint Review designed to reinforce certainty, competitiveness, and integration across the North American chemical value chain.

First, protect tariff-free trade. Tariff-free, rules-based trade in chemicals, resins, and plastic products remains

the backbone of North American manufacturing integration. Even the prospect of new tariffs can have a chilling effect on investment, disrupting supply chains that depend on the seamless cross-border movement of feedstocks and intermediate goods. For capital-intensive sectors such as chemistry and plastics, predictability is essential. Preserving USMCA's tariff-free framework supports jobs, exports, and long-term capital allocation decisions across the region. The industry's position is clear: tariff-free trade in chemicals and plastics must remain intact.

Second, preserve and strengthen regulatory cooperation. USMCA's Good Regulatory Practices (GRP) provisions, and the Chemical Annex provide important tools to improve transparency, early consultation, and evidence-based decision-making. Practical cooperation on chemical assessments, hazard classification, product approvals, and reporting requirements can reduce duplication while maintaining robust health and environmental protections. Establishing and empowering a dedicated working group to oversee implementation of the Chemical Annex would help ensure sustained progress and measurable outcomes.

Third, avoid the emergence of new non-tariff barriers. In an integrated market, domestic policy measures developed in isolation can unintentionally disrupt trade. Well-intentioned environmental objectives should be designed in ways that are science-based, administratively workable, and aligned with trading partners wherever possible. Early dialogue and coordination can prevent fragmentation that would otherwise undermine supply chain efficiency and raise costs.

Finally, improve alignment and predictability. Greater regulatory coherence and, where appropriate, mutual recognition of standards can lower compliance costs and enhance North America's competitive position. At the same time, environmental and climate policies should be outcomes-focused, evidence-based, and coordinated regionally to avoid distortions within the integrated market.

Taken together, these four priorities reflect a pragmatic approach: reinforce what is working, close implementation gaps, and ensure that North America continues to function as a cohesive and competitive production platform in a challenging global environment.

Looking Ahead

As governments prepare for the formal 2026 review beginning this spring, engagement between industry and policymakers will intensify. The chemical associations of Canada, the United States, and Mexico have committed to working closely with their respective governments and with one another to advance clear, constructive and pragmatic recommendations.

For a sector that sits at the heart of modern manufacturing, the stakes are high. A fully implemented and effectively enforced USMCA can strengthen North American competitiveness, enhance supply chain resilience, and attract new investment in chemical and downstream manufacturing.

In a world of uncertainty, stability is not merely beneficial; it is strategic.

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Powering Global Chemical Innovation

India's CDMO Strength in Agrochemical and Pharmaceutical Chemicals

India's manufacturing strength shines in life sciences CDMOs, especially agrochemicals, fueled by R&D and production expertise, geopolitical shifts, raw material access, and strong IP protections—making it a top chemical sourcing hub. Maharashtra-based Astec LifeSciences, a Godrej Agrovet subsidiary, excels in agrochemical and pharmaceutical ingredients/intermediates. Burjis Godrej, Executive Director at Agrovet and MD at Astec, details CDMO R&D capabilities and efficiency upgrades for global markets.

CHEManager: India's CDMO sector is rapidly gaining global attention. What are the main factors behind India's rise as a preferred manufacturing partner for Western chemical companies?

Burjis Godrej: Western innovators are re-evaluating supply-chain risk, IP protection and the quality of long-term partnerships. Amidst this shift in the landscape, India has certainly emerged as a preferred CDMO destination supported by its cost competitiveness, scientific talent and steadily maturing manufacturing ecosystem.

Government-led initiatives like favorable foreign investment policies, 'Make in India' and targeted industry incentives – have further accelerated this momentum, positioning India firmly on the global map as high quality, dependable partners.

While China continues to hold an advantage in large-volume, off-patent molecules, global innovators are actively diversifying their sourcing strategies to reduce concentration risk and improve transparency. In doing so, India has emerged as a credible and trusted alternative, supported by stronger governance frameworks, legal robustness, and regulatory alignment with Western markets.

Crucially, Western innovators trust Indian CDMOs more with proprietary data due to stronger IP protections. Indian firms have bolstered R&D, evolving from vendors to strategic innovation partners. As a result, India's rise in the global CDMO ecosystem is being powered not just by cost advantages, but by a combination of trust, IP security, and lifecycle competitiveness.

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How do the lessons-learned from the global supply-chain disruptions during the Covid crisis and the current geopolitical landscape, including the China+1 strategy, impact India's position and competitiveness as a CDMO hub for Western partners?

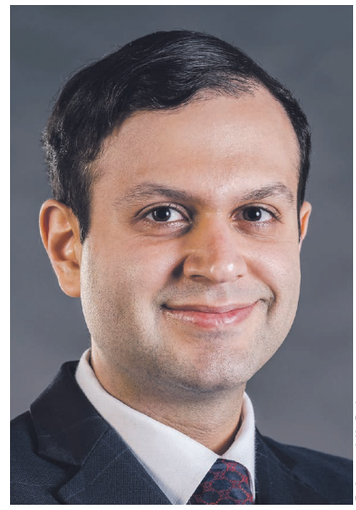
B. Godrej: The Covid crisis was a turning point for global innovators to rethink supply chain dependencies, exposing the risks of overdependence on a single geography, particularly China. As resilience becomes as important as cost, we witnessed many Western companies adopting China + 1 strategies to diversify risk.

In this shift, India has emerged as a strong and trusted alternative. Global innovators value India's reliability, transparency and ability to handle complex and patent protected chemistries. Recent policy developments in the US and Europe, which encourage diversification away from China in critical supply chains, have further strengthened India's position as a preferred alternative.

That said, India must overcome its image as a secondary manufacturing option to stay competitive long-term. Its strengths—robust IP protection, advanced R&D, operational excellence, and a highly skilled workforce with global expertise—enable CDMOs to master the full value chain. This positions them as strategic, innovation-driven partners beyond China+1 alternatives.

With India's share in the global chemical CDMO sector growing, what strategies are in place to support and accelerate this growth and capture a larger market share?

B. Godrej: India's rising global chemical CDMO share stems from policy support and industry capacity building. Policies emphasize world-class chemical clusters with shared infrastructure, faster regulatory clearances, and fiscal incentives to boost ease of doing business and large-scale investments.



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Burjis Godrej, Managing Director, Astec LifeSciences

At the same time, there is greater emphasis on boosting R&D through industry- academic collaborations, technology partnerships, and funding support for innovation-driven projects.

On the industry side, companies are advancing the value chain with investments in complex process development, advanced chemistries, and versatile facilities for patent-protected molecules. They're pursuing backward integration for supply reliability, expanding development teams, enhancing global collaborations, and upgrading tech platforms to meet customer needs.

Another important dimension is the increasing alignment with global ESG and sustainability standards. Indian CDMOs are investing in solvent recovery systems, improved waste management practices, and energy-efficient operations to meet the environmental and regulatory expectations of international clients.

Together these shifts are enabling India to evolve from a cost-driven manufacturing base to a strategic, innovation-led CDMO partner capable of capturing a larger share of the global market.

What are the biggest challenges facing Indian CDMOs, such as R&D investment and infrastructure gaps, and how is Astec LifeSciences ddressing these to attract Western business?

B. Godrej: One of the key challenges for Indian CDMOs today is balancing sustained investment in R&D, infrastructure, and supply chain resilience while navigating long development cycles and market volatility. Despite the sector's momentum, structural gaps remain, particularly around raw material security, modern chemical infrastructure, and research spending. India continues to rely significantly on imported feedstocks, and several chemical clusters require modernization. At the same time, overall investment in chemical R&D is still relatively modest at about 0.7% of GDP, compared to the global average of nearly 2.3%, which can slow the pace of innovation.

Another challenge is the inherently long commercialization cycle of CDMO projects. Unlike generics, these engagements require significant upfront investments in process development, pilot trials, validation batches, regulatory documentation, and specialized infrastructure, with revenue often realized much later in the product lifecycle. The recent slowdown in the global chemical industry has further added pressure on margins and capital investments.

Astec LifeSciences overcomes challenges through enhanced R&D and collaboration. We've built a world-class development center for process innovation and scale-up, upgraded manufacturing equipment, infrastructure, and HSE systems to global standards. Leading in Grignard, Friedel-Crafts, halogenation (bromination/chlorination), pyridine chemistry, PPO inhibitors, triazole fungicides, and sulfonylurea herbicides, we aim to be the top global CDMO for complex agrochemicals.

Equally important is evolving the partnership model with global innovators – through longer-term contracts, shared development risk, and more strategic collaborations – so that Indian CDMOs can scale capabilities faster and position themselves as trusted global partners.

How does Astec LifeSciences invest in and leverage its R&D capabilities and infrastructure to meet the evolving needs of global clients in the CDMO space?

B. Godrej: At Astec LifeSciences, we view investment in R&D not as an expense but as a strategic commitment to long-term growth and capacity building.

In the CDMO space, global innovators increasingly expect partners who can solve complex chemistry challenges, optimize processes, and reliably scale molecules from development to commercialization. Delivering on these expectations requires a robust and future-ready research infrastructure.

The Adi Godrej Center for Chemical Research and Development in Maharashtra advances innovation with state-of-the-art synthesis and formulation labs, advanced analytical instruments, and modern safety systems for new product development, route optimization, and rapid lab-to-commercial scale-up. We invest in process teams to enhance scale-up expertise, focusing on cost optimization, yield improvement, and operational excellence for complex molecules—evidenced by ongoing programs with leading innovators meeting global standards. HSE upgrades in infrastructure and processes ensure safety, sustainability, and reliability as the foundation of our competitiveness.

At Astec LifeSciences, our goal is to build a resilient, innovation-led CDMO platform that consistently delivers high quality outcomes across the value chain while meeting the evolving needs of the global innovators.

In what ways is Astec LifeSciences leveraging R&D to develop and implement green chemistry technologies, such as biocatalysis or flow chemistry, and how do these align with the sustainability requirements of Western clients?

B. Godrej: At Astec LifeSciences, sustainability is core to our operating philosophy and long-term strategy, beyond selective green chemistry tools. We're adopting flow chemistry for economic, operational, and safety gains—improving heat transfer, cutting solvent use, enhancing hazardous reaction safety, and boosting energy efficiency. We also pursue greener pathways like biocatalytic processes when commercially viable and scalable.

But our sustainability efforts extend beyond chemistry to reduce our environmental footprint across the value chain—boosting renewable energy use, energy productivity, water conservation, recycling, and landfill waste reduction. These initiatives grow more vital as global innovators demand responsible, transparent supply chains.

Our progress is validated by global benchmarks and partnerships: Astec LifeSciences holds an EcoVadis Gold rating (top 5% worldwide for ESG), Responsible Care re-certification (2024), EP100 commitment to double energy productivity from 2020, and a 10% waste-to-landfill reduction from 2021. These efforts align our sustainability, R&D, and operations with Western innovators' expectations, solidifying our role as a responsible, future-ready CDMO partner.

Looking ahead, what investments or innovations do you believe are critical for India—and Astec LifeSciences in particular—to evolve from a 'plus-one' sourcing option to a global leader in CDMO services?

B. Godrej: India must transcend its "plus-one" sourcing image to become a global CDMO leader by investing in transformative technologies for chemical development and manufacturing. The market shifts to specialized, innovation-driven products in smaller batches needing sophisticated processes and flexible multi-campaign cycles. At Astec LifeSciences, we prioritize manufacturing innovation alongside chemistry via sustained R&D, process advances, and operational excellence for speed, reliability, and quality.

India's ambition to double chemical output by 2040 and capture 5–6% of global value chains demands sustained investment in advanced manufacturing—continuous flow reactors, modular plants, automation, and AI-driven process control. These technologies will lift India from a purely cost-competitive option to a differentiated, innovation-led partner.

Astec's roadmap aligns closely with this. By strengthening R&D capabilities, expanding specialized technical talent, and building next-generation manufacturing infrastructure, we aim to support global innovators with reliable, scalable and sustainable solutions. Ultimately, companies that combine deep technical capabilities with dependable supply execution will help position India not just as an alternative supplier, but as a trusted global CDMO partner of choice.

■ www.godrejastec.com

Resilience by Design

How Leaders Prepare Supply Chains for an Evolving Landscape

In a market shaped by trade volatility, tighter regulatory expectations, and rising pressure to secure continuity of supply, leadership increasingly shows up in the systems people build and the decisions they empower others to make. In this CHEManager Leaders & Motivators interview, Frank Romanski, VP, Head of Strategic Growth and Global Pharma Solutions, Lonza Capsugel, reflects on how strategy becomes execution, what resilience demands from teams, and the leadership habits that help organizations stay steady when the environment isn't.

CHEManager: US manufacturing has moved back to the center of strategic conversations. What do you see as the biggest drivers behind that shift — and what's most often misunderstood about it?

Frank Romanski: US manufacturing capacity has always been a strategic imperative for the pharmaceutical and biotech industry. However, recent regulatory, trade, and industry-specific dynamics have increased the importance of maintaining a US footprint to support reliable supply and business continuity.

Underlying this shift is a growing recognition of how vulnerable global supply chains can be—whether due to geopolitical dynamics, transportation, natural disasters or other external shocks. In the context of medicines, that vulnerability carries higher stakes because while there are certainly many things people can live without, medicine is not one of them.

One of these drivers is the recent decision by the US Department of Commerce to issue final affirmative antidumping and countervailing duty determinations on hard empty capsules imported from China, Brazil, India, and Vietnam. These duties, which became enforceable in February 2026 in addition to existing tariffs, have reinforced the strong desire to have fair market pricing and sustainable manufacturing footprints in the US. As a result, we've seen several companies increase investment in the US to support long-term planning and continuity.

What is often misunderstood is that these shifts have implications for US pharmaceutical and biotech companies that go beyond near-term cost and availability of imported capsules. They also shape long-term planning and investment decisions, prompting companies to reassess supply chain structure, geographic exposure, and qualification timelines. In this environment, advance planning becomes critical, particularly for high-volume or late-stage programs.


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Frank Romanski, VP, Head of Strategic Growth and Global Pharma Solutions, Lonza Capsugel

"Supply chain resilience" is discussed constantly but rarely defined clearly. From your perspective, what does resilience look like in practice — and which leadership decisions make the difference?

F. Romanski: In practice, resilience starts with a disciplined, proactive assessment of where supply chains are exposed to volatility and how those risks can be mitigated over time. It is not a one-time exercise, but an ongoing leadership responsibility in ensuring drug developers have access from the earliest stages through commercialization. The red line, so to speak, is ensuring that you never even get close to patients not receiving critical and often lifesaving medicines.

At Lonza Capsugel, we maintain a resilient supply chain by having an established global footprint and assessing investments in capacity and technologies through a strategic lens that helps customers scale their innovations while mitigating risks. A clear example of this proactive approach followed the opening of our Innovaform acceleration center in Colmar, France. The center enables customers to design and customize even highly complex capsule formulations, supported by the deep expertise of world-leading experts in drug formulation.

However, customers also need the ability to move those formulations into the clinic in a cGMP environment and take them all the way through commercialization. To address that, we integrated our Tampa, Florida site—adding clinical and commercial manufacturing capabilities alongside for-

mulation development. Today, this combined offering provides customers a seamless, end-to-end experience that takes molecules from clinic all the way through commercialization, thus mitigating the risks of bouncing between sites, suppliers and manufacturers.

Trade and regulatory volatility are now structural, not temporary. How do you plan and lead when assumptions around sourcing, trade, or policy can change quickly?

F. Romanski: In today's environment, planning and leadership require building flexibility into the system from the outset, so that companies can adapt quickly as conditions change. While not all of these trade and regulatory shifts are structural quite yet, the longer-term direction can indeed be viewed as having staying power, requiring companies to plan with durability in mind. For us, that means staying close to regulatory developments and helping customers navigate these complexities and respond with speed and confidence.

We are seeing this play out in real time. For example, recent regulatory updates across both the US and global markets are impacting foods and ingested drugs. The US FDA´s decision to revoke authorization for FD&C Red No. 3 (erythrosine, E127) is one such shift, requiring manufacturers to reformulate products intended for the US market.

At Lonza Capsugel, we take a proactive approach to these changes. We have a dedicated team monitoring regulatory developments and a cross-functional task force that works closely with customers to assess impact and guide transitions. Just as important, we maintain a broad portfolio of capsule options and deep formulation expertise, enabling us to support reformulation efficiently and with minimal disruption.

Building redundancy often conflicts with efficiency. What lessons have you learned about strengthening supply security without sacrificing speed, quality, or competitiveness?

F. Romanski: One of the most important lessons in balancing redundancy and efficiency came out of the COVID-19 pandemic, when multiple parts of the pharmaceutical value chain were under significant stress, both from demand and efforts to build greater supply security.

During that period, many companies moved quickly to expand capacity. This was up and down the value chain, from finished dosage forms to APIs to excipients and key starting materials. As conditions stabilized, it became clear that resilience requires a more measured, long-term, sustainable competitiveness across the value chain—particularly for products that are more available, underutilized or even commoditized.

At the same time, COVID and more recent trade and geopolitical dynamics highlighted where critical dependencies still exist. In pharmaceutical manufacturing, having most of what you need is not enough—because of regulatory and quality requirements, you need full reliability across every input. For example, expanding manufacturing capacity in one region does not fully mitigate risk if key upstream materials remain exposed to disruption.

The lesson is to take a first-principles view of the entire value chain and ensure that every stage is sufficiently de-risked. In practice, that means making targeted investments that strengthen supply security while maintaining the speed, quality, and consistency that customers depend on.

You sit at the intersection of strategy, operations, and customer expectations. How do you translate high-level direction into decisions teams can execute with confidence?

F. Romanski: In my experience, there are two things that need to work in sync to enable confident decision-making. The first is having a clear vision, or "north star." This should be informed by data, but not exhaustively so—just enough to inspire confidence and direction.

From there, it becomes about consistency. In a highly dynamic and fast-moving industry, it is easy to get distracted or pulled off course. Remaining aligned to the original strategic vision is what enables teams to deliver on initiatives that go beyond the superficial.

When leaders are consistent, and teams can trust that consistency, it creates alignment over time, and you all start to row in the same direction with confidence.

Can you point to a moment or decision that fundamentally changed how you think about leadership — particularly in times of uncertainty or transformation?

F. Romanski: There are a few moments that come to mind, all centered around the concept of accountability. Across all levels of organizations, I've seen that beyond a certain level of risk, people become hesitant. They'll get paralyzed with a bit of doubt and seek additional analysis or certainty before moving forward.

> *"In today's environment, planning and leadership require building flexibility into the system from the outset, so that companies can adapt quickly as conditions change."*

What I learned in those moments is that progress often depends on someone stepping forward and owning the accountability for the decision, even if the outcome is uncertain. The first time doing this is uncomfortable, but it becomes easier over time, and it can even become a kind of superpower. When leaders take accountability, it creates momentum, and teams are more willing to align and move forward together.

At the same time, accountability needs to be paired with the right support. Ensuring teams have the resources and tools they need to build their skills- particularly in areas like data analytics, automation, and AI- enables them to operate with greater confidence and make decisions more effectively in times of uncertainty.

Ultimately, it becomes a combination of ownership and empowerment where we are learning from each decision, taking accountability, and continuing to move forward.

Lonza recently announced the divestment of its Capsules & Health Ingredients business. From Lonza Capsugel's point of view, how does this transition shape strategic focus, customer relationships, and future growth priorities?

F. Romanski: The strategic divestiture positions Lonza Capsugel for continued global leadership and growth across pharmaceutical and nutraceutical oral dosage delivery. Under new ownership, we are strengthening our ability to anticipate market shifts and respond with clarity and focus, while maintaining continuity in quality, service, and supply.

With more than 100 years of operating experience, we will continue to build on our rich heritage of quality, innovation, and service excellence. We have a dedicated leadership team, established governance, and global operational structure in place to ensure continuity while enabling forward momentum. This foundation allows us to evolve with confidence, preserving what customers trust while accelerating progress where it matters most.

As Lonza Capsugel enters its next phase, where do you see the biggest opportunities to create value—and what leadership priorities will determine whether those opportunities are realized?

F. Romanski: Today's pharmaceutical and nutraceutical landscape is shaped by converging pressures: rapid technological advancement, shifting patient preferences, complex regulatory guidance, and global trade volatility. We see the biggest opportunities to create value as delivering greater speed, reliability, and partnership in response to these dynamics.

Lonza Capsugel continues to strengthen operations, accelerate key investments, and expand global manufacturing capacity and supply chain capabilities to meet these needs—ensuring resilience across every region. In December 2024, we added advanced manufacturing lines in APAC to support the manufacturing of hard gelatin capsules. In April 2025, we announced the expansion of our largest warehouse in Belgium, increasing storage capacity by 50%. Our Tampa (US) site supports customers with clinical development, scale-up and commercial supply, analytical method development, and quality control testing.

A constant for Lonza Capsugel is the ability to delight our customers. By investing further in our pharmaceutical capabilities, we extend our role beyond excipients and formulation into a true end-to-end partnership. From formulation to commercialization, we remain focused on speed, transparency, and proactive collaboration to help customers navigate complexity with confidence. Delivering on these opportunities will depend on disciplined investment, operational excellence, and a continued focus on customer-centric innovation.

■ www.capsugel.com

Creating New Value through Sustainability

Mitsubishi Chemical Group Promotes Sustainability by Accelerating Innovation

Sustainability has evolved from a niche concept into a global megatrend. The UN Sustainable Development Goals (SDGs), adopted in 2015 as part of the 2030 Agenda, form the most widely accepted blueprint for global sustainable development. Mitsubishi Chemical Group is included in several sustainability and ESG indices globally. In its "Kaiteki Vision35", a management vision outlining the targeted state of the Group for 2035, the Tokyo, Japan-based global chemicals and materials manufacturer has defined the path to become a Green Specialty Company. CHEManager spoke with Noriyuki Mita, Executive Officer, Chief Sustainability Officer, Mitsubishi Chemical Group (MCG), about how MCG's sustainability concept contributes to the sustainable development of the environment and society, and the role material innovation plays to achieve these goals.

CHEManager: What are the main drivers behind Mitsubishi Chemical's sustainability efforts in a world where ESG and sustainability reporting have become standard for global industry?

Noriyuki Mita: Fundamentally, growing concern on sustainability of our planet and society, shared by people, especially in western society, has been the basic driving force of sustainability. Directly, 1) developing policies and regulations, especially in Europe, and 2) markets, not only financial but also commercial and labor, are the strongest driving forces of our actions. Our customers, consumers, employees, and society are looking for solutions to sustainability challenges, and we will be rewarded by providing such values throughout supply chain.

What are your company's top priorities in sustainability and corporate social responsibility?

N. Mita: Mitsubishi Chemical has identified the material issues to be addressed by the Group. As for issues related to environment and social impacts, Mitsubishi Chemical identified product safety, reduction of GHG emissions and environmental impact as well as realization of a circular economy. Also, Mitsubishi Chemical has set targets and measures progress on these material issues with a set of KPIs called "Management of Sustainability (MOS)".

Mitsubishi Chemical considers sustainability as both risk and opportunity to its business. As a chemical company it takes three tracks approach to realize sustainability in its business.

First, energy transition by converting energy sources and increasing use of renewable energy.

Second, feedstock transition through recycling (combination of mechanical and chemical), biomass, and Carbon Capture and Utilization (CCU). We have established a new Green Chemical Business Department to accelerate our efforts, in collaboration with partners by leveraging our unique technologies.

Third, contribution to customers' carbon neutrality, circular economy and nature positive. We can provide sustainable solutions to customers, and through our customers, to all stakeholders in the value chain, consumers, and society. For example, thermal management (insulation, heat resistance, conduction) function of our materials can contribute to more efficient use of energy in processing and utilization of goods. Similarly, functions we offer, such as lightweight, barrier properties, recyclability, processability, can be solutions to challenges.

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Noriyuki Mita, Executive Officer, Chief Sustainability Officer, MCG

For realizing sustainability, we have three basic principles, 1) holding long term vision and not being glad and sad in the short run, 2) having time axis and sequence for concrete actions, and 3) developing competitive advantage. As a player located in rather upper stream supply chain, we need to deliver values across supply chain, not only direct customers, and need to collaborate with all stakeholders in value chain. Data management is a key to this by visualizing and sharing our sustainability values.

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What does the Kaiteki concept mean, and how has Mitsubishi Chemical further developed this sustainability philosophy since its introduction in 2011?

N. Mita: At Mitsubishi Chemical, our Purpose is to "lead with innovative solutions to achieve Kaiteki, the well-being of people and the planet." In other words, we aim to provide solutions to the sustainability challenges of people and our planet. This concept

has been already rooted in our employees around the world as a way of thinking and a guiding principle. Upon this basis, Mitsubishi Chemical has developed concrete actions to realize Kaiteki.

In 2025, MCG has formulated a new management vision "Kaiteki Vision 35" that outlines its aspirations for 2035. "Kaiteki Vision 35" identified focused areas where MCG can make most of our strength to address social issues.

How does Mitsubishi Chemical experience regional differences in sustainability expectations, and how are these reflected in your global strategy?

N. Mita: The trend of sustainability is so different from region to region. Moreover, the situation varies depending on the business. We believe it is important to implement sustainability initiatives in a way that is customized to the specific circumstances of each business and region, rather than being bound by a one-size-fits-all global policy.

At the same time, since our supply chain is connected globally, our businesses are exposed to trends and situations of not a single region but so many regions in the world. Global economic interdependence has deepened, and regional policies and regulations now exert global influence through extra-territorial reach and other spillover effects. So, we strengthen global communication and collaboration among regions while respecting regional diversity. I feel Mitsubishi Chemical is one of the companies which has a globally coherent and shared approach and understandings of each other.

Does Europe's strict environmental regulation drive sustainable innovation, or does its inflexibility and lack of technology neutrality sometimes constrain progress?

N. Mita: European regulation both drives and, at times, constrains sustainable development, depending on how it is designed. The EU has clearly been a strong driver in many areas. The Packaging and Packaging Waste Regulation (PPWR) is a good example: without it, we would likely not see the same momentum around secondary raw material use and recyclable packaging solutions. Regulation provides direction and market certainty that accelerates change. At the same time, we see a need for greater flexibility and technology neutrality, particularly in recycling. Mechanical, physical, and chemical recycling address different waste streams and all have a justified role in achieving circularity. Regulation should set clear sustainability objectives but avoid implicitly favoring certain individual technologies as an eternal one. The decision on which solution prevails should be left to innovation and the market. Internationally, for instance in Japan, we observe a more collaborative approach between government and industry, which can be very effective in scaling sustainable solutions. Overall, European regulation is essential, but it works best when it remains outcome-oriented, technology-neutral, and open to innovation.

Global companies think and act globally, comparing regions directly in terms of competitive pressure. European policies have been taking the lead in creating markets for sustainable solutions. If such markets exist only in Europe, companies may be forced to choose between a uniquely European market and other regions or pursue a dual-track strategy. Global policy convergence is therefore essential.

Also, how to deal with cross border movement of sustainable goods / raw materials should be incorporated into policies. Strengthening recycled contents regulation may lead to global shift (hollowing out) of recycled material production in certain countries and eventually weaken competitiveness of sustainable domestic industry. Such consideration is important.

How are MCG's initiatives in fuel conversion, biomass use, and recycled materials advancing carbon neutrality and a circular economy, and what main implementation challenges?

N. Mita: About fuel conversion, MCG is changing fuel type of power plants and increasing the use of renewable energy. Access to affordable and sufficient low carbon energy sources is critical.

MCG put feedstock conversion as one of the pillars of its strategy for decarbonatization and circularity. Mitsubishi Chemical is working to develop and commercialize all three routes; recycling, bio, and CCU.

MCG completed construction of one of the world's largest chemical recycling plants using supercritical water. For recycling, access to waste plastics and market creation are important. So, collaboration with all stakeholders in the supply chain, in other words creating loops, including vein industry, downstream industry, public sector, and society is the key.

How does Mitsubishi Chemical collaborate across the supply chain to advance its sustainability goals, and which practical mechanisms work best to align diverse partners?

N. Mita: Mitsubishi Chemical realizes the importance of external collaboration with all stakeholders across the supply chain. We participate in many initiatives not only within chemical industry but also across sectors and regions. Mitsubishi Chemical is the founding member of Carbon Fiber Europe last year together with producers and partners along the value chain. We are also a member of GIC, Global Impact Coalition, which accelerates formulation of concrete innovative sustainability projects by global chemical companies.

I worked as the chair of energy and climate change leadership group of ICCA (International Council of Chemical Associations). I think these shows the importance and effectiveness of our collaborative actions in policy making as well as innovation.

Also, Mitsubishi Chemical put importance on visualizing and communicating sustainability values among stakeholders and actively contributes to developing methods.

What is your vision for Mitsubishi Chemical in achieving key sustainability goals such as carbon neutrality and circular economy targets?

N. Mita: I believe that, based on the Kaiteki concept which is already well rooted in our organization, we can embed sustainability in our strategy as a profitable business by addressing the sustainability challenges of our customers and society. With a long-term vision, we will continue to take concrete steps in fuel and feedstock conversion (recycled, bio-based and CCU) and support our customers' evolving sustainability needs.

■ www.mcgc.com

Product and Service in Balance

Logistics as a Sales Pitch in the Chemical Industry

What are the potentials of innovative supply chain solutions? A current study entitled "Logistics as a sales pitch in the chemical industry" provides answers to this question. Authors Christian Kille and Andreas Backhaus analyze how logistics is being repositioned as a success factor and competitive advantage for chemical companies. The study was supported by Dachser Chem Logistics, which offers safe and efficient logistics solutions for packaged chemical products, including dangerous goods.

The chemical industry is facing fundamental changes. Energy transition, technological innovation, the circular economy, and geopolitical fragmentation are shaping an environment in which traditional competitive edges are increasingly losing importance. In this context, logistics, which until now has often been seen as a supporting or supplementary function, is gaining strategic importance.

The study by Christian Kille, Professor of Trade Logistics and Operations Management at the Technical University of Applied Sciences Würzburg-Schweinfurt, and Andreas Backhaus, freelance lecturer and chemical logistics expert, builds on this context. The study examines 69 new logistics services that can offer customers of chemical companies significant added value. In the analysis, a focus was put on highlighting the specific potential of logistics to move chemical companies beyond competing solely on product specifications or prices. Instead, they can differentiate themselves on the market through supply chain expertise and concrete added value in customer service.

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Logistics as a Competitive Edge in the Chemical Industry

Today, the question "Can you deliver?" is largely outdated. In times of dynamic change and numerous risks along the supply chain, the focus has shifted to reliability, transparency, and sustainability. Logistics providers that combine these qualities with deep expertise can offer customers in the chemical industry a real competitive edge. At best, logistics can be a key enabler in helping chemical companies to overcome current challenges, instead of only coping with them.

© Christian Kille

Christian Kille, Technische Hochschule Würzburg-Schweinfurt

The challenges listed above do not arise independently. Instead, they are direct consequences of the far-reaching structural changes that are currently shaping the chemical industry. Eight megatrends identified in the study—from raw material security to changing regulatory requirements—influence logistics processes and have a direct impact on the performance of the entire supply chain. In the course of the analysis, these megatrends give rise to 21 specific challenges that chemical companies and their logistics partners are facing, which are then grouped into eight clusters: capacity availability, sustainability and regulatory compliance, process quality in the supply chain, process quality in operational logistics, pricing and cost pressure, network transparency, forecast accuracy, and customer service. If these aspects are consequently addressed by the logistics industry, it will move away from being a pure cost center and increasingly become a strategic differentiator.

> *"In logistics, economy and ecology are not mutually exclusive."*

Paradigm Shift through Technological Progress

A shift in thinking is required to overcome these challenges. Technologies such as artificial intelligence, digital twins, and the Internet of Things open

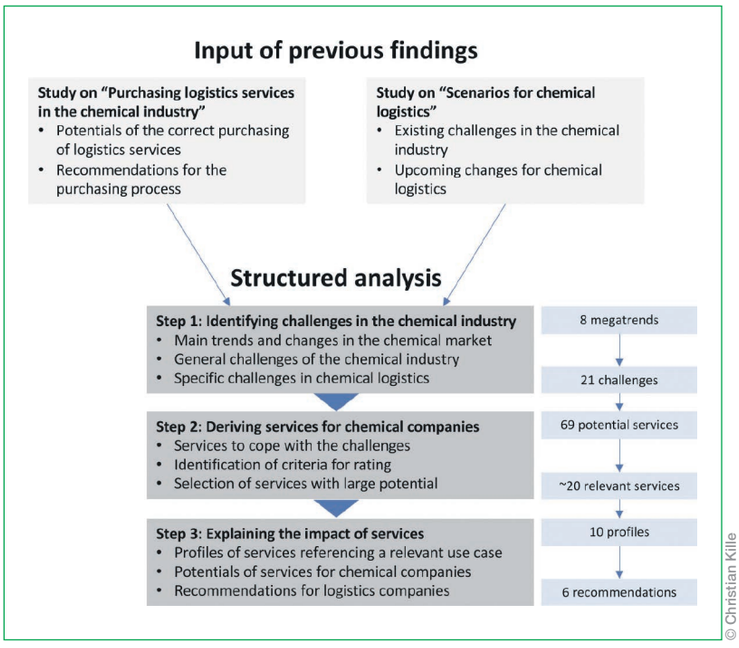

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Figure 1: Approaches and outcomes

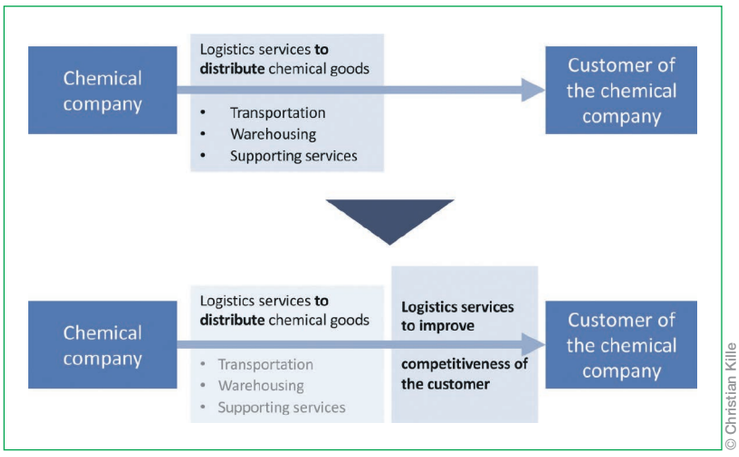

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Figure 2: Logistics services from cost reduction to sales arguments

up possibilities that were beyond reach just a few years ago, especially to this extent. The 69 logistics services mentioned earlier have been defined based on this new potential and the growing challenges. Of those services, the ten most relevant were evaluated in detail. They include digital twins, AI-powered demand forecasting, and real-time visibility platforms.

These innovations shouldn't be seen as isolated standalone solutions, but should be developed as part of a move toward an integrated ecosystem. As a result, logistics is taking on a new role and establishing itself as a sales pitch in the chemical industry.

In the last step of the analysis, six specific recommendations for action are derived for logistics managers in chemical companies as well as logistics service providers:

Implement collaborative planning: Integrated planning systems that connect chemical companies, customers, and logistics service providers are the basis for improved transport utilization and reliability. Investing in shared platforms pays off not only through reduced empty runs, optimized inventory flows, and higher delivery reliability, but also through realizing resilience in the supply chains by means of joint coordination.

"Logistics is no longer just a cost center that is cited as a necessity in discussions with customers, but a strategic enabler for greater customer competitiveness."

Systematize scenario planning: The dynamics in individual markets require a robust planning basis, ideally built on different strategies. Logistics service providers have a wealth of experience as well as data, which can be used to develop scenarios that run through various future projections on a broad basis of input factors.

Create supply chain transparency: End-to-end visibility has become a necessity in order to be able to assess the numerous risks along the supply chain and react to them if needed. This makes it possible to proactively adapt not only transport routes but also production processes in particular.

Strengthen customer service through technical expertise: It is common knowledge that chemical logistics is subject to numerous requirements, regulations, and safety needs. Embedding perfectly tailored expertise in customer service speeds up problem-solving considerably.

Proactively manage regulatory compliance: The regulatory landscape is constantly changing. Industry-specific expertise for monitoring regulatory changes and aligning with compliance frameworks is complex and time-consuming, but indispensable. Future requirements should be recognized at an early stage and implemented in good time.

Operationalize sustainability goals: In logistics, economy and ecology are not mutually exclusive. Partnerships with logistics service providers to evaluate multimodal transport and warehousing options open up low-carbon alternatives that can also be more cost-effective if all influencing factors can be taken into account and adapted.

Pillars	Description	Customer gain
1. Collaboration	Integrated systems smooth utilization.	Predictable costs and lead times.
2. Resilience	Logistics scenarios tailor volatility strategies.	Tested contingencies.
3. Transparency	Visibility loops pre-empt issues.	Stability in operations.
4. Expertise	Embedded know-how accelerates fixes.	Best-in-class solutions.
5. Compliance	Joint monitoring aligns operations.	Audit-save logistics.
6. Sustainability	Broad overview offers ESG-aligned operations.	ESG-aligned with lowest negative impact especially on costs.

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The six recommendations provided create an approach for chemical companies to collaborate with logistics partners, customers, and internal teams. The approach itself is built on six core pillars for competitiveness in the chemical industry through logistics.

From Cost Center to Strategic Enabler

The fundamental challenge lies not so much in the technological implementation, but rather in changing the overall perception of logistics among chemical companies, their customers, and especially in sales. Logistics is no longer just a cost center that is cited as a necessity in discussions with customers, but a strategic enabler for greater customer competitiveness. Logistics managers of chemical companies and their logistics service providers should see themselves more as architects for increasing the competitiveness of the chemical company's customer than as a mere operational unit. Companies that perceive logistics as a strategic instrument that is developed systematically will consistently set themselves apart within their competitive environment.

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Free download of the study: The full study results are available for download here.

Scaling Sustainability in Cosmetics

How Europe's Cosmetics Companies are Accelerating Sustainable Change

Sustainability in cosmetics is no longer a side issue. It has become a business, policy, and value-chain priority. Commit for Our Planet shows how a voluntary, industry-wide framework can help companies of all sizes move from ambition to measurable action on climate, packaging and nature.

Europe's cosmetics and personal care industry is operating in a very different sustainability landscape than just a few years ago. Reporting requirements are becoming more demanding. Packaging rules are tightening. Nature-related impacts are moving up the corporate agenda. As an industry, we will be able to meet consumer expectations – and our own aspirations – faster, if we work from a common framework, instead of relying on disconnected approaches.

That is the idea behind Commit for Our Planet, the sustainability initiative by Cosmetics Europe, the European trade association for the cosmetics and personal care industry. We want to help companies reduce their greenhouse gas emissions, improve packaging solutions and act for nature through a structure that is feasible, flexible, measurable and meaningful. The initiative is built around one simple idea: every company – large and small – can contribute, whether it is just beginning its sustainability journey or already has mature systems in place.

Actionable Tools for a Flexible Framework

What makes Commit for Our Planet distinctive is not only its ambition, but its design. The initiative combines shared commitments with tools, guidance and annual reporting. That matters because many companies, especially smaller ones, do not lack willingness. They lack a clear, practical and repeatable pathway. Sustainability can feel complex, fragmented and resource-intensive. Commit for Our Planet helps turn it into something manageable.

Our two-tiered framework is central to that approach. For companies at an earlier stage of their sustainability journey, Tier 1 provides an extensive toolbox of detailed commitments and actionable steps. For companies with more advanced systems, Tier 2 allows them to align their existing commitments with the initiative's shared goals, so that they can contribute to the progress across the industry. It is this flexibility that makes ambition scalable.

From Ambition to Action

Our second Commit for Our Planet report, covering 2024, shows that our model is starting to deliver. The initiative now brings together 41 companies that represent more than one-third of the European cosmetics market by turnover. The reporting exercise shows a sector moving beyond broad pledges and into implementation. That has implications not only for brand owners, but also for ingredient suppliers, packaging producers, and manufacturing partners across the value chain. For these industry partners, this increases the need for providing better supplier data, stronger traceability, more circular packaging design, and closer coordination on sustainability reporting and performance metrics.

In climate, measurement is becoming standard practice. More partners are tracking Scope 1 and 2 emissions, and a growing number are calculating full corporate footprints across Scopes 1, 2, and 3, setting targets and putting reduction plans in place. Science-based target setting is also gaining ground. Credible climate action depends on data, discipline, and transparency, not just declarations.

In packaging, companies are translating commitments into redesign, recycled content, improved sourcing, and better consumer communication. That reflects a wider shift in how packaging is understood: not only as a waste issue, but also as a climate issue, a circularity issue, and a trust issue. Better packaging decisions can therefore deliver environmental gains and strengthen brand credibility.

For the industry's nature commitments, progress is still at an earlier stage, but the direction is encouraging. Companies are increasingly tracking water use and pollutant load, identifying higher-risk facilities, and assessing upstream nature-related risks in sourcing. Water stewardship is emerging as an especially practical entry point where we see how the nature agenda can be translated into concrete operational action.

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Emma Trogen, Deputy Director General, Cosmetics Europe

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"What makes Commit for Our Planet distinctive is not only its ambition, but its design."

Helping Companies Large and Small to Move Forward

One of the strongest aspects of Commit for Our Planet is its inclusivity. Sustainability debates often default to the capabilities of large multinationals. The European cosmetics sector, however, includes many small and medium-sized businesses, and any serious industry transition has to work for them too.

That is why the initiative places so much emphasis on guidance and tools. These include a greenhouse gas emissions calculator, technical guidance, recycling guidance, a nature-related risks database of cosmetics ingredients, and supplier engagement questionnaire. The goal is not to create a club for those already advanced. We also want to help companies that are getting started, by giving them the tools they need and building their confidence as they progress step by step.

Our inclusive approach helps to raise sustainability standards across the industry. We don't focus on isolated frontrunners but want to help companies to join forces so that the sector can lift its overall baseline. We do this by creating a shared language for progress, which is valuable as reporting expectations grow and data quality becomes more important.

Where Voluntary Action Meets Regulatory Change

Commit for Our Planet also matters because it links company action to European and global sustainability goals. The initiative's three pillars – climate, packaging and nature – align both with the realities of the cosmetics value chain and broader policy and science-based frameworks. Cosmetics Europe also shows participating companies how they can map their work to some ESRS environmental disclosure requirements of the EU's Corporate Sustainability Reporting Directive (CSRD) and the voluntary sustainability reporting standard for SMEs.

That is particularly relevant at a time when businesses are navigating a more demanding regulatory environment. Voluntary action still matters, but it increasingly needs to connect with formal expectations for disclosure, governance, and measurable progress. In that context, initiatives like Commit for Our Planet can help companies prepare earlier, learn faster, and act more consistently.

Help Shape the Future of Sustainable Cosmetics

Commit for Our Planet shows what is possible when companies work together, share tools, build common methods, and report transparently. We want to invite all cosmetics and personal care companies to join this initiative, regardless of size or Cosmetics Europe membership. Joining the initiative is free of charge. What matters is a willingness to engage, act, and improve. That is how a sector raises the bar – not in theory, but in practice.

What Comes Next

Our second report shows that progress has been made, but also that the journey is not complete. Data quality, methodological consistency, and breadth of reporting still need to improve. Accounting for Scope 3 emissions remains difficult for many companies. Nature-related metrics are still evolving. Smaller businesses will continue to need tailored support. But that is precisely why the initiative matters. It provides a framework not only for reporting progress, but for identifying gaps and improving the system over time. As Cosmetics Europe, we are committed to supporting participating companies in reaching their set ambitions.

Emma Trogen, Deputy Director General, Cosmetics Europe

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Sustainable Chemistry as a Driver of Sustainable Innovation

Meeting Today's Needs – Without Compromising the Future

Sustainable Chemistry is evolving from a concept into a central engine of innovation for a climate-friendly and sustainable economy. Sustainable Chemistry goes beyond traditional circular approaches. The International Sustainable Chemistry Collaborative Centre (ISC3) supports this transformation by developing innovative solutions in collaboration with the private sector and international organizations, promoting start-ups, contributing to international policy processes and initiatives, and advancing practical implementation along global value chains.

Innovation in Practice

Sustainable, high-performance, and cost-efficient advanced polymers with a reduced carbon footprint. Technologies for chemically recycling hard-to-recycle plastics at low temperatures and without solvents. Integrated solutions that combine climate action, sanitation, and circular economy approaches in countries of the Global South. These examples show that Sustainable Chemistry is already a reality. ISC3 actively supports innovations like these, including the start-ups behind them: Polymer2Polymers, AC Biode, and ClimEtSan-OnTheGround. "Anyone seeking to address the global challenges of our time and achieve the goals of the 2030 Agenda needs transformative ideas and innovative solutions. Sustainable Chemistry plays a key role in this, as it effectively brings together innovation, resource conservation, and economic development," says ISC3 Managing Director Thomas Wanner: "For several years, ISC3 has been actively supporting start-ups and innovations worldwide to accelerate the transition of promising approaches into real-world applications. We work closely with the private sector, build expertise, and continuously expand it. At the same time, we develop educational and advisory materials to disseminate knowledge internationally. For us, it is essential not only to develop sustainable solutions, but also to make them scalable and integrate them into existing value chains."

Chemistry at the Center of Transformation

Few industries shape the economy and everyday life as profoundly as the chemical sector. Around 90% of global production depends directly or indirectly on chemical products. At the same time, the chemical industry accounts for approximately 10% of global final energy consumption and about 7.4% of worldwide greenhouse gas emissions. A sustainable and climate-friendly economy therefore requires a fundamental rethink in the design of services, substances, materials, and processes. Sustainable Chemistry provides a practical framework for this transformation.

Sustainable Chemistry as a Guiding Principle

Sustainable Chemistry takes a systemic approach: Products are considered across their entire life cycle – from development and use to recycling. The process begins with a critical question: Is a specific function or service needed at all, or can the desired outcome be achieved differently? The next step is to reduce or eliminate negative impacts while creating economic and societal value. This is not only about efficiency. Material flows must be reduced and approaches aligned with actual needs. Circularity alone is not sufficient; complementary approaches are essential.

© ISC3

Christian Ruth-Strauß, Director Communications, International Sustainable Chemistry Collaborative Centre (ISC3)

"Sustainable Chemistry requires comprehensive thinking from the outset—ecological, economic, and social. It is not enough to optimize individual processes; rather, we must understand the impacts of substances and materials across their entire life cycle—globally and over the long term," says Klaus Kümmerer, ISC3 expert, professor, and recipient of the Wöhler Award for Sustainable Chemistry. "This also means addressing fundamental questions early on: Why are we applying a given solution? What resources will be required if an innovation succeeds – in what quantities and from which sources? What by-products arise throughout a product's life cycle, and what impacts result from large-scale application, including at end-of-life? How can negative effects be avoided from the beginning and incorporated into product design? At the same time, social and ethical aspects must be considered more strongly to develop solutions that are not only technically viable but also socially sustainable. Sustainable Chemistry is defined by systems thinking, not isolated solutions."

One example: Under certain conditions—such as insulated and moisture-exposed façades – algae and fungi can develop. A chemical solution would be to add biocides to façade coatings. Alternatively, structural and material-based approaches – such as roof overhangs or suitable materials like sandstone, mineral plasters, or wood with natural fungicidal properties – can reduce algae growth without harming the environment.

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More Than Circular Economy

Addressing global challenges requires a fundamental shift in the chemical industry and related sectors. Sustainable Chemistry goes beyond traditional circular approaches. ISC3 promotes a global transition toward Sustainable Chemistry along chemical value chains with cross-sectoral impact: a holistic sustainability strategy that embeds future-proof services, functions, technologies, and innovative processes and products across supply chains.

Sustainable Chemistry does not consider individual products and associated material flows in isolation. Instead, it follows a systemic approach that accounts for product life cycles, closes material loops, and promotes sustainable business models. At the same time, ISC3 strengthens sufficiency approaches to reduce resource consumption.

Key focus areas include climate protection, decarbonization, and defossilisation of industrial processes, as well as responsible resource use and waste and chemicals management. This means:

- Assessing needs and considering non-material alternatives
- Designing products that are durable, repairable, reusable, and ultimately recyclable, rather than disposable
- Developing competitive processes and products for local and global markets that require less energy and fewer resources and rely on bio-based or recycled feedstocks
- Promoting technologies that sustainably reduce or eliminate risks to humans and ecosystems

The goal of this holistic approach is to respect planetary boundaries, strengthen social responsibility, and ensure long-term competitiveness.

Another example: Plastic waste in India is an environmental, resource, and social issue, as informal waste pickers work in hazardous conditions while playing a key role in waste management. Policies must recognize their contribution, improve working conditions and social protection, and gradually create safer income opportunities, or risk reinforcing inequalities and undermining long-term sustainability.

Sustainable Chemistry – Where Change Begins

Ongoing international discussions on Sustainable Chemistry show that expectations vary across stakeholder groups. To foster a shared understanding, ISC3 has developed the "Key Characteristics of Sustainable Chemistry" and recently updated them in concise guiding statements. The result is ten simplified explanations covering the core aspects of Sustainable Chemistry – from holistic thinking and systems approaches to social responsibility, circular economy, and green chemistry.

"Sustainable Chemistry starts wherever sustainable change begins. Because this transformation takes time, it must be advanced on multiple levels simultaneously—through innovation, policy frameworks, knowledge transfer, and international partnerships. Our goal is to build a shared understanding and establish Sustainable Chemistry as a central approach for a future-ready economy," summarizes Wanner.

The Road Ahead

Sustainable Chemistry is not a vision for tomorrow; it is a prerequisite for shaping a sustainable future. It is a prerequisite for sustainable innovation, a future-ready industry, the protection of the environment and human health, and a key lever for achieving the global sustainability agenda (SDGs). The path forward requires a fundamental cultural shift. Policymakers, businesses, academia, and society must act together. ISC3 serves as a platform and catalyst – connecting stakeholders worldwide, promoting innovation, and helping bring sustainable solutions into practice.

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Sustainability That Delivers

Turning Sustainability into Value Across the Chemical Supply Chain

As sustainability moves from ambition to expectation, chemical distributors are under growing pressure to turn ESG commitments into tangible results. In this interview, Michael Heite, Group Sustainability Director, Azelis, explains how Azelis is integrating sustainability across the entire value chain—from supplier engagement to product formulation—to deliver both environmental impact and business value.

© Azelis

Michael Heite, Group Sustainability Director, Azelis

CHEManager: Sustainability is becoming a core requirement in the chemical industry. How is Azelis approaching this transformative shift?

Michael Heite: Sustainability only matters if it translates into real impact and real business value. That is the mindset behind everything we do.

We see sustainability as a fundamental part of how we operate, not as a separate initiative. With our Impact 2030 programme, we have moved from setting ambitions to delivering measurable impact, guided by frameworks like SBTi and the UN Sustainable Development Goals.

The key for us is integration. Sustainability is embedded across the value chain, from sourcing and product development to customer engagement. That enables us to support both our principals and our customers in achieving their goals in a practical and scalable way.

> *"We see sustainability as a fundamental part of how we operate, not as a separate initiative."*

Supply chain defossilization is a major challenge. What role do you play in this transition?

M. Heite: Defossilization is primarily a value chain challenge. In our case, Scope 3 emissions are by far the largest share, so collaboration with suppliers and customers is essential.

We align with SBTi to reduce emissions across all scopes, but equally important is how we engage our partners. Through Together for Sustainability, we have a structured approach to assessing supplier ESG performance and driving continuous improvement.

Today, more than 80% of our revenue comes from ESG-assessed suppliers. This shows that sustainable procurement is already embedded in our day-to-day decisions and is a key lever for reducing emissions across the supply chain.

We are now taking this a step further by strengthening supplier engagement in line with our SBTi targets, focusing more on product ESG data quality, transparency, and joint defossilization efforts. This is critical to move from measurement to real emissions reduction across the whole value chain, from raw materials to end users.

How do you ensure that sustainability also creates business value?

Michael Heite: Sustainability only works if it creates value for all stakeholders. That is why we focus on making it tangible and actionable.

Our Portfolio Sustainability Assessment (PSA) plays a central role here. It gives us a data-driven view of our portfolio of products and solutions and allows us to actively steer it towards more sustainable solutions.

For customers, this supports more efficient reformulation and compliance with evolving ESG requirements without sacrificing performance. For principals, it means working with a partner who can actively contribute to their sustainability ambitions. In that way, sustainability becomes a driver of growth rather than a constraint.

How do you support customers in making more sustainable choices?

M. Heite: It starts with transparency, but it also requires technical support. Tools like our PSA provide clear insights, but the real impact comes from applying that knowledge in practice.

> *"Sustainability only works if it creates value for all stakeholders."*

Our application and formulating labs are key in this process. We work closely with customers to develop and test formulations that integrate more sustainable ingredients while maintaining performance in applications. This is where our 'innovation through formulation' purpose truly materialises.

A typical example is supporting customers in reformulating products by replacing more carbon-intensive or less sustainable ingredients with alternatives that deliver the same technical performance. Often, it is not just about substitution, but about optimising the full formulation to meet economic and performance expectations, regulatory requirements, and sustainability targets at the same time.

The objective is to make sustainable choices practical and achievable, so customers can implement them efficiently and with confidence, and thus reach their business and sustainability goals.

■ www.azelis.com

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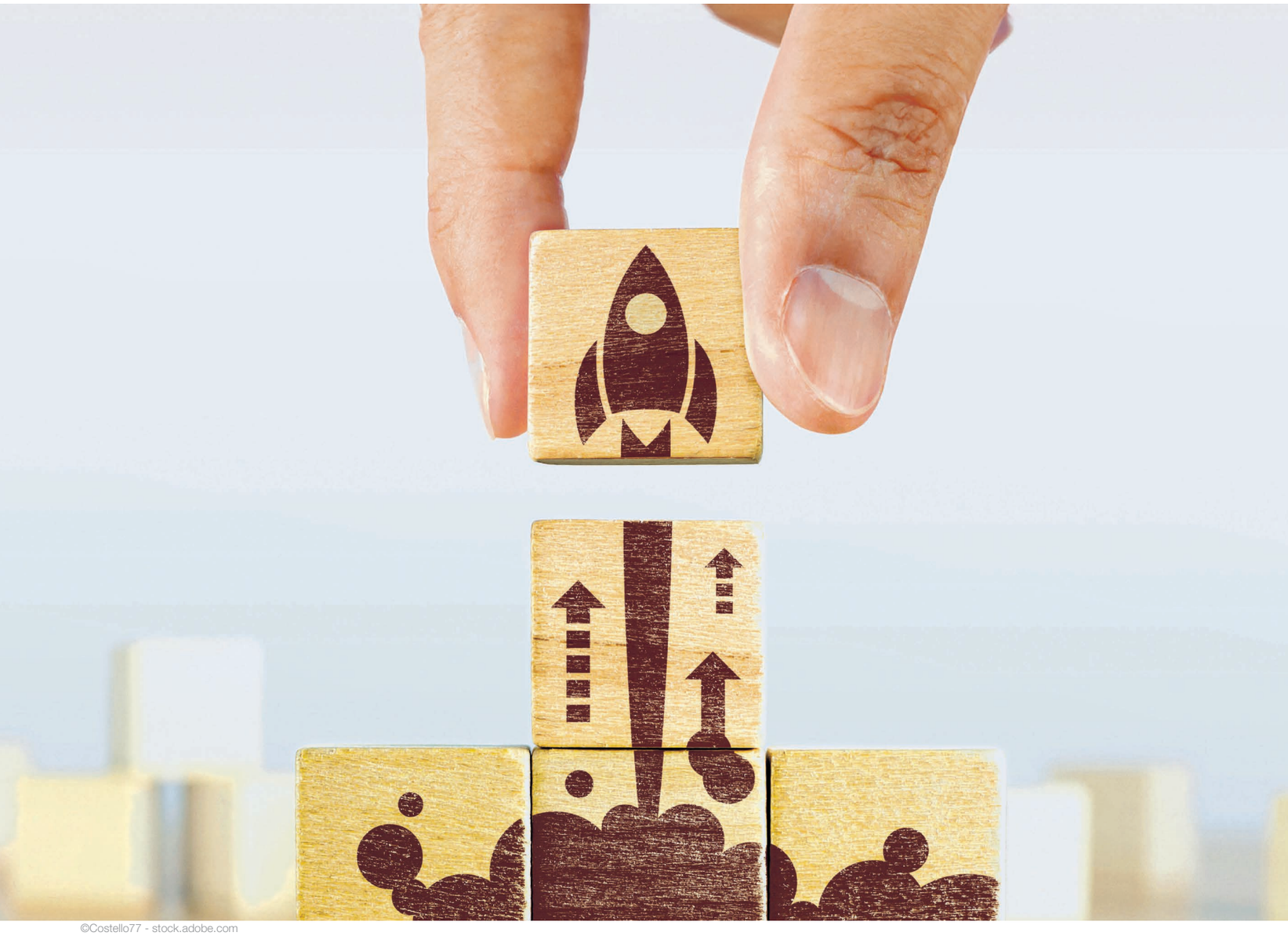
INNOVATION PITCH



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Turning Waste into Treasure
Recycling Rare Earths from Waste for a Sustainable Future

Biocatalytic Surfactants
Inside Norfalk's Mission to Produce Next-Gen Surfactants

Circular by Design
Seprify scales cellulose platform for low-emission material

WILEY

Turning Waste into Treasure

Recycling Rare Earths from Waste for a Sustainable Future

Rare earth elements (REEs) are key to both the digital and the energy transitions but their sourcing by mining bears significant environmental and geopolitical issues. Reecover's vision is to tackle these issues by providing the technology to recover these critical metals from waste. The Swiss cleantech start-up company, born in 2023 in a research lab at ETH Zurich, takes advantage of a unique patented technology which allows to recover these elements from electronic waste. CHEManager asked co-founder Marie Perrin to elaborate on the innovative chemical process for the sustainable recycling of rare earth elements.

CHEManager: What inspired you to focus on the recycling of rare earth elements,?

Marie Perrin: Reecover grew out of my PhD research which I conducted in the group of Victor Mougel from the Department of Chemistry and Applied Bioscience at ETH Zurich. I was studying rare earth elements with a very counterintuitive approach: to combine them with synthetic metallosulfur molecules, inspired from the active site of natural metalloenzymes, to unlock new properties. Which under the right conditions worked very well and we discovered new molecules with very interesting magnetic and luminescence properties. But one property we did not foresee was the ability of these synthetic metallosulfur to discriminate rare earth elements, which we could then use to separate them very efficiently. Rare earth separation has been a chemistry challenge for the past 200 years, and the market need was obvious. Maria joined as a business partner and brought the commercial perspective we needed to take this from lab to venture. I am currently enrolled in the ETH incubator program for deep-tech startups, the ETH Pioneer Fellowship, which provided us with initial funding and allowed me to transition from academia to entrepreneurship with the best support and training possible.

What challenges existed in rare earth element recycling before Reecover?

M. Perrin: Rare earth separation is notoriously difficult because these elements are chemically very similar; this is also why they are all found together in natural ores. Conventional solvent extraction methods which are used in rare earth refining from ores relies on very small differences in reactivity and requires hundreds of separation stages. Our approach is exploiting distinct solubility properties to separate rare earth elements in a very limited number of steps. Our results on model systems show that we can recover >90% REO from a 1:1 mixture in a single separation stage. This is because the separation factors we achieve are orders of magnitude higher than those of traditional techniques. This translates directly into a leaner, more economical process, and our first proof-of-concept on recycling europium from energy saving lamps illustrates the robustness of our system towards complex waste streams. It is important for us to optimize our process on waste streams, because current rare earth recycling rates fall <1% and the increasing demand and suply risks make these secondary sources very attractive.

How are recent policy shifts and IEA/EU reports shaping your business and the industry overall?

M. Perrin: Recent policy developments have really been a turning point for our industry and strongly validate what we are building at Reecover. Following the Critical Raw Material Act from the European Commission in 2024, there is now a clear ambition for Europe to source 25% of its rare earth input from recycling by 2030. But at the same time existing solutions are still scaling up, illustrating a significant gap between political targets and industrial reality at the moment. This is even more enhanced in the US, where recent directives from the DFARS impose traceability on the entire supply chain from mining or production for NdFeB/SmCo magnet by 2027. Overall, these policy shifts are creating both momentum and urgency, and it puts Reecover at the heart of a transition towards more resilient and circular supply chains.

Marie Perrin, CEO, Reecover

How does your technology differ from traditional recovery methods?

M. Perrin: What makes our technology fundamentally different is that we are not trying to adapt existing mining processes to waste but instead designing a solution specifically built for complex waste streams. Currently there are no processes used at scale to recover rare earth elements from electronic waste, largely because traditional methods were developed for high-grade ores and not dilute heterogenous mixtures. For a chemical perspective our technology is also inherently different, as we demonstrated for the first time that inorganic metallo-sulfur extractants can be used for rare earth separation.

What are the key challenges in scaling up your recycling process?

M. Perrin: I would say the main difficulty we face is the inherent variability of e-waste streams, which means the process must be robust enough to handle different input streams while maintaining performance, and this is why in parallel of scaling we are also investigating a wide range of different feedstock to test the robustness of our technology. Different feedstocks require different pre-treatments, which can be cumbersome. It is also about how accessible these feedstocks are and if the supply chain is already built, like it is for energy saving lamps, or if it has to be built entirely, like it is for magnets.

Eventually there are economic and regulatory considerations, as the rare earth market is still influenced by global dynamics and while policies are increasingly supportive, this still has to translate into regulatory frameworks. For example, in the US the government has introduced a price floor for rare earth producers in order to be competitive despite market fluctuations. Therefore, scaling is not only about the technology but about building the entire ecosystem around it, from circular design to collection, dismantling, recycling, and re-introducing these materials into the economy.

Looking ahead, what are your goals for Reecover over the next five years?

M. Perrin: Our ambition is to transition from a promising technology into a fully validated industrial solution, at scale and with real impact. A key priority is therefore to build our pilot where we can show continuous and reliable operation in a real environment. We aim to establish strong partnerships with recyclers, industrials, and manufacturers so that our technology can be integrated directly into existing value chains. Ultimately, our goal is to position Reecover as a leading technology provider in rare earth recycling to contribute meaningfully to building a circular and resilient supply chain for critical materials in Europe.

Personal Profile

Marie Perrin is a chemist-entrepreneur specializing in sustainable rare earth recycling. She earned a PhD from ETH Zurich (2024) on bio-inspired rare earth chemistry, following studies at Université Paris-Saclay, ENS Paris-Saclay, and École Polytechnique. Recipient of the European Young Chemists Award, ETH Spark Award, and EPO Young Inventor Prize 2025, she co-founded Reecover and serves as an ETH Pioneer Fellow.

Business Idea

Recycling Rare Earths at Industrial Scale

Rare earth elements are at the core of many technologies, from permanent magnets in wind turbines and EV motors to phosphors in lighting and catalysts in refining. Yet despite their strategic importance, fewer than 1% of REEs are currently recovered from end-of-life products globally. Conventional separation methods are energy-intensive, chemically complex, and economically viable only at very large scale, leaving secondary sources largely untapped.

Reecover addresses this gap with a proprietary separation technology inspired by nature. Our petroleum-free biocompatible metallo-sulfur extractants, a synthetic analogue of natural enzymes active sites, discriminates individual REEs based on their size, and allows us to exploit differences in solubility to achieve separations with a selectivity order of magnitude higher than traditional solvent extraction processes. The result is a streamlined, scalable process that can handle heterogeneous industrial waste streams as illustrated by our first proof-of-concept on recovering europium from spent energy-saving lamps.

The technology is patent-protected and has been validated at proof-of-concept stage against demanding real-world feed materials. It is currently being developed within the ETH Pioneer Fellowship program, which supports ETH researchers in translating innovations into sustainable ventures. Reecover is currently conducting scale-up assessments and exploring a range of secondary REE sources, with the goal of establishing a commercially viable, locally sourced supply of critical metals for European industry.

Marie Perrin and with her teammates Maria Pujos and Victor Mougel.

■ Reecover, Zurich, Switzerland
www.recover.ch

REEcover.

Elevator Pitch

From ETH Lab to a Circular REE Supply Chain

Reecover was created at ETH Zurich by Marie Perrin, Victor Mougel, and Maria Pujos. The company's patented rare earth separation technology, developed during Marie Perrin's PhD, achieves separation factors orders of magnitude above conventional methods using synthetic metallo-sulfur extractants, inspired by the active sites of natural metallo-enzymes. Reecover targets the recovery of REEs from complex secondary sources to create a local, circular supply of critical metals for industry.

Milestones

■ 2023
- Marie, Maria and Victor initiated the Reecover startup project through The Talent Kick program.
- Reecover was selected as part of the national cohort of the Circular Economy Incubator program.

■ 2024
- First Patent was submitted and published.
- First recycling proof-of-concept was published in the journal Nature Communications.
- Marie was awarded the European Young Chemists' Award Gold Medal by the European Chemical Society.
- Marie and Victor won the ETH Spark Award, recognizing the most promising technology patented at ETH Zurich during the year.
- Marie successfully defended her PhD at ETH Zurich.

■ 2025
- Marie started as an ETH Pioneer Fellow.
- Marie is selected as one of ten Young Inventors worldwide by the European Patent Office and wins the "World Builder" jury award.
- Scale-up assessment initiated
- Exploration of diverse secondary REE sources and industrial collaborations.
- Reecover is a recipient of the Implementation Grant by the Peter Bopp Stiftung.
- Reecover wins the "Out of the Lab Award" by Anima, the biomimicry Venture Studio.

Roadmap

■ 2026
- Planned incorporation.
- Lab-scale process optimization and validation.

■ 2027
- Process optimization and scale-up on real waste systems.
- Process industrial validation with existing partners.
- Pre-seed/seed funding round.

Marie Perrin in the Lab.

Marie Perrin at the European Patent Office Young Inventor Prize Ceremony.

Biocatalytic Surfactants

Inside Norfalk's Mission to Produce Next-Gen Surfactants

Norfalk is a biotech player developing new chemicals via biocatalysis. The initial focus are bio-based surfactants, crucial ingredients in many products - from shampoos to laundry detergents. Norfalk is one of the only ones in the industry using the biocatalysis platform to produce surfactants. Kasper Falkenberg, Co-founder & CEO of Norfalk shares insights into the motivation behind the company, the value that biocatalysis brings in the chemical space and its vision for the future.

CHEManager: Why surfactants?

Kasper Falkenberg: Surfactants are essential to everyday life. We wanted to start with an ingredient that truly matters - something that people use without thinking, but that has a huge environmental impact behind the scenes. Surfactants were the perfect place to start to make a meaningful impact and scalable change.

Why biocatalysis?

K. Falkenberg: Biocatalysis is the perfect hybrid between fermentation and traditional chemistry. It allows us to produce high performing surfactants at a competitive price to the established market.

How did you come up with biocatalysis as a new approach to producing surfactants?

K. Falkenberg: As we explored different production routes, we saw limitations with existing methods in terms of energy use, harsh reaction conditions, and environmental footprint.

At the same time, we were fascinated by the precision and efficiency of enzymes - their ability to build molecules selectively, and under mild conditions. That curiosity led us to test whether biocatalysis could offer a better way forward.

Eventually, it became clear that biocatalysis wasn't just an alternative - it was a breakthrough approach. That's how the idea was born: by combining curiosity, practical problem-solving, and a commitment to rethinking how surfactants can be made.

How is this approach different from other methods?

K. Falkenberg: Fermentation and conventional chemistry each have strengths, but biocatalysis offers greater reaction control and modularity. It's another way to design ingredients.

Biocatalysis differs in how reactions are controlled and designed. It uses enzymes to carry out specific chemical steps, which allows individual reactions to be optimized and combined more flexibly. Enzymes provide high selectivity, often reducing unwanted side reactions, and simplifying processing. Another important difference is modularity: the same enzymatic system can be used with different feedstocks to produce different molecules, and they can be reused again and again in production. In this sense, biocatalysis functions as a flexible platform rather than a single fixed process.

Following the "chicken or the egg," what came first - the wish to make surfactants or the wish to use biocatalysis to make something?

K. Falkenberg: It's a great question - and honestly, it was both. We were fascinated by biocatalysis as a cleaner, more precise way to make chemicals, but at the same time we wanted to apply it to something with real, meaningful impact, such as surfactants.

So, the thinking became: If we're going to leverage biocatalysis to create something great, why not start with the ingredient category where improvement matters most?

© Norfalk

Kasper Falkenberg, CEO, Norfalk

In that sense, biocatalysis was the spark - but surfactants were the clear opportunity.

What is your vision for Norfalk?

K. Falkenberg: My vision for Norfalk is to establish biocatalysis as a foundational platform for designing and producing chemicals that are safer, smarter, and more responsible. By rethinking how chemistry is designed at its core, we aim to help shape a future where innovation and responsibility move forward together.

What have been the biggest technical or scale-up challenges in bringing biocatalytic surfactants from lab to commercial production?

K. Falkenberg: It is always a challenge to scale-up an unproven technology for the production of surfactants. However, since we have gathered some very competent biocatalysis experts in our team, the development and optimization of the process has gone surprisingly well and efficiently.

So, if I have to come up with a unique parameter for our success in developing and optimizing our process, it is the experience of our technical team and the built-up synergy that has been created internally in the team between biotechnology knowledge and process and engineering knowledge.

Personal Profile

Kasper Falkenberg co-founded Norfalk in 2022 together with Nicklas Nørgaard. Norfalk originated as a university spin-off, where the two founders met while pursuing an M.Sc. in Biotechnology and Chemical Engineering at Aarhus University, Denmark. Driven by a strong passion for startup, innovation, and sustainability and a desire to create a positive impact, combined with his deep interest in chemistry and entrepreneurship, Kasper is dedicated to turning scientific innovation into sustainable solutions that create real impact for mass

Where do you see the strongest early-market pull – which customer segments or value chains are most ready to adopt biocatalytic surfactants, and why?

K. Falkenberg: Surprisingly, we see a lot of interest from the large established companies within home care and I&I. These markets are often more price sensitive in relation to the ingredients they use. But because we can bring performance and sustainability into play with our technology without compromising on price, it attracts these types of customers.

This is far from saying that cosmetic and personal care customers do not also see great benefits in our product and technology. Here, it is, among other things, the great mildness we see in our product and the viscosity-building effect that appeal to these customers.

How do your biocatalytic surfactants perform compared with conventional ones in real formulations?

K. Falkenberg: We clearly see that our surfactant, depending on the application, either performs on par or better than the market standard when it comes to cleaning power. This happens at the same time that our surfactant meets the physical chemical requirements for stability. In some applications we see that our surfactant performs at the same level even though the loading is between 20 and 50% less. This has a big effect on the cost-in-use.

Business Idea

More than a Surfactant Company

Norfalk is transforming chemical manufacturing with a biocatalysis platform built for the future. Surfactants are the initial focus, but the same platform design can be applied to develop entirely new molecules across multiple industries. The surfactants created through biocatalysis are both high-performing and exceptionally mild, redefining what's possible in personal care and home care products, and something that is a clear need in the market.

Have you ever used a personal care or home care product that's tough on dirt but gentle on your skin? Many of today's surfactants rely on harsh chemical processes that achieve performance at the expense of mildness, sustainability, or versatility. While effective, these conventional methods often lock products into compromises.

Newer solutions compromise less but still lack performance compared to conventional methods. Norfalk says: no more compromises. Norfalk is more than a surfactant company - it's a platform for smarter chemistry, where performance, and sustainability go hand in hand, today and in the future.

Our platform technology allows us to produce a wide variety of esters and amides which are large markets within consumer products. The possibilities are endless but as a startup we need to have a focus, and this is the surfactants.

Our biocatalysis process is the perfect hybrid between traditional organic chemistry and precision fermentation. We utilize the great efficiency from the organic chemistry while maintaining the low CO_2 emissions seen in fermentation.

The unique process we have developed enables cost-competitive production at low volumes. At the same time, we see that our first surfactant product exhibits a much greater mildness than is seen in the established market. All this has been proven through testing with our customers and external consultants and emphasize why we are experiencing great interest from the market in our product and technology.

We are starting to produce our first surfactant in large scale and expect to have volumes in several hundred kilos and up tons scale over the next half a year. This will take NorFalk into the next phase where the focus will be on scaling globally.

■ Norfalk, Risskov, Denmark
www.norfalk.com

NorFalk

Elevator Pitch

From Enzymes to End Products

NorFalk is a biocatalysis platform transforming how molecules are made, starting with high-performance, exceptionally mild surfactants, removing the usual trade-offs between performance and sustainability. The platform is built to scale, enabling entirely new molecules across industries - smarter chemistry, no compromises.

Milestones

■ 2022
- Received Innofounder Grant and 1st MVP
- FTO in EU and USA
- Received grant from GreenUp Accelerator
- First test of our surfactant by external party
- 8 LOI´s from private label companies

■ 2023
- Received Innobooster Grant
- Received Preseed Investment by BII Accelerator
- Received MUDP Grant for patent applications

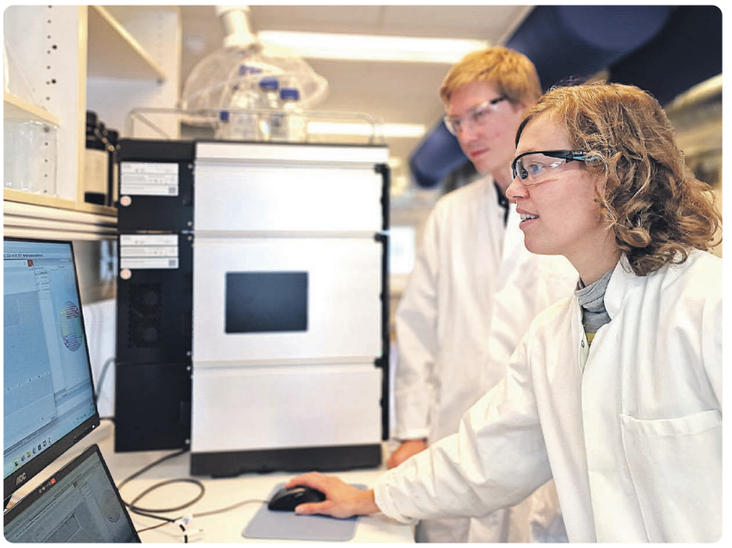
■ 2024
- Produced our surfactant from waste stream
- Validation on high performance by external parties on our surfactant
- Collaboration agreement with the largest private label company in the Nordics

■ 2025
- Received INCI name for our surfactant Received product certifications
- Scaled our production
- 28 sample sales
- 90+ samples of our surfactant sent worldwide

Roadmap

■ 2026-2027-2028
- Completion of Seed investment round
- Industrial Scale-up production at CMO set-up
- Registration of our first commercial surfactant
- <50 commercial agreements
- Patents
- Receive Innobooster Grant for the third time
- First JDA agreement
- New surfactant developments
- Receive new product certifications

■ 2029
- Profitable business (+15m EUR)



Laboratory testing of surfactants in cosmetic formulations, focusing on performance, stability, and compatibility.

Norfalk's biosurfactants created through biocatalysis are both high-performing and exceptionally mild.

Circular by Design

Seprify Scales Cellulose Material Platform to Replace High-Emission Industrial Ingredients

Co-founded by physicist Lukas Schertel and serial entrepreneur Oliver Polcher, Seprify transforms cellulose into high-performance functional ingredients inspired by nature's light-scattering systems. Originating from research at the University of Cambridge, the Swiss start-up has developed a platform technology that enables sustainable alternatives to conventional ingredients such as titanium dioxide (TiO2). The leadership team is complemented by Chief Technology Officer Wadood Hamad, who brings extensive expertise in cellulose applications and processing.

CHEManager: Can you explain the core innovation in simple terms for our readers?

Lukas Schertel: Seprify engineers cellulose, the most abundant natural polymer, into microstructured particles that control how light interacts with a material. Instead of relying on chemical composition, we design the structure of cellulose at the micro-scale to achieve properties like whiteness, opacity, or SPF boosting.

> *"We measure commercial success through customer engagement and conversion."*

Nature does this extremely well. For example, the Cyphochilus beetle (a core inspiration for our technology) appears intensely white not because of pigments, but because of how its microscopic structure scatters light. We replicate that same principle using cellulose. The result is a single, bio-based material that can deliver multiple functions across a range of industries from personal care and cosmetics to food, pet food, nutraceuticals and coatings.

What specific industry problem does your solution address, and why is it urgent now?

L. Schertel: Many everyday products rely on materials that are increasingly under pressure - TiO2, fossil-based polymers, and certain UV filters. These materials can be carbon-intensive, face regulatory scrutiny, and/or raise concerns around safety and environmental impact. As regulations tighten and consumer expectations shift towards cleaner, more sustainable ingredients, manufacturers are being pushed to reformulate at pace.

The challenge is that many alternatives compromise performance, increase costs, or require changes to established manufacturing processes. Our approach removes that trade-off by using a renewable, plant-based material that matches or enhances performance, enabling manufacturers to transition without disrupting their production systems.

What differentiates your technology or approach from current market alternatives?

L. Schertel: Our cellulose platform can be tailored for different applications - for example, SPF boosting in personal care, and whitening in food and nutraceutical tablet coatings - using the same underlying process. This creates platform economics, where the same core technology can be deployed across multiple industries with minimal adaptation.

We also focus on real-world performance and supply readiness. Our materials are designed to work within existing formulations and manufacturing processes, and we are now moving from pilot-scale validation to procurement-ready, repeatable industrial-scale supply, enabling customers to move from trials into reliable long-term sourcing.

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Lukas Schertel, Co-founder and CEO, Seprify

What are your main drivers for business growth and how will you achieve scale in the next few years?

L. Schertel: Our growth is driven by three factors: regulatory change, customer demand, and platform scalability. Regulatory pressure on materials like TiO2 and microplastics is accelerating reformulation across various industries.

> *"We produce a single, bio-based material that can deliver multiple functions across a range of industries from personal care and cosmetics to food, pet food, nutraceuticals and coatings"*

At the same time, large manufacturers are actively seeking solutions that combine sustainability with proven performance and reliable supply. We address this through partnerships and industrial integration. We work closely with formulation partners and distributors in industries such as personal care and food to validate performance and accelerate market adoption.

On the supply side, we are scaling through a capital-efficient model, leveraging established manufacturing partners to reach hundreds of tons of production capacity in the near term. In parallel, we are advancing plans for larger industrial facilities to support long-term demand.

Which key metrics or milestones will you use to measure your success, and what targets have you set for the next year?

L. Schertel: Our key milestones are centered around commercial traction, production scale-up, and operational readiness. Over the next year, the primary focus is transitioning from pilot to commercial sales in core markets such as cosmetics and food, while continuing to expand our product portfolio.

We measure commercial success through customer engagement and conversion - including the number of active evaluations, progression into commercial partnerships, and securing long-term offtake agreements. This builds on existing traction with over 100 customer organizations across industries.

On the production side, a key milestone is scaling outsourced manufacturing through toll partners to reach hundreds of tons of capacity, ensuring consistent quality and reliable supply. In parallel, we are focused on achieving full commercial readiness, including revenue execution and preparing for the next phase of scale, with plans for larger industrial facilities and a future Series B.

Personal Profile

Lukas Schertel is CEO and co-founder of Seprify, where he leads the company's growth from lab breakthrough to industrial scale. A physicist by training, Lukas holds a PhD from the University of Zurich and brings deep expertise in photonics and cellulose-based materials from his research at the University of Cambridge. He is the author of 20+ peer-reviewed publications (including Science, Nature Photonics, Advanced Materials) and holds multiple patents in light management and bio-derived materials.

Business Idea

A Platform for Natural Functional Ingredients

Seprify is a Swiss materials innovator developing high-performance, plant-based functional ingredients from cellulose, the most abundant biopolymer on Earth. Originating from academic research at the University of Cambridge and now based in Fribourg (Switzerland), the company combines photonics, materials science, and process engineering to create scalable alternatives to conventional industrial ingredients.

At the heart of Seprify's technology is a proprietary process that engineers cellulose into microstructured particles capable of controlling light scattering. This enables functionalities such as whiteness, opacity, and UV interaction without relying on traditional chemical additives.

The result is a versatile and scalable material platform with applications across multiple industries. In personal care and cosmetics, Seprify's SilvaLuma enhances SPF performance while improving sensory properties and reducing reliance on UV filters. In food and pet food, SilvaAlba offers a clean-label alternative to TiO2 for whitening. In coatings and other applications, the technology enables improved optical performance with a lower environmental footprint.

Seprify's approach is designed to meet the growing demand for materials that combine performance, safety, sustainability and supply reliability. By using renewable, FSC-certified wood pulp and an energy-efficient process, the company delivers significantly lower CO_2 emissions compared to conventional materials.

Following successful pilot validation and backed by Series A funding, Seprify is now transitioning to procurement-ready supply, enabling industrial customers to move from trials to long-term sourcing. Supported by strategic investors and partnerships, the company is scaling production and expanding its commercial footprint across Europe and beyond.

With growing regulatory pressure and demand for clean, scalable alternatives, Seprify operates at the intersection of sustainability and industrial performance. The company is moving from pilot validation to procurement-ready commercial supply, enabling customers to adopt bio-based materials without compromise.

■ Seprify, Marly, Switzerland
seprify.com

Seprify MATERIALS

Elevator Pitch

From Nature to Industry

Seprify is transforming cellulose into a new class of functional, plant-based materials designed for industrial performance. Inspired by nature and enabled by advanced materials engineering, its platform technology replaces high-emission and regulated ingredients such as TiO2 and fossil-based polymers across multiple industries.

Milestones

■ 2022
- Formation of Seprify as a spin-out building on research from the University of Cambridge and University of Friborg. Built up of the initial team and IP transfer

■ 2023
- Closing of a 3.4 million CHF Seed funding round and additional grant funding of 2 million CHF. Expansion of team and capabilities across R&D, engineering and commercial.

■ 2024
- Development and validation of cellulose-based materials platform through build up of a pilot plant

■ 2025
- Launch of first application-ready products, including SilvaLuma (cosmetics) and SilvaAlba (food).
- Strategic partnership with Oterra for natural whitening solutions in food applications.
- Expansion of distribution in cosmetics through partners such as Grolman.

■ 2026
- Closing of €13.4 million Series A funding round, including investment from Inter IKEA Group, alongside investors Una Terra Early Growth Fund, Zürcher Kantonalbank (ZKB), Cambridge Enterprise Ventures, Kickfund, and other investors.
- Transition from pilot-scale validation to procurement-ready supply with successful scale up to the tons scale, enabling repeatable sourcing and early commercial contracts.

Roadmap

■ 2026/2027
- Commercial sales in cosmetics and food
- Production of commercial material at hundred ton scale
- Operational excellence
- Portfolio extension
- Preparation for Series B for first commercial plant

■ 2028
- Industrial scale-up
- Sales into larger volume markets
- Launch of new product lines

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Seprify's pigment in paint formulation.

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Seprify's product can function across a range of industries.

ChemOutsourcing 2026

ChemOutsourcing 2026 takes place September 15–17, 2026, in Boston, MA, USA, bringing together the global pharmaceutical supplychain community for three days of business, sourcing, and networking. The event focuses on pharma supplychain ingredients, CDMO services, and strategic outsourcing, with an exhibition and agenda designed to connect drug developers with suppliers and service providers across the pharmaceutical value chain.

■ www.chemoutsourcing.com

EPCA 60

EPCA 60 takes place October 5–8, 2026, in Vienna, Austria, bringing together industry leaders from Europe's petrochemical sector for four days of strategy, networking, and knowledge exchange. The 60th Annual Meeting will focus on the future competitiveness, security, and innovation of Europe's petrochemical industry, with over 2,500 participants from more than 500 companies.

■ www.epca.events/epca60

Sepawa Congress 2026

The Sepawa Congress 2026 takes place October 14–16, 2026, in Berlin, Germany, bringing together the European detergents, cosmetics, and perfumery industry for three days of innovation, networking, and knowledge exchange. The event features over 350 exhibitors, 160+ expert presentations, and an Innovation Zone highlighting new developments in the home and personal care industry.

■ www.sepawa.com

CPHI Milan 2026

CPHI Milan 2026 takes place October 6–8, 2026, at Fiera Milano, Italy, bringing together the global pharmaceutical and biopharma community for three days of business, innovation, and networking. The event showcases the full pharma value chain—from APIs, CDMOs, and excipients to machinery, packaging, and technology solutions—alongside a conference program focused on market trends, regulation, and digital transformation.

■ www.cphi.com/europe

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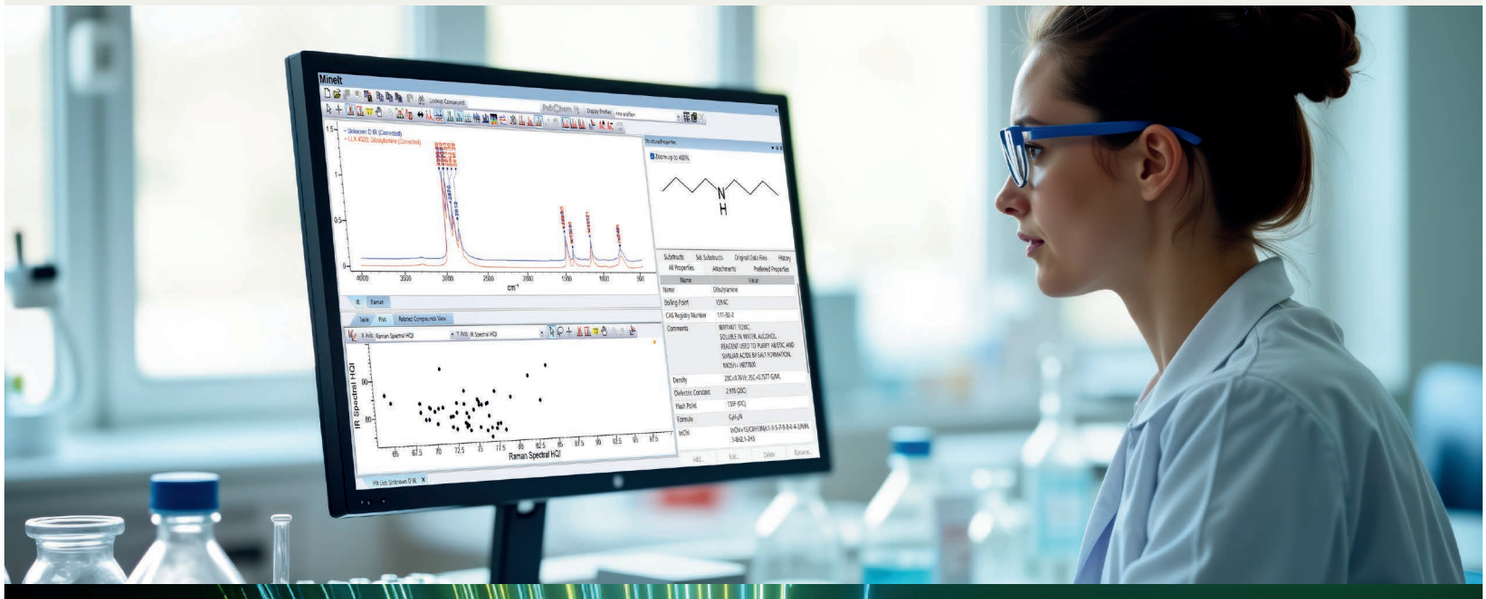

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