

Standing among giants

There is a challenging environment for start-up companies developing safer chemicals



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With more countries adopting regulations and policies to identify and manage the hazards and risks associated with chemicals of concern, the need for safer alternatives is growing exponentially. To address this, initiatives have been set up that aim to connect small companies that have developed alternatives with larger firms which have the capital to bring them to the marketplace.

Examples include the 'start-up network' of the Green Chemistry and Commerce Council (GC3), a US-based multi-stakeholder group, and the German authority-run International Sustainable Chemistry Collaborative Centre's (ISC3) innovation hub. More recently, Echa has been putting an emphasis on substitution, through its recently established supply chain [network](#).

Bringing together the right organisations to advance the uptake of safer alternatives is at the core of all three initiatives. ISC3 says on its website that it supports potential entrepreneurs by "identifying and evaluating emerging technological trends and facilitating the transfer of research results into industrial applications".

Echa's network - part of the agency's substitution strategy - is holding workshops that bring together users of hazardous substances, their suppliers and downstream customers, providers of alternatives and those helping in their development and implementation, such as technological support or funding organisations. These will identify obstacles in substituting a substance, as well as the solutions available.

Before either of these were launched, the GC3 created its start-up network and now has a 'strategic connections'

programme. "We have selected a pool of experts, who have a wide variety of relevant expertise and have agreed to assist our start-ups with directional advice and support on a variety of business and technical topics," it says on the GC3 website.

Start-ups, it continues, are an important driver of innovation; however, many lack the connections to the strategic partners that they need for product evaluation, co-development, licensing and investment. For those not familiar with the term, a start-up company is defined as a newly emerged business that has a product, solution or process for a particular market need.

However, while the start-up business community has emerged as a key piece of the puzzle - with entrepreneurs and small companies aiming to address the absence of effective and available alternatives - creating the right environment for them to bring their alternatives to the market remains a challenge.

Delegates from across supply chains at the recent 13th GC3 roundtable, an annual forum for business leaders to exchange strategies and best practices, agreed that start-ups particularly need to overcome:

- » complex supply chains;
- » the existing infrastructure of established chemical industry suppliers;
- » price/performance challenges; and
- » supply in terms of one plant versus the incumbents' numerous and fully depreciated global plants.

One panellist, Tess Fennelly, CEO of start-up company Remooble, says that there is a need for more brand owners that can help start-ups to understand what the needs and requirements are to serve their market. At the other end of the chain, large chemical companies, which can be enticed to invest in a "complementary

or disruptive technology”, need to get on board too, she says. Ms Fennelly stresses that going it alone as a new green chemistry start-up is challenging and highlighted the recent demise of two companies. Bioamber, a renewable materials company that was established in 2008, filed for bankruptcy in May, while Verdezyne, a company converting yeast for the production of renewable chemicals, recently announced that it was closing its operations.

Low oil prices over the last few years have created an unstable market for some renewable chemicals companies, which are unable to compete on costs. Despite this, there have been some examples of success. Natureworks, a company that captures greenhouse gases and converts them into materials, has been “afforded staying power as they grow” by partnering with a major trading company, Cargill, says Ms Fennelly.

Communicating needs

Through its experience with Natureworks, Cargill’s bioindustrial senior marketing manager Audra Wendt, who was another GC3 roundtable panellist, says that better communication is key for these type of partnerships to succeed and work for both parties.

“Start-up companies are coming up with some innovative solutions but we need to communicate and help shape the areas that get focus and are invested in,” she says. “We don’t want start-ups just creating alternatives where there isn’t a need, so is there a way to direct their innovations through collaboration with the bigger, broader industry to identify areas and problems that need solutions?”

This, continues Ms Wendt, would guide the entrepreneurial community and help them - through companies that have more financial backing - to scale up their technologies. “By helping focus new innovations that better address market needs beyond a greener footprint, you can change the perception of that innovation from a ‘nice-to-have product’ to a ‘need-to-have solution.’”

Management buy-in

However, it can be just as hard for the larger companies to come up with capital for safer alternative solutions, says Rene Molina, global business leader for DuPont’s textiles material brand Sorona. Start-up projects and opportunities compete with other expansions and projects being considered by the company.

“We get a lot of questions from management. For top level buy-in to support and invest in a potential solution, we need to address how a project will become profitable going from start-up through the pilot and commercial phases,” Mr Molina says.

The start-ups, he added, have to have a strong chance of succeeding and becoming a profitable option in order to be accepted and invested in. “Creating demand and properly conveying your value proposition is key. A start-up may come with an enticing solution but when the company carries out a metric for scaling it up, it can reveal a number of issues, such as difficulties in creating customer demand, costs, performance and process issues,” he says.

Regulation

Dr Patrick Harmon, BASF’s industry manager in North America, says that bringing a new material or substance to the market

involves large costs related to R&D. Moreover, with the further implementation over the years of REACH and the new TSCA, “there is more testing required than ever before”.

This is not a bad thing, he says, but it does involve additional costs. That factor is likely to impede some companies, particularly smaller ones, from fully developing and achieving large scale supplies of green alternatives. Before you get people to invest, you need to have a market and the availability of new chemical products is inhibiting this.

“I have found that start-up companies have a lab-scale or pilot plant-scale substance,” Dr Harmon says. “Sometimes we’re looking at things we need five or ten years down the line, which means this sort of scale isn’t an issue.”

“However, I have ideas for some products that I’d like to see available in a couple of years and, unfortunately, the new materials and substances at this scale are not commercially available,” he adds. “While there is demand for green chemistry in certain sectors and applications, there is a big need to create stronger demand across the marketplace.”

Downstream

Performance, scale and cost are also issues for downstream industries. “We have a large fabric care business and we promise consumers superior cleaning and care, so formulating substitution materials with both scale and equal performance is difficult,” says Todd Cline, head of Procter & Gamble’s North American R&D team for the Fabric Care division.

Mr Cline says that his team has worked through this by formulating its plant-based product line from the ground up, learning and developing further as it grows, so there is more flexibility in incorporating new materials. The company has also been actively involved in the GC3 Preservative Project to identify safe and effective preservatives for personal care and household products, which is a need across many companies.

For fabric care specifically, Mr Cline and his team are searching for surfactants (or substitutes for them) that are renewable, can deliver cleaning performance and can be scaled up to meet business needs. The company is also looking for green chemistry-based chelates with similar efficacy profiles to synthetic and renewable or biodegradable polymers.

To source new, safer chemicals, companies need to connect more effectively with their industry peers, their suppliers and innovative start-ups to articulate these technical needs and build trusting relationships that can spur new alternatives, says Professor Joel Tickner of the University of Massachusetts’ Lowell Centre for Sustainable Production and director of the GC3.

“To ensure safer product ingredients, brands need to know what suppliers are putting into the products, and suppliers need to know what materials have been researched,” Professor Tickner says. And while start-ups hold the key to developing solutions, there is also a critical role for government in addressing the challenges of incumbency by incentivising research, partnerships, new manufacturing operations and the adoption of more sustainable chemistries, he adds.