


Growth and innovation in chemicals

A glass half empty or half full?

Executive Summary





Innovation has always been closely linked to growth in the chemical industry, but today, the need for innovation is greater than ever. Governments are pushing for greater sustainability and greenhouse gas (GHG) reductions, while the industry's customers are pursuing growth in areas such as electric vehicles, batteries and 3D printing. Altogether, these trends will require a range of innovative chemical products—and that will create a tremendous growth opportunity for the chemical industry.

The question is, will chemical companies be ready for that opportunity? To find out, Accenture analyzed chemical companies' innovation-related investments—and the results paint a mixed picture of the industry.

Indeed, whether the “glass is half full” or “half empty” depends on one's perspective and the timeframes involved. On the one hand, the industry has well-established innovation capabilities and is pursuing a range of innovations. On the other hand, it tends to focus on improving today's products and processes, rather than creating new ones.

In the near future, that will not be enough. The chemical industry is at an inflection point where the need for disruptive innovation is increasing rapidly, with growing demand for a range of new products and services. In that world, chemical companies' incremental and narrowly focused approaches to innovation are likely to fall short—and if they don't change, the demand for innovation will soon outpace their ability to deliver it.

The analysis: Six key levers

The Accenture study analyzed chemical companies' investments across six key levers related to growth and innovation: patents, startups, corporate venturing, partnerships, mergers and acquisitions, and capital projects.



Patents

The research examined the number of references to priority patent filings in three categories: *materials*, *applications* and *processes*. The highest number was for materials-related patents. Many of these cover incremental improvements of existing materials—rather than new materials—and focus on enhancing performance characteristics such as flexibility, durability, electroluminescence and chemical resistance. Meanwhile, there was a relatively low number of references to process patents. This may be in part due to a desire not to publicize process innovations, but it also suggests that the industry may not be investing enough in the core processes that will be required to reduce carbon footprints and meet the growing demand for more sustainable products.



Corporate venturing

Much of the industry's corporate venturing continues to focus on existing product groups such as agrichemicals, paints and coatings, and food ingredients. Companies appear to view their corporate venturing activities as an extension of their in-house research and development (R&D) efforts, rather than a way to explore uncharted territory. And instead of seeking disruptive innovations for the market, they are primarily targeting improvements to their internal capabilities and looking for new applications for existing molecules. The picture changes somewhat with technology-related investments, with growth in AI, 3D printing, hydrogen/fuel cells and analytics—areas where companies presumably see potential for innovation.



Startups

Chemical-related startups, which have seen dramatic growth in funding, are addressing many of the industry's important growth areas, including building materials, waste management, additive manufacturing and machine learning (ML), which together represent about 30% of the total startup investment in recent years. Nearly 20% of investments have been focused on digital solutions such as AI/ML for molecule discovery and quantum computing for simulations, or activities in the fields of e-commerce and business-to-business interactions. Startups exploring materials that support CO₂ reductions and the circular economy account for 10% of investment share.



Partnerships

While getting close to the customer is a well-established credo in the industry, partnerships with customers are still less frequent than chemical company-to-chemical company partnerships when looking at a five-year average. Looking forward, growing fields such as 3D printing and circular economy products and processes will require close collaboration with customers. Increased partnering with technology providers, currently fairly rare, also offers opportunity. As an asset-intensive and data-rich industry, chemical companies can use AI, ML, analytics, Industry X, quantum computing and so forth to further improve operations and extract value from data and assets.



Mergers and acquisitions

More than 70% of M&A investments targeted extensions to existing products or additional business in segments already served. Far fewer (15%) focused on entry to new markets and moving into new businesses (12%). In terms of products and offerings involved in M&A, the highest growth rates were in chemicals and solutions for electronics, information technology and plastic products. Overall, however, the majority of transactions focused on agrichemicals, “traditional” specialty chemicals, or coatings, adhesives, sealants and inks.



Capital projects

Chemical companies have increased their capital investments in newer fields such as batteries, recycling and pyrolysis. However, a majority (68%) of investments are still going into traditional areas such as basic and intermediate chemicals, thermoplastics and fertilizers. Some companies are shifting investments to new segments related to the circular economy and GHG reductions, but the numbers are still fairly small. Overall, the industry may not be pivoting quickly enough to address the requirements of a circular economy.



Staying ahead of shifting demand—and disruption

The industry’s “more of the same” approach to innovation will need to change. Customer industries will require leading-edge breakthrough innovations that will enable them to deliver more new products and services, more quickly, to a changing world—but the current patterns of industry investment do not fit with that shift in demand.

If chemical companies fall behind in the race to deliver more innovation on more fronts, they run the very real risk of not being able to exploit the major growth opportunities that will be emerging in the coming years. Even more troubling, they also run the risk of being disrupted by the growing number of chemical-related startups that are essentially filling the innovation gaps opened by the industry’s traditional innovation efforts that are limited in scope.

In short, today’s approaches to innovation will not be sufficient for tomorrow. The industry will need to make fundamental changes to the way it drives innovation. Tremendous opportunity lies ahead for chemical companies—but if they are to grow, they will need to enhance their innovation capabilities to deliver a broad and evolving range of new products, processes and services.

About the research

The Accenture Study on Growth and Innovation in Chemicals defined and analyzed the innovation lifecycle in the chemical industry across six key levers: **patents, startups, corporate venturing, partnerships, mergers and acquisitions, and capital projects**. For each lever, clusters of primary data were created, and traditional as well as advanced analytics were applied to extract insights. The research encompassed the following:

Patents: More than 100,000 patents (filed 2015-2019, published by July 2021) from in-house R&D

Startups: Outside investment in more than 1,900 operating chemical-related startups since 2016, with the startups founded after 2010

Corporate venturing: More than 500 venture capital investments by chemical companies since 2016

Partnerships: More than 600 partnership announcements since 2016

M&A: More than 500 M&A transactions between 2016 and 2020

Capital projects: More than 2,500 capital outlay announcements since 2016

References

All data points included in this executive summary come from the Accenture Study on Growth and Innovation in Chemicals. For more detailed information about the research and to read the full report, please visit www.accenture.com/ChemicalsGrowth.

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Authors



Dr. Bernd Elser
Managing Director,
Global Chemicals Lead
Accenture



Dr. Karin Walczyk
Global Chemicals Research Lead
Accenture



Paul Bjacek
Global Resources Research Lead
Accenture

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