While executives may not want to hear it, the answer is yes. Companies that continue to operate within the usual guardrails, as challenging as that can be, will eventually find themselves in deep trouble. The reason? Broad but powerful forces are acting upon industries and making not just minor but radical change imperative.

We know this because we’ve been researching industry reinvention for the past several years. We’ve looked at the big picture, the macro environment of new technologies, societal pressures, consumer demands, and business ecosystems. And we’ve examined the performance, strategies, and innovation approaches of thousands of companies during this period.
THE RIGHT CHEMISTRY

The six forces driving change in the chemical industry

In 2019, we engaged in a new study, talking to more than 1,300 executives in 14 industries and 17 countries. We looked at industry reinvention through the lens of six forces bearing down on companies.

01 The always-on, hyperconnected consumer’s search for personalized products and experiences, e.g. virtual agents.

02 The growing imperative for higher productivity by way of targeted investments in growth levers such as technology, e.g. XR-enabled upskilling.

03 The challenge of digital disruption, which is blurring the boundaries of the chemical industry due to the introduction of digital technologies, e.g. digital plants.

04 The drumbeat to “go green” and implement sustainable sourcing and circular material management.

05 An evolution of business ecosystems, where established companies must work with, not against, startups, competitors and customers to enable new services like remote maintenance.

06 And the politics of economics, in which long-held views on trade and internationalism are strongly challenged resulting in new regulations, e.g. digital trade compliance.

These forces don’t exist in a vacuum; they collide in ways that increase their power and keep companies scrambling to keep up.

What we’ve sought to answer through our research and analysis is how companies should respond.

How do you build for tomorrow without risking all that you do today? How do you make the right investment choices, across what may be an older but still-strong core business, alongside a new core that has lots of running room left and new businesses that are taking shape but face great uncertainty?

In several industry-focused reports, we explain how leading companies are stepping up to the challenge. These companies are in fact at the forefront of remaking their industry.
Feedstock-sourcing challenges, uncertain trade and tax policies, new forms of competition and more demanding consumers. These trends are coalescing to put enormous pressure on chemical companies.

Though most have answered the call to adapt for this era, a small group of innovative companies are distinguishing themselves. We call them the Chemical Champions. This report explains what sets them apart.
The call for sustainability and circularity

Challenges chemical companies face today

Chemical companies are facing enormous challenges. Trade and taxes have become more complex with uncertain policies and stringent government regulations.

Competition has become fiercer, while the talent pool of engineers and factory workers has gotten scarcer. And the notion of circular economies has become popular with customers today and made them more aware and critical of how chemicals are made, used, recycled or disposed. As a result, sustainability and circularity are no longer discretionary—they now determine competitive advantage and form the basis of business transformations. Accenture research shows that by 2025, digitization could unlock up to $550 billion of value for the chemical industry.¹

What do you get from the collision of these forces? A kaleidoscope of new value propositions. (See Figure 1)
While chemical companies are facing broad economic and social challenges, they can exploit these new value propositions to capture 21st century consumer-driven opportunities.
Chemical companies have just begun to scratch the surface of what’s possible with digital innovation. According to our survey, they are making the most innovation investments—not surprisingly—in product research and development. (See Figure 2)
Add innovation to the mix

Reimagine offerings to realize a higher RODI

But to truly take advantage of these new digital value propositions, chemical companies must completely reimagine the products and services they offer. They must also create new and exceptional value across key business functions, at scale, to get a return on their digital investments.

For the chemical industry, this can be an arduous task. The main reason is that research and development has been all about new molecules, which take significant amounts of time and money to design and develop. Process manufacturing requires a focus on pure scientific research to innovate new formulations, catalysts and processes. Long-lasting paints, soil-friendly fertilizers, safe-to-use detergents, and easy-to-recycle polymers are only made possible by massive investments in chemistry-based R&D. Add to that fragmented technology platforms across key functions and shop floor personnel who aren’t ready for the long journey to digital skills adoption. Quite a complex mix.

Digital technology has the power to reinvent the chemical industry if implemented as an integrated, cross-functional operational technology ecosystem.

Take big data, for example. Virtual simulations powered by big data analytics can dramatically improve the speed and accuracy at which scientists predict the performance and longevity of chemical products. Similarly, artificial intelligence solutions can help automate and optimize production, batch testing for customized specifications, and supply-chain operations—ensuring higher productivity and greater quality control.

However, such an implementation will require senior leadership to think differently about innovation. For decades now, chemical companies have invested in chemistry-based R&D to differentiate themselves from the competition. The same can’t be said for digital R&D, at least not yet.

Out of the 121 chemical companies with annual revenues in excess of $1 billion we studied, less than a quarter were succeeding at scaling digital innovation in R&D and across their production and operations. That high-achieving group of Chemical Champions not only successfully scaled more than half of their digital proof of concepts (POCs) but also earned higher-than-average returns on their digital investments (RODI). Innovative use of digital technology in production and operations also is a key priority for the Champions.

While some companies are distinguishing themselves as digital innovators and seeing impressive returns, most chemical companies aren’t.

In fact, more than 75 percent of the companies we researched earned an RODI lower than the industry average (12 percent), regardless of how much they scale. This implies that simply scaling more doesn’t guarantee success.
The new chemical producer mindsets

Chemical Champions employ three distinct mindsets

So, what makes a Chemical Champion? After studying these organizations closely, we discovered a few things. For one, how you scale POCs can be more important than how many POCs you scale. Secondly, these leaders view innovation and associated costs differently. In fact, they spend more time and money than their peers on formulating differentiated products.

They also fare better in scaling up production—they do it faster and more efficiently. But most of all, they can breakdown the functional silos allowing value data and digital value to flow seamlessly across the enterprise.

But here’s the big revelation: Chemical Champions have the courage to scale new digital innovation at the right pace so they neither miss their perfect moment nor over-extend themselves. Based on our research, we found all these companies have three distinct mindsets that help them unlock new value propositions and earn higher returns on their digital investments.
Chemical Champions view innovation as an investment—not a cost.

They also allocate these investments wisely—balancing old and new to drive new levels of operating efficiency, without the wholesale replacement of legacy technology. In contrast, other chemical companies view innovation spending as cost—in many cases, spending more or cutting cost unwisely in areas that impact their future growth.

More than a third (35 percent) of the Chemical Champions invested at least $500 million or more each in digital innovation from 2016 through 2018. In comparison, only 11 percent of the remaining chemical companies we surveyed spent as much.

Where is that money going? Chemical Champions are investing significantly in reinventing their production and operations, merging their information technology (IT) and operational technology (OT) groups to create an integrated governance structure. Once the portfolio of assets and the data they create is consolidated, applying advance analytics and machine learning to make processes flexible, responsive and efficient becomes easier. Champions saw conversion costs—direct labor cost plus manufacturing overheads—grow by 30 percent over the past three years, implying a fine balance between cost efficiency and digital investment. In comparison, others saw the same costs jump 82 percent during the same period.

Chemical Champions also understand the importance of hyper-personalizing products to individual customer needs. Digital investments in product R&D come in handy here. They spend more time and money on product R&D—evident in a 38 percent increase in design-update costs. In contrast, the design spends by other companies grew at a moderate 25 percent during the same three-year period.

Take Evonik. Since 2014, the German specialty chemical company has run a project house, Creavis, as part of its strategic innovation unit. The house has 20 scientists who use processing technologies such as electrospinning and 3D printing to quickly evaluate material properties and create prototypes. Evonik also leverages automation with its High-Throughput Equipment (HTE) which includes 13 robots performing various tasks. They can, on average, formulate 120 samples in the system within 24 hours, allowing for faster initiation of new projects and tests.
Chemical Champions achieve tangible and timely returns on their investments.

In contrast, regular companies that view digital innovation as a cost rarely expect returns, let alone achieve them. Chemical Champions make sure that digital investments in production and operations deliver tangible returns. For years, chemical companies have invested in automated operations, process controls, sensors and real-time data systems. Big data analytics is now enabling them to exploit the data they already have to deliver value by way of remote monitoring, predictive plant maintenance, enhanced worker safety and the lot.

According to our study, they were able to increase throughput yield—the ratio output that meets quality standards—by 5 percent between 2016 and 2018. In comparison, others were only able to increase this critical performance metric by 2 percent.

For Chemical Champions, the returns go beyond better product R&D or higher capacity utilization. The returns are also financial, naturally. On average, Chemical Champions earned a RODI of 24.3 percent over three-year period, from 2016 through 2018. That’s three times higher than others who earned a mere 7.6 percent.

“With an understanding of digital capabilities, companies can reassess how the overall portfolio of assets can be made more flexible, responsive and efficient—that is, more competitive.”

Tracey Countryman, Managing Director, Global Resources Industry X.0 Lead, Accenture
Most companies continue to work and collaborate in conventional ways to avoid racking up costs. Champions make unique, differentiated investments in growth levers to enhance productivity and agility.

We identified five levers that organizations use to scale digital innovation—skills, platforms, technology, partnerships and leadership. We found Chemical Champions use these growth levers in new ways. (See Figure 4)

Consider partnerships. Chemical Champions are partnering with technology companies to extend collaborations beyond typical engagements such as IT hardware supply, ERP software implementation or tech support. Bayer, a German multinational and life sciences and crop sciences company, is partnering with Genedata, a Swiss bioinformatics solutions provider, to digitize R&D processes. Discovery of new crop protection products is a complex and time-consuming process due to the vast number of species, genomes and related information that needs to be analyzed. Genedata’s Selector software provides global data access to Bayer’s scientists as an entry point to collaborate, harmonize and streamline R&D processes toward finding innovative solutions.

Similarly, BASF and Citrine Informatics are collaborating to implement machine learning to accelerate the development of new materials that can capture greenhouse gases, like carbon dioxide (CO2). Developing new materials requires faster and more efficient analysis of materials data. Citrine’s AI algorithms allow this by consolidating data into a single consistent searchable format, as well as structuring and storing them for use.
The critical question today is how business can simultaneously prepare for unprecedented social, political, environmental and technological challenges—both imminent and distant.

The answer is not easy.

What we have learned in our research is that only a handful of companies are taking on the disruptive forces, making dynamic decisions and successfully remaking industries. We call them the Champions.

The Champions understand that digital technology is creating more discerning customers who want connected products that don’t pollute, save time, and are easy to use. But Champions also know how to create these products. They rely on digital technology to build smart factories, nimble supply chains, and responsive distribution networks. Most important, they successfully scale digital innovation and earn a higher return on those investments.

But the truth is such successes are rare.

Our research shows three mindsets work best in concert to help any company that wants to become a Champion. First, view digital innovation as an investment that needs thoughtful allocation, not a cost that ought to be cut. Second, set timely and robust expectations on return on digital investments. Third, invest in five in-house levers to scale digital innovation—skills, platforms, technology, partnerships and leadership.

The payoff from adopting these mindsets can be substantial, and help any company answer this simple question: Will you move beyond the usual guardrails and remake your business to successfully face off the forces before they take you down?
The Remaking of Industries: CHEMICALS

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The Remaking of Industries: CHEMICALS

Research Methodology

We surveyed 121 executives from chemical companies with annual revenues in excess of $1 billion, across 12 countries. In our survey, companies were asked to report how much they spent on scaling digital innovations and the returns they achieved on those investments, over the period 2016-18.

The consistent and clean survey data set was utilized to arrive at the set of Champions. We defined “Champions” as companies that were scaling more than 50 percent of their digital proof of concepts and achieving a return on digital investment (RODI) higher than the average RODI being clocked by their industry peers and higher than their industry-level ROIC. The rest—whom we called “Others”—were companies which were achieving a RODI lower than the average RODI being clocked by their industry peers, as well as, their industry-level ROIC, irrespective of their scaling efforts.

Thereafter, specific questions in the survey were utilized to examine the impact of digital on certain key performance metrics across various organizational functions. Lastly, key differences and drivers that generate higher digital ROI for Champions were compared to other companies to understand the difference in approaches and strategies between these two sets of companies.

Appendix


Exec Profile

- C-Suite: 48%
- Senior VP/EVP: 37%
- VP/Director: 15%

Annual Revenue

- $1 - $10 billion: 85%
- $10 - $30 billion: 10%
- Over $50 billion: 5%
- $1 - $10 billion: 82%
- $10 - $30 billion: 30%
- Over $50 billion: 25%
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