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ACCENTURE CHEMICAL INDUSTRY VISION 2016

New Realities, New Opportunities

High performance. Delivered.

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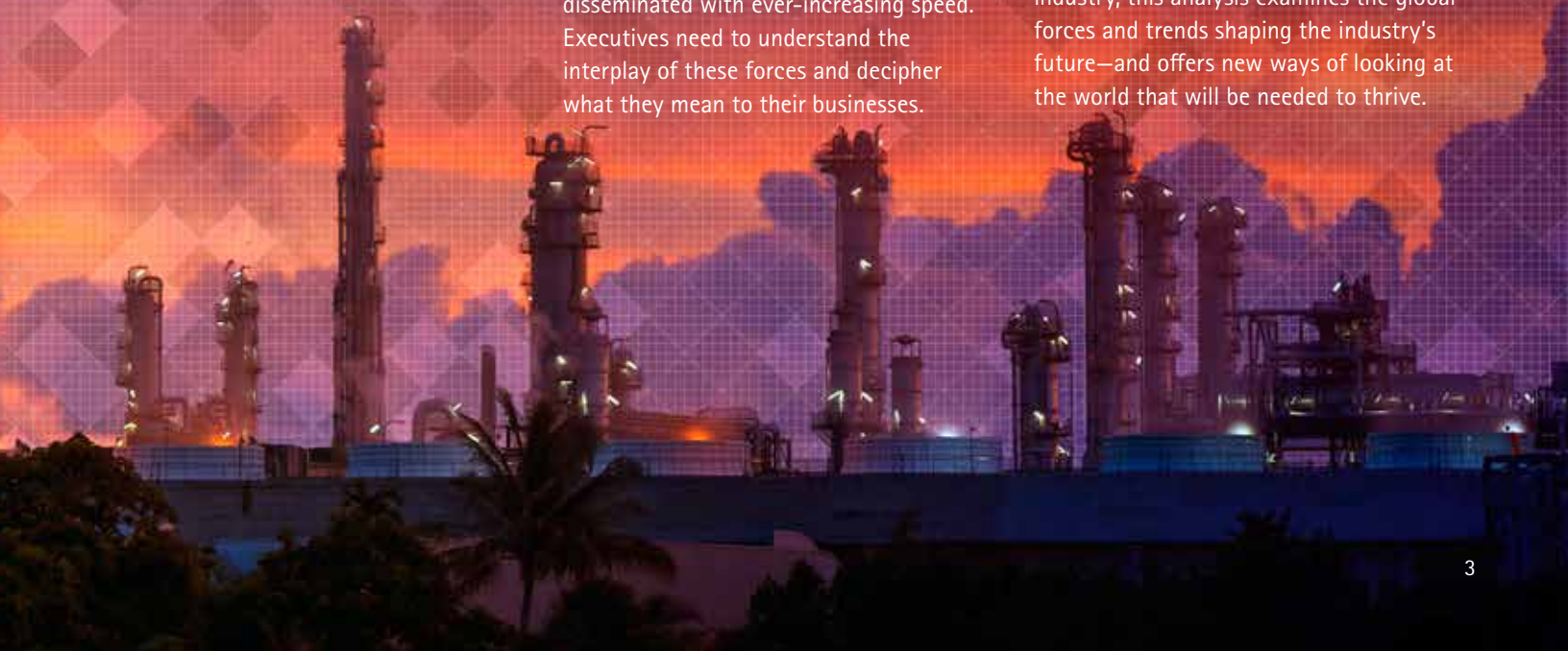
INTRODUCTION

Kodak once sat at the top of its industry. Then, technology and customer expectations started to change. Kodak's leaders saw the waves of change coming, but failed to respond. Today, business schools study companies like Kodak and dissect their strategies to see why they failed to adjust in time. Like Kodak, the chemical industry is now seeing fundamental change. The question is, what can industry leaders do to ensure that their companies adapt to this change—before the world passes them by?

A host of forces are disrupting today's chemical industry, including geopolitical risks, changing customer desires, growth challenges, population changes, digital technology proliferation and pervasive volatility. At the same time, the pace of change continues to accelerate, as the world generates more and more information, and that information is disseminated with ever-increasing speed. Executives need to understand the interplay of these forces and decipher what they mean to their businesses.

Getting it right will be critical to each company's future—and the key to creating advantage and maintaining market position in the coming years.

The question of what lies ahead and what it means to the industry is addressed in this Vision 2016 paper. Drawing on Accenture's research and experience with the chemical industry, this analysis examines the global forces and trends shaping the industry's future—and offers new ways of looking at the world that will be needed to thrive.



Megatrends That Matter

To chart a course for the future, executives can begin by understanding the undercurrents, or megatrends, that are vastly reshaping the world and the chemical industry. Accenture analysis points to five megatrends that will drive new challenges and opportunities over the next decade and a half.

Megatrend 1

Resource availability

Natural resources are the backbone of many economies, and having the right resources available at the right time is an increasingly critical factor. While some resources are abundant, others are becoming more difficult to extract, and that reality will have significant ramifications for chemical companies.

For example, there is currently an abundance of shale oil and gas, but many other mineral resources are found only in more remote, deeper or harder-to-reach locations. Thus, sustainability, new methods of extraction and finding use for waste will grow in importance in the coming years, with a focus on new technologies such as coal-to-chemicals and renewable energy.

Meanwhile, water management is quickly becoming a global issue. Water availability can be unpredictable, with droughts and floods a regular occurrence in some areas of the world. In arid regions with high population growth, such as in certain parts of Africa, water management is more critical. This is particularly true for the agriculture industry, which uses 70 percent of the world's fresh water.[1] Here, the chemical industry has the opportunity to provide innovative solutions for improved filtration, purification and desalination, as well as methods that enable crops to use less water, such as drip irrigation and genetic modification.

Resource availability and climate-change concerns will continue to drive energy-efficiency efforts. For example, according to Navigant Research, annual sales of electric vehicles are expected to reach 4.9 million by 2020. This will likely increase demand for advanced materials (plastics and composites) and battery technologies. Government energy policies are evolving as well, and Europe has set a goal of having 27 percent of its energy come from renewable sources by 2030.[2] This should increase demand for products such as wind-turbine coatings, foams in rotor blades and silicones for solar panels and wind turbines.

Efforts to reduce carbon emissions will impact the way chemicals are produced and used. Emissions primarily originate from processes that use fuel to make chemicals, as well as in certain chemical reactions. The opportunities here include the use of carbon dioxide in value added ways, including the production of new products (via new carbon dioxide routes to needed chemicals), chemical-based carbon capture processes and the replacement of certain carbon-emitting chemical reactions with new chemicals/process routes.

More broadly, we are likely to see resource availability lead to heightened interest in the circular economy. As the term implies, the circular economy replaces the traditional "make, use, dispose" approach to production and consumption with one that prolongs the use of natural resources. By drawing on innovative business models and advancing technologies, companies can essentially eliminate waste and operate more like a sustainable natural ecosystem—an approach that promises to confer a powerful advantage in the coming years. Perhaps advances in de-polymerization and landfill mining may bring simplification and other benefits to re-use in the future.

Megatrend 2

Changing populations, changing societies

As they look to the future, chemical executives need to consider population trends. Europe, for example, is facing an aging population and its overall population growth is flat. On one hand, this means a fixed overall market. On the other hand, it could create opportunities in areas such as healthcare, transportation, cosmetics and personal care products.

The industry's future also will be affected by increasing global affluence combined with a general decline in the cost of goods. These factors mean consumers will continue to drive demand and waste. Urbanization, too, will play a growing role. By 2050, 66 percent of the world's population is expected to live in cities.[3] This will drive infrastructure projects that require chemical products.

The millennial generation—those born between 1980 and 2000—is a powerful force that is reshaping markets. These individuals were born into a digital world, are comfortable with technology and look to buy experiences, versus products. They expect good service and rapid innovation, and care deeply about environmental responsibility.

And in many developed nations, this group is leading a fundamental change in buying patterns: They are moving away from a traditional "I want" consumer perspective, with its drive to acquire goods, to an "I don't need" mindset, with less interest in ever-increasing consumption. Altogether, these changes mean that chemical companies will need to focus on getting products to market more quickly, and creating products that enable experiences—while demonstrating the environmental benefits their offerings can deliver, such as energy efficiency or lower emissions.

Megatrend 3

Emerging and opening markets

Companies are likely to discover significant opportunity in the growing middle classes found in China, India, Mexico and other emerging markets. Demand for chemicals in these markets will continue to increase in industries such as construction, infrastructure, manufacturing and consumer goods. In addition, these populations need safe food and water, which will create new opportunities in areas ranging from aseptic and longer shelf-life packaging to food-preservation technologies and cleaning chemicals.

China will continue to be a dominant factor among these markets. The country's "Made in China 2025" plan for growing value-added manufacturing focuses on 10 priority sectors that involve chemical industry products—sectors such as energy-efficient vehicles, aerospace equipment and medical devices.

Emerging market players also are growing in global prominence, with companies such as SABIC and Sinopec rising to the top ranks of chemical producers just within the past ten years. And the emerging market players are acquiring firms in developed regions. A recent example is ChemChina's US$43 billion bid for Syngenta in agricultural chemicals. These deals will hasten the flow of technology between regions and will increase significantly the innovation and competitive position of emerging market companies over the next five to ten years.

Megatrend 4

Greater operational efficiency

Efficiency has always been important in manufacturing, but it has the potential to reach much higher levels with the convergence of new software, hardware and communications technologies. With this convergence, robots are becoming less expensive and more sophisticated, and they are able to perform a wider range of tasks in a broader range of companies. At the same time, advances in 3D printing could allow for a whole new way of manufacturing, with micro-factories set up in communities or homes to print products on demand.

The increased use of robotics and technology convergence will create more possibilities for improving both efficiency and safety in chemical plants. For example, the combination of analytics and sensors embedded into equipment can enable preventative maintenance strategies that reduce downtime. Technology convergence also means companies—and their customers—can consider a broader range of locations, both near and far, for new factories as labor becomes a less-critical production factor.

Megatrend 5

The opening of new frontiers

Advancing technology is enabling people to move into and operate in extreme environments, and that is opening up a range of possibilities for the industry.

Increased activity in deep-earth mining and the privatization of spaceflight will make high-performance materials more important. Historically, the military has been a key driver of such leading-edge developments, as well as a sponsor of related chemical-industry innovations. This is likely to continue, as world military expenditures reached US$1.8 trillion in 2014.[4] It is noteworthy that the number of countries spending more than four percent of their gross domestic product (GDP) on the military increased from 15 to 20 from 2013 to 2014.[5]

The aerospace industry will be looking to chemical companies to pioneer new technologies to make aircraft more fuel-efficient, cheaper to operate and maintain, and safer. For example, NASA is developing insect-shedding airplane coatings that could allow planes to use five percent less fuel.[6]

The deep seabed holds an enormous amount of hard mineral resources. Although current market conditions may not warrant its exploitation, that situation could change over the next 20 years. Increased seabed mining would bring greater demand for chemical reagents, dispersants, rheology modifiers, and other mineral-processing chemicals for use in sensitive marine environments.

Together, these five megatrends provide vital insight into the coming decade and beyond. The question is: how can industry executives work through the challenges and maximize the opportunities inherent in these megatrends?

Taking Action: The CEO Agenda

As the five megatrends reshape the landscape—and disrupt economies, businesses and people—chemical companies will face risks. But they will also uncover new possibilities. To help executives navigate through it all, Accenture has identified six CEO agenda action items for 2016:

1 JOIN THE DIGITAL REVOLUTION

2 BUILD MORE RESILIENT BUSINESS MODELS

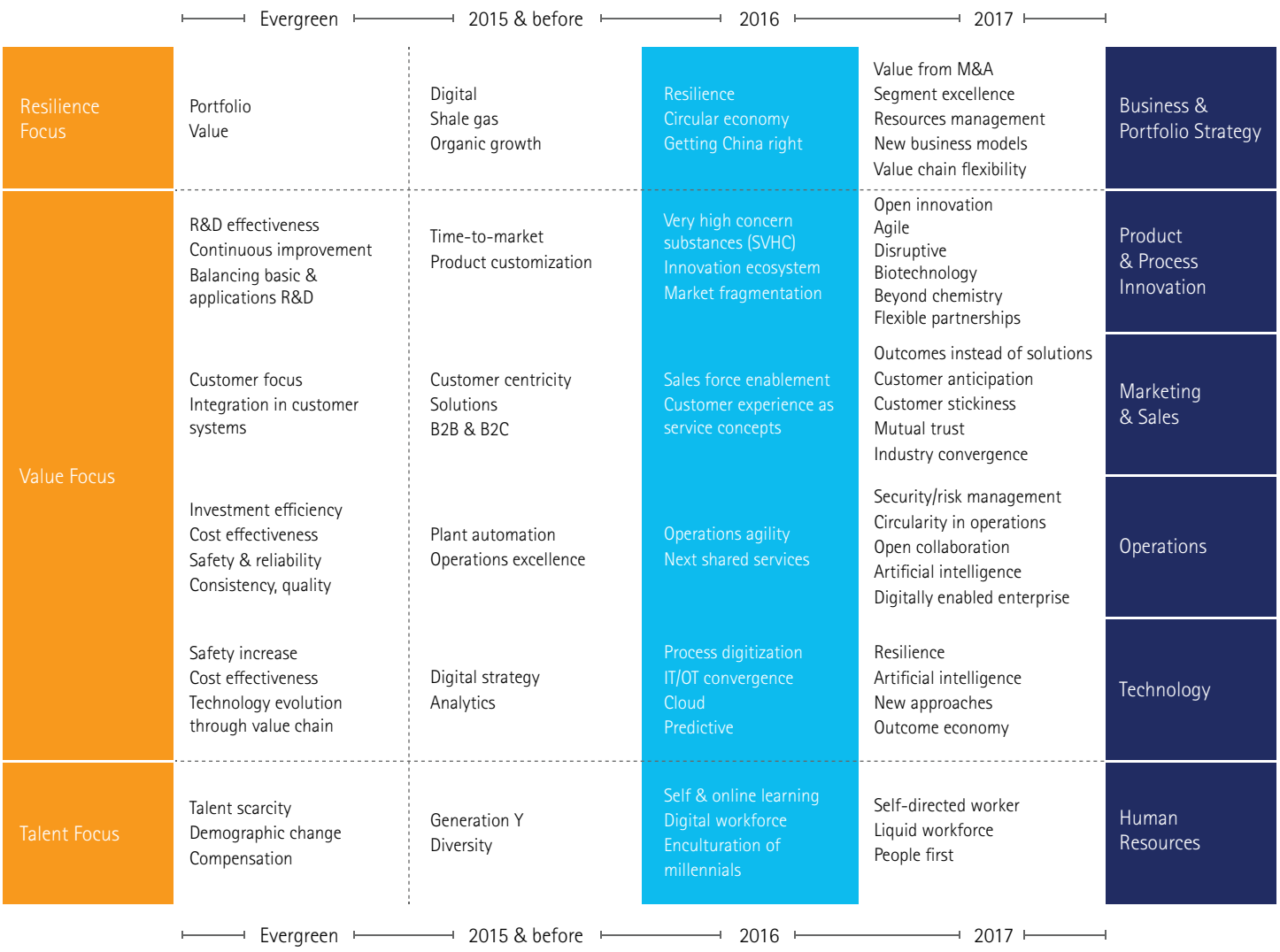
3 RIDE THE TIDE OF RISING EXPECTATIONS

4 CONNECT AND COLLABORATE FOR INNOVATION

5 MAKE OPERATIONS WIRED AND DATA-DRIVEN

6 DESIGN THE WORKFORCE OF THE FUTURE

CEO Agenda 2016



Join the Digital Revolution

Digital technology is advancing rapidly. It is in all aspects of business and driving change across industries. That includes the chemical industry, where it is playing a growing role in enabling higher levels of business performance and opening the door to new opportunities.

Today's digital technologies include wireless tracking, global positioning system (GPS) mobile equipment, sensors, analytics, the cloud and the Internet of Things (IoT)—that is, the connecting of sensors, devices and equipment to the network. Digital technology is a critical enabler of the changes that will help chemical companies adapt to the five megatrends. Thus, it is a vital thread that runs through the various points on the CEO Agenda. And its impact will be felt well beyond the individual company.

Accenture believes that digital technology is leading to the emergence of the "outcome economy." In the future, companies will compete on their ability to provide outcomes, rather than individual products. For chemical companies, this could mean providing seeds, fertilizers and pesticides to deliver a guaranteed yield on a given area of land. Similarly, it could mean delivering plastics that guarantee freshness in food packaging. Digital technology makes it possible to identify, measure and target customers' desired outcomes.

Digital technology is clearly a disruptive force. But it is one that is opening up new opportunities for the chemical industry—and executives need to understand how it can affect their companies and competition.

Key Questions

1. Do you do enough to factor digital technology into business strategies?
2. What types of outcomes can you sell instead of molecules/compounds?
3. How can digital fuel your growth and improve your business performance?

What is the outcome economy?

TODAY'S SELL →	TOMORROW'S GUARANTEE
Products like seeds, fertilizers, pesticides	A certain yield
Food packaging	A specific shelf life
Computer packaging	Safe delivery of equipment
Water treatment chemicals	Clean water
Industrial lubricants	Guaranteed machine service hours
Tires	Tire mileage
Paints	Years of preservation/aesthetics solutions

Build More Resilient Business Models

Technology and connectivity are making new business models possible—and the changing reality reflected in the five megatrends is making them necessary. To meet the growing demand for innovation, efficiency, and delivering outcomes, chemical companies can explore new ways of working—and build the resilience needed in a changing world.

Today, activist investors already are pressuring chemical companies to re-think their business models—witness the moves made by Dow, DuPont, Ashland and Air Products. But as they weigh those pressures, executives should look farther ahead.

With shareholder activism a reality in the industry, companies can build on that energy to propel more strategic change—to allocate cash to new business capabilities, new technologies and new ways of serving customers. Taking a longer view of the business-model question can help companies develop models that build on their core strengths, rather than trying to be "all things to all people" through various businesses. And it can help companies focus their acquisition efforts on the right targets, defend against activist investors and boards, and achieve strong market positions.

To support new business models, chemical companies can broaden acquisition strategies to include peripheral and niche companies that have unique technologies, services or sales channels. This will mean having to assimilate and integrate unfamiliar business model frameworks into the company. In addition, by forming partnerships with companies outside of the industry, chemical companies will be better equipped to compete by bringing stronger marketing and customer-relationship expertise to the table. With such partnerships, companies can work with a broad ecosystem of partners to deliver outcomes to customers.

More and more companies are leveraging information technology to enable new business models. With the emergence of industry technology platforms, partners can easily create connections with one another. These platforms are already having an impact. In Accenture's cross-industry research, 39 percent of surveyed executives said they are using industry platforms to integrate data and applications with digital business partners; 35 percent said they are experimenting with such platforms. In addition, eight out of 10 executives believe that such platforms will dramatically blur traditional industry boundaries in the coming years.[7]

In exploring new business models, companies should make resilience a basic watchword. Being resilient will mean being able to make rapid decisions to rebalance the company portfolio when markets change, anticipate and adjust to future customer needs, and enable flexibility in the value chain. It will mean being able to scale down when sales decline, and then quickly scale up when they rebound. And it will mean being able to drive strong operational performance and minimize costs to keep pace with the competition—not to mention manage the impact of activist investors. Overall, resilience is the quality that will enable chemical companies to thrive in the face of change and, often, increasing risk—and ultimately turn disruption into opportunity.

Key Questions

1. Who will your competitors be in a networked, outcome-oriented industry?
2. What business model will meet today's demands for shareholder value and tomorrow's strategic needs?
3. What will your company's business model look like if the core business is outcomes, not chemicals?
4. How resilient is your business—and how can you increase resilience?
5. What happens to your products in a truly circular economy?

Ride the Tide of Rising Expectations

The most successful and resilient businesses have one thing in common: they consistently find ways to meet or exceed customer expectations. And with megatrends changing the nature of markets and consumers, doing so is only becoming more important, and more challenging.

In this new environment, companies will need to build "customer stickiness." That is, they will need to look beyond the fundamentals of price and quality, and find ways to further differentiate themselves, build trust and keep customers coming back. Here, the ability to deliver outcomes, as opposed to products alone, will be key for many companies. This could mean offering customers a guaranteed shelf life for their food products, rather than just selling them packaging; or selling total water-cycle management services or water-neutral solutions, rather than just water treatment chemicals.

Customers often expect a business-to-consumer (B2C) experience in a business-to-business (B2B) transaction. Today, many chemical companies recognize the need to adapt to this new reality. In an Accenture survey, 81 percent of respondents said that providing a personalized customer experience is among their top three priorities, and 60 percent are seeing a positive return on investment (ROI) from personalization technologies.[8] For example, AkzoNobel's Visualizer app gives customers the ability to see how the company's paint will look on their walls. Customers can then order samples to be delivered to their homes. Personalization can be effective with channel partners as well as consumers. Chemical companies could, for example, integrate their systems with those of their dealers, distributors and manufacturers to provide those partners with customized ordering and services—and help drive increased retention and share-of-wallet with partners.

As global competition increases, loyalty among chemical company customers is likely to decline, as those customers find a widening array of options when choosing suppliers. This situation will be amplified in North America due to the significant new supply sources coming online over the next several years. More supply means even more customer choice and power, so companies will need to build more stickiness to keep customers satisfied. The drivers of customer stickiness will differ depending on the company and industry segment in question.

Overall, companies can get closer to customers by using digital technology that makes it easier to do business with the company. They can connect and work with their ecosystem of partners to meet the full range of customer needs and provide outcomes that customers want. They can use "social listening" and data analytics to help their customers anticipate what their end-customers will want in the future. And to stay in step with rising expectations, companies can give their B2B customers the online B2C tools they are accustomed to, such as product search and configuration, comprehensive catalogues, easy transactions and so forth.

Key Questions

1. What can you do to differentiate your products and build customer stickiness?
2. How could you use digital technology to anticipate your customers' customers' needs?
3. What could you do to make it easier to do business with your company?

Connect and Collaborate for Innovation

Like chemical companies themselves, chemical company customers will find that the five megatrends are changing the fundamentals of their businesses. As a result, they will expect the industry to come up with new ways to support the innovation, reliability, consistency and quality that they need in today's evolving markets.

A recent study by Thomson Reuters indicates that chemistry and materials science together are at the top of the list in emerging new research; the study further concludes that the chemical industry is key to the world's future.[9]

To reach its full potential in that regard, the industry needs to shed its traditional research and development (R&D) model and embrace a new one that can drive better, faster innovation. The traditional R&D model has typically been:

Closed. Involving a well-defined, isolated R&D function.

Slow. A linear and carefully controlled process, along with a focus on safety, incremental improvement, risk avoidance, rigorous process rules, stage gates and milestones.

Predictable. Based on regular budgeting cycles with expected, pre-defined outputs.

This traditional approach has been effective, and indeed, it is likely to remain key to certain aspects of innovation. However, its speed and scope is by nature limited. In the emerging world of rapid innovation, the approach will need to be augmented by other processes that are less structured and more flexible. Thus, the new R&D model will need to be:

Open. Innovation can come from anywhere and involve collaboration with a variety of partners through open systems and extensive information sharing.

Agile. Rapid innovation is enabled by processes that can be adjusted quickly to changing demands, so the company does not lose out to new and more-innovative competitors.

Disruptive. Incremental improvement remains vital, but companies can also proactively pursue innovation on a wide range of fronts that can change the competitive landscape.

This new approach will require "connected innovation" that breaks down internal silos to include more parts of the organization in the innovation process. Companies will need to do the same with external boundaries to create an innovation ecosystem—an extended network that includes alliance partners, universities, entrepreneurial companies, customers and customers' customers. This type of collaboration is rising in industrialized countries. Our patent analysis shows that the share of patents filed by single companies (as opposed to joint innovations) decreased by 25 to 30 percent in the past decade.

Digital technology will play a key role by enabling these connections and giving virtual teams the collaboration tools needed to work together seamlessly. Instead of R&D being an isolated function, it will be the center of a web of flexible partnerships that lets companies draw on a range of knowledge and resources to speed up innovation and pivot quickly to exploit new opportunities.

This approach will require looking well beyond the horizon. Simply being a "fast follower" will no longer be a sound strategy. Instead, companies will need to explore entirely new ideas that may be unrelated to their current product—or that even render that product obsolete. Case in point, the LEGO company announced that it is planning to stop using acrylonitrile butadiene styrene (ABS) plastic and replace it with a sustainable, non-petroleum based product by 2030.[10] Other companies that purchase plastics may follow a similar course. To take advantage of this opportunity, chemical companies will need to hire scientists with a more varied set of technical skills (such as biotechnology)—and they need to start that hiring now.

In addition, companies will need to "think beyond the chemistry." That is, they will need to explore innovations in areas such as process and delivery, and look for ways to offer total solutions that combine products and services that deliver outcomes customers want.

The innovation ecosystem represents a fundamental shift from current industry practices, and many companies will want to take an evolutionary approach to getting there. That might mean starting with corporate venturing and investments in partner companies, focused innovation incubator centers, and joint innovation or co-creation agreements with other companies. Certainly, building the innovation ecosystem will take time, but executives can start planning a path forward now.

Key Questions

1. Who are your trusted partners for more open, agile and disruptive innovation that are ready to participate in an innovation ecosystem?
2. How are you thinking "beyond chemistry" and shifting from creating products to creating outcomes?
3. What are your new talent requirements for faster innovation?

Make Operations Wired and Data-Driven

Years of process improvement have brought high levels of safety and efficiency to chemical operations. However, megatrends such as changing resource availability and the need to operate in emerging markets are constantly raising the bar for operational excellence.

So, too, is the need for new business models and rapid innovation. In an Accenture/ICIS survey, nearly nine out of 10 chemical industry executives said that operational excellence will be important or extremely important in the coming years. Those executives also said that achieving operational excellence could add about 7.5 percent to the bottom line, on average. That would translate to an increase in global industry profits of some US$50 billion.[11]

The importance of operational excellence is clear when looking at unplanned outages. These outages are a growing problem in US and European chemical plants, and they are reaching new highs for some. This issue stems from higher operating rates, greater complexity in plant controls, changing workforces and aging facilities. The average age of ethylene crackers is 32 years in North America and 38 years in Western Europe.[12] Accenture estimates that a shutdown of a world-scale cracker in the US could mean lost opportunity of about US$1 million per day in cash margins.[13]

Digital technology is an increasingly critical key to addressing such issues. Indeed, Accenture analysis shows that higher-performing chemical companies tend to embrace a broader scope of digital technologies in their plants, compared to lower performers. With the ever-growing need for greater operational excellence, the ability to leverage digital technology in plants and the supply chain will be a basic, table-stakes necessity.

The IoT, in particular, can be a powerful enabler of operational excellence. Researchers project that by 2020, the IoT will include some 212 billion sensors and 50 billion devices. The IoT is bridging the "last mile" between the digitally enabled enterprise and the physical world, while blurring the boundaries between the two. As a result, IoT is making it possible for interconnected systems to seamlessly support activities across the business and the supply chain, bringing increased visibility into products, processes, customers and partners.

Networked systems and the IoT make it possible to bring new levels of efficiency, collaboration and flexibility to the supply chain, and to tap into a wealth of information about operational processes. Companies can use this information to increase the efficiency and effectiveness of operations, while driving better decision making in everything from manufacturing to the supply chain and marketing.

The impact of digital technology will be especially significant in chemical plants. With an IoT sensor-enabled environment gathering a wealth of plant data, companies can automate more processes and have real-time insight into operations to increase uptime and reliability. Analytic tools can use that data for predictive maintenance. Companies can also integrate scheduling and planning using cloud technology; establish remote operations centers; use drones to conduct routine visual inspections; and deploy mobile technology to help field operators make more timely decisions. The possibilities are virtually endless.

Lastly, chemical companies can reap tremendous benefits from the integration of the digital plant with enterprise systems. This type of integration can lead to better execution of business and operational processes. It can also enable more automation and speed up communication and decision making within the plant and across plants.

Key Questions

1. How much could investments in operational excellence add to your bottom line?
2. How much could you save by investing in operational excellence to lower outages?
3. What are your strategic plans to further your operational excellence with digital technology?

Design the Workforce of the Future

There are waves of change headed toward the chemical industry in terms of talent and skills. Preparing for these changes will be key to navigating through the five megatrends and pursuing the CEO Agenda items—to working with new business models, pushing innovation to a higher level, fully utilizing digital technology and meeting customer expectations.

All of these goals depend on talent—and here, the chemical industry has several fundamental challenges.

First, despite the lure of healthy salaries, benefits and promising career paths, Accenture experience shows that many companies are struggling to get the talent they want.

What's behind this struggle? A key factor is long-standing public misconceptions about the industry's safety record and environmental impact. In spite of efforts to remedy these perceptions, chemical companies have a long way to go.

It is clear that the industry needs to be more effective at changing such perceptions, and implementing new human resources strategies for attracting, cultivating and retaining an effective workforce. Accenture research identified several criteria as being most important to recent graduates. Aside from salary and benefits, recruits want interesting work, mentoring, flexible work hours and opportunity for rapid advancement.[14] The industry will need to adjust to those expectations.

The second basic challenge involves the other end of the talent lifecycle. Boomers are exiting the workplace in large numbers, and with them go decades of experience, knowledge and trusting customer relationships developed over years.

At the same time, evolving digital technology will continue to call for new skills, such as in predictive analytics, artificial intelligence, cyber security and operations technology. The emerging digital reality will also create the opportunity to think differently about how work is organized, how it is performed and who performs it. Already, many companies are using end-to-end workforce management solutions that provide insights into workforce capabilities and readiness; others are turning to predictive analytics to help them make better hiring and promotion decisions.

Looking ahead, increased automation built on IoT, analytics and cloud technologies will help relieve skill shortages and enable workers to focus on more value-added and personally rewarding work. There will be more "self-directed work" as automation and workers are brought together to perform tasks. Employees will use mobile and wearable technologies to interact with sensors, robots and other systems around them. Mobile and collaboration technologies will also enable companies to make the most of employee skills, while enabling greater work flexibility—a quality valued highly by younger workers, and thus a potential key to future recruitment and retention.

Companies will also need to cast a wider net in the future. Historically, the industry workforce has consisted of employees and contractors closely associated with the company. The emerging paradigm looks very different and relies on a "liquid workforce" approach to fill skills gaps. Companies will still have an employee and contractor base, but they will have to have a more flexible workforce including freelance engineers, researchers, students and strategic-partner employees in the mix.[15]

Overall, by rethinking their approaches to talent, chemical companies will have the opportunity to increase their resilience through a "people first" approach—one that fosters a change-ready workforce and the ability to access critical skills sooner, innovate faster and operate more effectively.

Key Questions

1. In the digital era, how will you compete for the best talent against more attractive technology companies like Google or Amazon?
2. With a liquid workforce that is more fluid and mobile, how will you use technology and knowledge-management resources to maintain and exceed your current standards of excellence?
3. What can you do to remake the chemical industry's image in order to compete for younger workers?

Conclusion

Chemical companies face a range of disrupting factors, from dwindling resources and changing customers to advancing digital technology and ongoing volatility—all taking place at an increasingly rapid pace.

Some of these present serious challenges to health and well-being around the world. But others offer new opportunities for the companies that understand and meet the evolving needs of global markets—and chart a clear course forward.

To win in the coming years, chemical companies will need to consider new approaches to customers, business models, innovation, operations and the workforce.

They will also need to take advantage of evolving digital technologies to drive higher levels of business performance. Implementing these new approaches will take time, which means chemical companies should begin sooner rather than later. Those that do will be in position to build a more resilient business—and forge a bright future for themselves, for the industry and for the world.

RESEARCH

Research Methodology

The Accenture Chemicals leadership team collaborated with Accenture Research to develop the Chemical Industry Vision 2016.

We began with secondary research of various sources, synthesized the results into a collection of major industry and company trends, and identified emerging technologies that will have an impact on the industry. Our industry strategists and consultants refined these findings via discussions with chemical company executives in major industry hubs around the world. Additionally, the findings were field tested at four industry events between October 2015 and early 2016.

This research will be updated regularly, providing the backbone for future deep-dive research over the next several years.

References

1 ©FAO 2012 "Water at a Glance: The relationship between water, agriculture, food security and poverty," page 3, 2016. http://www.fao.org/nr/water/docs/wateratglance.pdf

2 2030 Energy Strategy, European Commission. 9/11/2015. http://ec.europa.eu/energy/en/topics/energy-strategy/2030-energy-strategy

3 World Urbanization Prospects, United Nations, 2014

4 Stockholm International Peace Research Institute; 13 Apr. 2015: "US military spending falls, increases in eastern Europe, Middle East, Africa and Asia says SIPRI." http://www.sipri.org/media/pressreleases/2015/milex-april-2015

5 IBID

6 "Airplane Coatings Help Recoup Fuel Efficiency Lost To Bug Splatter", Chemical & Engineering News, June 29, 2015. http://cen.acs.org

7 "Accenture Technology Vision 2016: People First: The Primacy of People in a Digital Age" Accenture, 2016. www.accenture.com/techvision

8 IBID

9 The World in 2025, Thomson Reuters, 2014

10 LEGO to replace oil-based plastics" by Alex Scott, Chemical & Engineering News, June 29, 2015. http://cen.acs.org

11 "Rich Pickings Lie Within Easy Reach" ICIS Chemical Business, May 11-17 2015. www.accenture.com

12 Accenture Research analysis of ICIS Consulting data.

13 Accenture Research estimate based on the analysis of Nexant data for July-August 2015

14 Accenture 2015 College Graduate Employment Survey

15 Accenture 2014 Volatility and Agility Study; Accenture Technology Vision 2015, January 2015; Accenture Strategy, The Rise of the Extended Workforce 2015

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