THINK ACT

BEYOND MAINSTREAM

July 2016

Master the maze

Formulating a winning digital strategy in chemicals

Roland Berger

DISCOVER YOUR DIGITAL ESSENCE
→ P. 11

THE BIG 3

4.0

The chemicals industry has entered a new age in which digitization is one of the driving forces. Welcome to Chemicals 4.0.

Page 4

59%

of chemical companies recognize the importance of digitization for their business. Yet half of all respondents say that they are not in a position to address this potential.

Page 3

65%

One company achieved 65% growth in its market value in just five years, partly thanks to its early mover strategy on digital.

Page 7

Digitization has the potential to disrupt every part of the value chain. Yet most chemical companies are struggling to master the digital maze.

Digitization. The word seems to be on everyone's lips, from market pundits to industry thought leaders. But what does it actually mean in practice?

Rather than a homogeneous set of new technologies, digitization is the coming together of different approaches that open up new possibilities. Big Data, neural networks, diagnostic algorithms, customer behavior tracking, word streaming, community creation, cloud sourcing. A giddying collection of "new" capabilities that turn 21-year-olds into billionaires – and leave many executives in the chemicals industry wondering whether something fundamental is happening to the asset-intensive industry that they used to know.

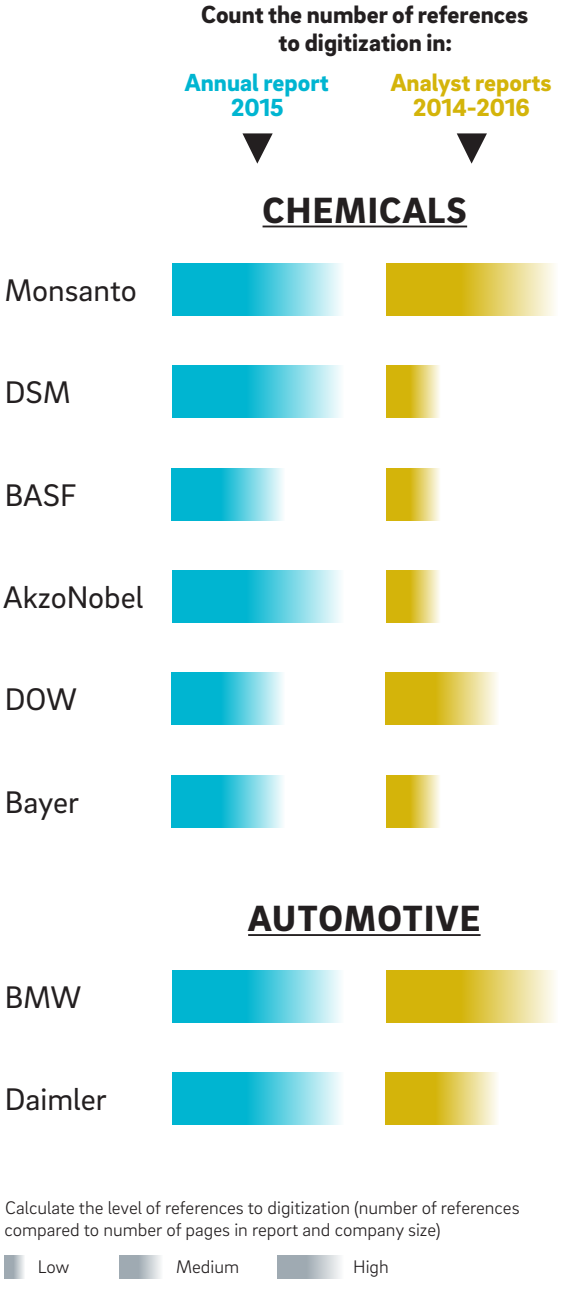
In this paper we set out a framework to help you think through your approach to digital. In a recent survey we found that almost 60% of chemical companies recognize their need for a digital strategy. But half of the respondents also acknowledged that they did not have the capabilities necessary to think through the problem and to link the agenda to their overall business strategy.

We call this paper "Mastering the maze" because we see a basic conundrum facing executives. Dismissing digital as just hype is incredibly tempting – in the world of chemicals, yield, asset utilization, working capital management, and pricing are the essential disciplines and mastery of these leads to success. Uber, Google, Facebook, and eBay are interesting, but it is difficult to draw meaningful parallels to the essence of process industries. Yet the nagging thought abides: Is there hidden value here that I have yet to discover?

A

GROWING AWARENESS

Digitization has begun to enter chemicals from the inside and outside perspective



Source: Barclays, UBS Research, Société Générale, Deutsche Bank Research, Credit Suisse, JP Morgan, BMO Capital Markets, Morgan Stanley, Raymond James, RBC Capital Markets, annual reports 2015

In an industry of the size and potential of chemicals, it's not surprising that the radical breakthrough represented by all things digital is generating a mass of hype. The chemicals industry is currently worth an estimated EUR 2.3 trillion and that could potentially grow to a staggering EUR 5.6 trillion by 2035. In our recent THINK:ACT study Chemicals 2035 – Gearing up for growth we explore how the industry has passed through a series of different cycles over the years. Having experienced a period dominated by mergers and acquisitions in the field of life science, we believe that the chemicals industry is now entering the age of digitization. Innovations are springing up at every turn: cheap sensors that constantly monitor product qualities, precision agriculture, 3D printing, digital tools in sales and to create even more transparency on market price data, predictive analytics in areas such as maintenance. By analogy with Industry 4.0 – the fourth industrial revolution – we call this new age *Chemicals 4.0*.

With its dramatic implications for the competitive industry landscape, digitization has made it firmly onto the agenda of most CEOs in the chemicals industry. An examination of the number of references to digital topics in the 2015 annual reports of sample companies proves to be true. Industry leaders recognize that digital technologies have the potential to drastically transform the value chain, from R&D, supply chain, and production to services, marketing, and sales. This is the internal view, so to speak. The external view, as revealed by the number of references to digitization in analyst reports from 2014 onwards, is rapidly coming into line. Moreover, a comparison with the automotive industry, where internal and external awareness are stronger, indicates that we can expect to see growing awareness in chemicals too. → A

Chemicals 4.0 is not just about firms adopting innovative technologies, however. Players that wish to remain competitive need to formulate a winning digital strategy. The question is, how can firms separate the reality from the hype when choosing the right approach? What, in a nutshell, is the key to mastering the digital maze?

Evolutionary or revolutionary approach?

Take the best of both worlds – a two-handed approach that combines one and the other.

EVOLUTION OR REVOLUTION?

What are the strategic options available for companies to master the digital maze? When hammering out a digitization strategy, most players think in terms of two possible options: evolution vs. revolution. In other words, adopting proven technologies within the industry norms (an evolutionary approach) versus disrupting the conventional industry structure with breakthrough innovations or procedures (a revolutionary approach). → B

An **evolutionary** approach is the more obvious strategy in chemicals. This is the pathway chosen by the majority of large players acting in heterogeneous market segments. These firms recognize that the future of the industry is difficult to predict and choose a strategy of step-by-step digital transformation. They begin by boosting their digital processes, streamlining and automating their core and non-core processes. They focus on process-heavy functions requiring human intervention. This is followed by incremental improvements in their competency, which may ultimately result in developing new business models based on their established capabilities.

The second option – a **revolutionary** approach – is not feasible for the majority of the industry. We currently only see this strategic path in the area of chemicals distribution. Here, experienced executives from the chemicals space are joining non-traditional players such as Amazon and Alibaba. The non-traditional players are approaching the distribution associations to identify areas of cooperation. Their revolutionary approach is forcing traditional firms such as Brenntag, Univar (ChemPoint) and Azelis into a proactive position.

Selected chemicals distribution players are making big bets by investing in B2B electronic exchange platforms. Their shareholders and executives have understood that their business model may change fundamentally in the near future.

But there is also a third option, one which combines the best of both worlds. We call this a **two-handed** approach. This approach is most frequently seen for

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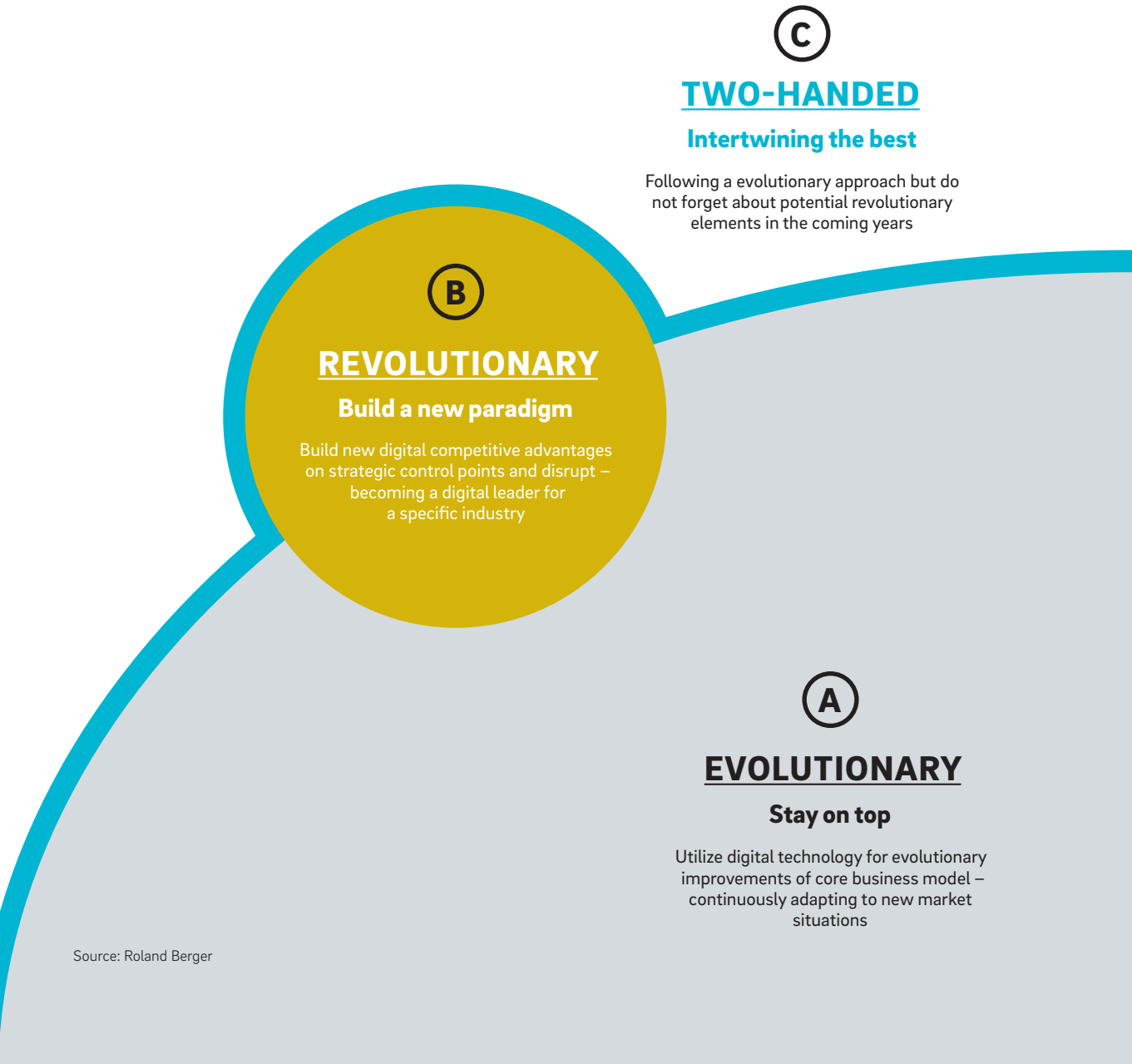
THREE STRATEGIC APPROACHES IN DIGITIZATION

Chemical players need to stay on top of their markets and build new digital competitive advantages to extend their core competencies



Source: Roland Berger

selected specialty chemical players. Firms adopting a two-handed approach identify digital "value pockets" and work on tangible results along the value chain. They stay on top of their industry while driving the disruption of the market. In other words, they intertwine the two approaches, using digital technologies for evolutionary improvements while at the same time building new, revolutionary digital competitive advantages in selected segments.

How does the chemicals industry break down in terms of its current response to digitization? Our research shows that around 70% of companies take an evolutionary approach, with just 20% taking a truly two-handed approach. The remaining 10% of companies are busy analyzing options but have not yet implemented any changes – the worst of all possible worlds. → C

Why do the majority of companies currently choose an evolutionary approach? One reason is the heterogeneity of their customer industries and product portfolios. It is more than understandable that you may be lost in the labyrinth of digital options if you cover several steps in the chemicals value chain and serve a dozen or more different industries from different business units on the basis of multiple applications.

Another reason may be lack of access to end customers. Integrated chemical players covering the whole chemical value chain have limited knowledge about how their products are actually used. In some cases, the companies they supply may actually want to protect this knowledge and deliberately not share it with their suppliers – paints is an area where we have seen this happening, for example. This lack of transparency makes it very hard for the firm originally supplying the chemicals to take a truly revolutionary approach.

By contrast, chemical companies with a clear focus on homogeneous end markets or a high level of customer intimacy and access tend to be more agile in exploring digital opportunities. The reason is obvious: There are immediate benefits for their customers – as in the case of agro-chemicals, construction chemicals, food/nutrition, and personal care.

Last but not least, large, multi-billion-dollar firms often find it difficult to change their business model entirely, especially when they have been working this way for, in some cases, a hundred or more years. Neither their corporate culture nor their incentive structure are designed for agile change. However, AkzoNobel shows that it is possible. The Dutch multinational used the potential of a fresh start after a successful restructuring process to introduce a two-handed approach to digitization. The strategy they chose involved shifting the business units closer to homogeneous end markets while retaining an evolutionary approach further up the value chain.

Even companies that choose to follow a basically evolutionary approach due to the nature of their business should not forget about potential revolutionary elements in the coming years. They should aim to become two-handed players, like AkzoNobel.

The problem is that developing such a vision can be highly challenging. In the chemicals industry, with its wide range of different products and applications, companies need to develop their own forward-looking vision. And that is where following a systematic methodology such as our Digital Transformation Approach – which we present in detail below – can prove extremely useful.

MONSANTO: A TWO-HANDED APPROACH PAYS DIVIDENDS

Multinational agrochemical and agricultural biotechnology company Monsanto is a highly focused specialty player that has chosen a pathway intertwining evolutionary and revolutionary strategies in a two-handed approach.

Since 2011 the company has made a series of digital acquisitions, gaining competencies in areas such as seeding control systems, Big Data-optimized seeding, hyper-local real-time weather monitoring and simulations, advanced analytics to optimize yield, and systems for capturing agronomic data. It has scaled up its capabilities in the collection and storage of data, Big Data analytics, value-added services, targeted marketing, and new business models. In so doing it has accomplished an impressive digital transformation, including a step up in its data availability and usage, a digital-driven set of KPIs, a new organizational setup and processes, and – vitally – a shift in mindset and culture within the company.

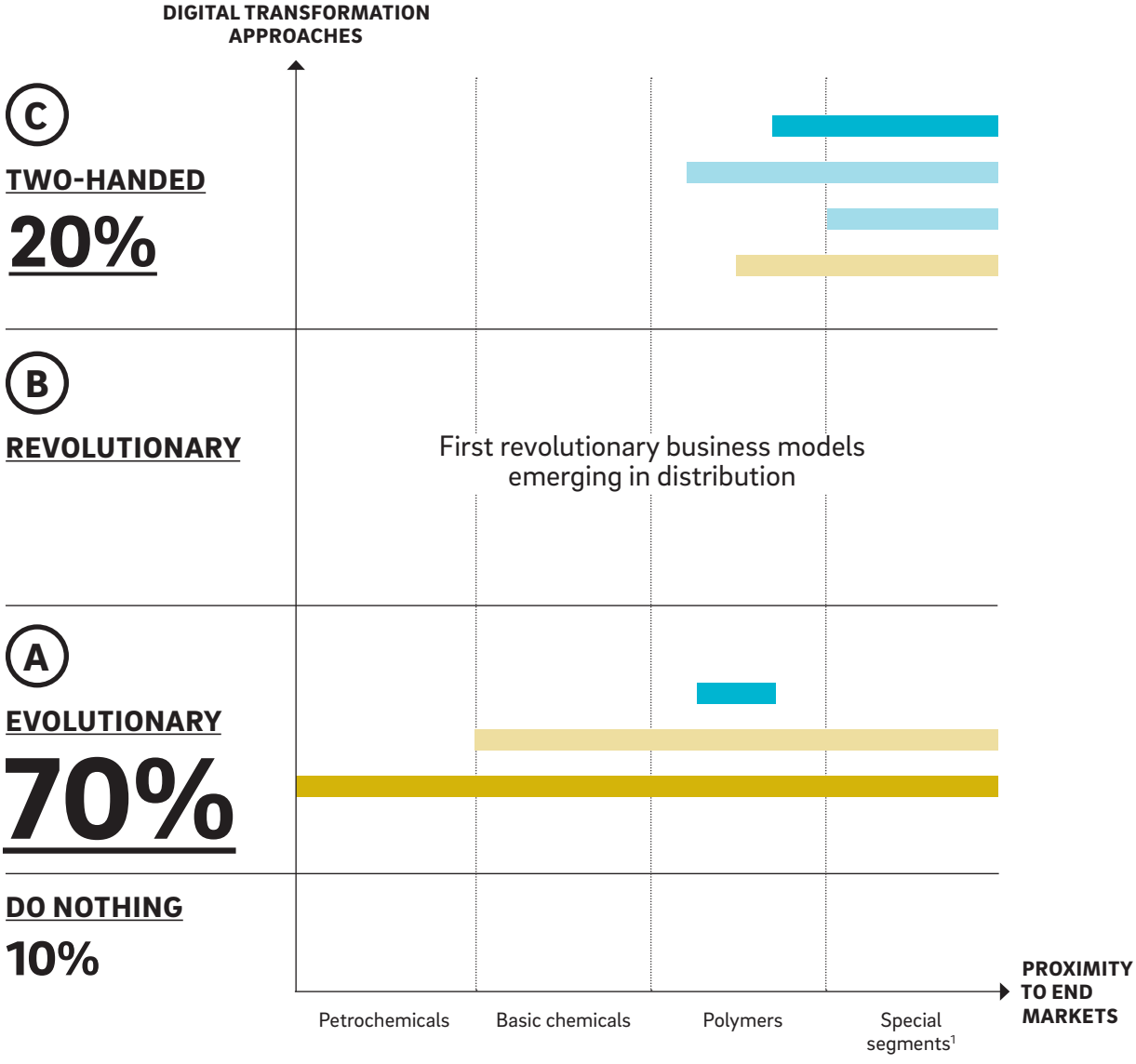
Monsanto's bold step into the digital arena has paid off handsomely. The firm saw revenues up USD 3.2 billion between 2011 and 2015. Moreover, the takeover bid by Bayer in May 2016 indicates that the company's market value has grown by USD 24.5 billion since 2011 – an increase of 65% in just five years.

Not only that, Monsanto has put the rest of the agrochemicals industry on the back foot. To remain competitive in the next five to ten years, its peers will either have to follow or react.

C

PLAYING IT SAFE

Most chemical companies take an evolutionary approach



1 Coatings; Agrochemicals; Construction chemicals; Personal care chemicals

Source: Roland Berger

Discover your Digital Essence. This is what enables you to identify value pockets and find a path through the digital maze.

THE ROLAND BERGER DIGITAL TRANSFORMATION APPROACH

How can companies turn themselves into skillful two-handed players? We have devised an effective three-stage Digital Transformation Approach for chemical companies to define a clear vision and execute a digital agenda for their business. It enables players to chart a path through the digital maze.

STAGE 1: Define your Business Essence and develop a future vision for your end markets.

This stage involves defining your core competencies in relation to the needs of your market, drawing up future scenarios for digitization with regard to industry trends, evolving customer needs, competitor behavior and key technologies, and integrating the customer's voice and perspective. The deliverables are a map of your core competencies and a picture of the agreed future scenario or scenarios in your end markets.

We call this map of core competencies your Business Essence. Business Essence describes a set of combined or "stacked" core competencies that is difficult to replicate, creating a basis for sustainable competitive advantage (for more discussion on this concept, see Know Thyself – Delivering profitable growth – The elusive frontier: Part 1). We use Business Essence as a tool at the start of our corporate and growth strategy process to help develop a common understanding across the organization of the firm's capabilities that help create, capture, and defend value.

Business Essence is central in the digital context because it helps firms focus their capital resources on efforts that enhance their existing competencies or address their competency gaps. It gives their digital efforts strategic intent. Furthermore, it ensures that the potential extension of the product portfolio or value chain participation through digitization is in line with the company's business model.

The other essential part of Stage 1 is defining future scenarios for the industry. This step is nothing short of mission-critical: Without a clear vision of the future, it is impossible to define a revolutionary digital pathway. To this end, we bring together the brightest minds from industry – futurists, innovators, entrepreneurs – and put them in a room with the company's managers, key stakeholders, and customer groups. Listening directly to customers helps understand their needs and how those needs are evolving over time. It also sheds light on industry trends such as regulation, and reveals if customers are building competencies that the company cannot address at present. Next, we look at what the company's competitors are doing: Do their actions represent a true threat? Finally, we draw up a picture of the company's potential future over the next five to ten years, defining the implications of their core strengths and competencies and identifying any possibly disruptive game-changing technologies and/or business models.

SIGN IN TO OUR DIGITAL PATHFINDER

With the Roland Berger Digital Pathfinder for Chemicals, we have developed an online tool for systematically identifying the digital competitive advantages and untapped potential of organizations. The Digital Pathfinder analyzes a firm's Business Essence and core competencies, identifying which digital value pockets along the chemical value chain it is actively pursuing. Using this information, the Digital Pathfinder then draws a map of the firm's digital strongholds and its as yet uncharted territories.

In addition, the tool determines your firm's Digital Maturity Index – a score based on how well your company meets key digital dimensions in the organization as a whole and in its individual departments. This added transparency forms the foundation for an objective evaluation of how your company's current capabilities match the digital initiatives it is undertaking. We then use all this information as the basis for deriving an optimal, tailor-made digital agenda.

Please follow the link to find out more and sign in to the Roland Berger Digital Pathfinder for Chemicals.

→ **www.digitalpathfinder.org**

STAGE 2: Identify value pockets and your Digital Essence. The second stage of the Digital Transformation Approach is known as the Pathfinder phase. It involves outlining the company's Digital Essence (see below), identifying which digital value pockets are relevant to the company's business along the value chain, and defining the "size of the prize" for each of these value pockets.

Looking at the company's Business Essence, we can draw up a catalogue of examples. In the realm of fundamental knowledge, for example, the firm may have core competencies in molecular design, technical in-use knowledge, regulations, regional market knowledge, and knowing global from local. In the area of physical capabilities, it may have a core competency in make vs. buy. The Digital Pathfinder then shows us that the firm's value pockets are customer experience data use (e.g. it should introduce a customer feedback tool that collects real-time data on customer experience) and the use of tailored, media-rich product demonstrations for specific local markets.

If the firm's fundamental knowledge relies on a deep understanding of compatibility and the interactions between multiple materials, and its physical capabilities are in the area of quickly solving customer requests or problems, the digital value pockets could include performance predictions for products using a dedicated advanced analytics tool, or bundling products within a product cart analysis based on customers' buying histories to ensure the firm was leveraging cross-selling potential.

In the realm of physical capabilities, a company may have competencies in sourcing, asset management, production scale, and efficiency. The digital value pockets of interest would then be demand forecasts, predictive maintenance sensors, and inventory optimization.

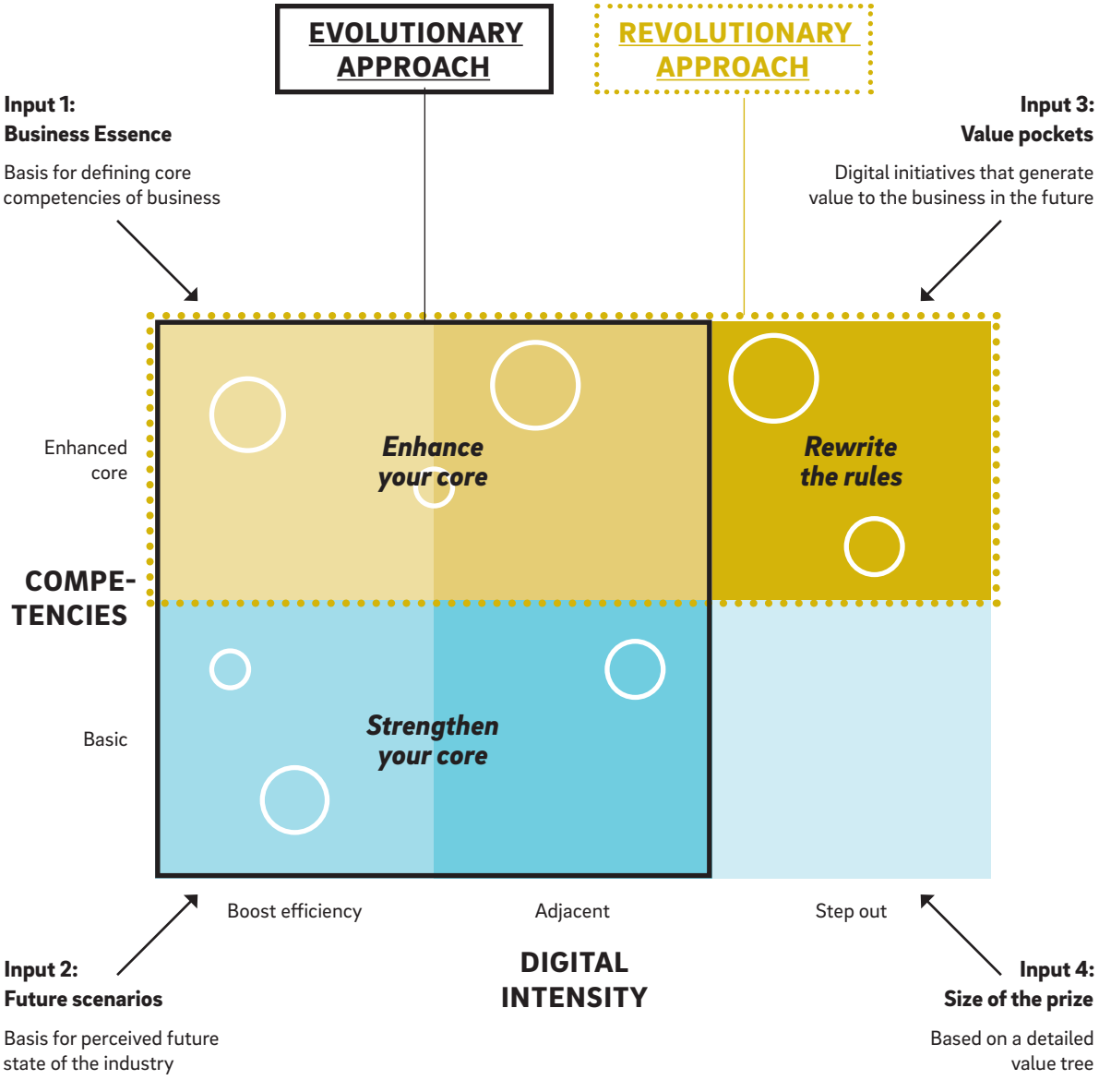
Unfortunately digitization is not logic like math. But it's also not a complete crapshoot. The catalogue of a company's competencies allows us to identify the value pockets for digitization. By this means we can provide the company with a clear path through the digital maze and define a robust digital agenda.

The Business Essence, future scenarios, value pockets for digitization, and size of the prize can then be mapped onto a Digital Essence Matrix. This matrix shows which initiatives have the greatest potential. A Digital Essence approach is one in which digital efforts are focused on activities that reinforce the company's

D

DIGITAL ESSENCE MATRIX

Your Digital Essence shows you the way through the digital maze



Digital value pockets. Size of bubble represents size of the prize

Source: Roland Berger

E

DIGITAL INITIATIVES IN ...

Each part of the chemical value chain already is or will be affected by digitization. Here are some successful industry examples of how to react.

REAL-TIME PRODUCT TESTING

One global consumer goods player and its chemical suppliers have introduced a customer feedback tool in drugstores that collects real-time data on customer experiences with body lotion. The firm then shares this data with its chemical suppliers, helping develop customer-oriented product solutions and technologies.

SALES

A US formulator of paints and coatings has introduced a color-matching app for mobiles and tablets. The tool captures colors from surroundings and matches them to the firm's own paint colors. The firm has also partnered with an online home furnishings retailer to help customers match paint colors with furniture, décor, and bedding. Millions of users have installed the app around the globe.

INVENTORY

A leading global chemical company has initiated digital actions to reduce inventory and improve supply reliability. Initiatives include creating real-time transparency over inventory at terminals, digital tank sensors, forecasts of available stocks per terminal and tank, and a new process in which selected customers receive discounts for managing their demand in line with the supply capacities.

RESEARCH & DEVELOPMENT

A world-leading supplier of high-tech polymers has launched an Internet-based open platform where it invites diverse external stakeholders to contribute to its product innovation. The firm uses the site to ask detailed product innovation questions and gather valuable feedback. In turn, the external stakeholders get the chance to contribute to product innovation and receive payment for their contribution, without being formal employees of the firm.

core competencies or develop new ones that enhance its competitiveness. It enables the company to stay on top of its industry while driving the disruption of its key markets – successfully navigating its way through the hype. → D

STAGE 3: Execute your digital value pockets at our digital hubs

The third and final stage of our Digital Transformation Approach involves achieving alignment within the company about the future digital agenda and defining the competencies that are required to ensure implementation. To do this, the company needs to open up the inspiration funnel and build fast-track implementation options.

A vital task here is to change the corporate culture and mindset. Companies that are caught up in the hype are often unable to think through the problem of digitization. To address this challenge, we develop the top management of the company into key promoters of the digital transformation. We do this at our Digital Boot Camp – a combination of classes, mobile learning, and hackathons. Offered by the Roland Berger Digital Academy, digital boot camps are comprehensive two- to four-day events for different hierarchical levels, spread over a total learning experience that lasts up to 90 days. We have tested the effectiveness of all our courses in process industries.

The deliverables in Stage 3 are more than just PowerPoint slides. We use approaches such as rapid prototyping, fast customer research, and quick start-up building to help the company begin to exploit its digital value pockets already, at least in the form of pilots that can then be rolled out to the entire organization.

Conclusion. How can chemical companies master the digital maze?

An evolutionary approach is one response, a revolutionary approach another. But with the right assistance companies can go one better: They can transform themselves into skillful two-handed players.

Separating the reality from the hype is no mean feat. Our Digital Transformation Approach can help companies formulate a winning digital strategy by identifying their core Business Essence and focusing investments on the value pockets that are really relevant for them. That way they can stay on top of their markets while building new digital competitive advantages – and in so doing navigate a winning path through the digital maze. ◆

THREE PILLARS OF INNOVATION

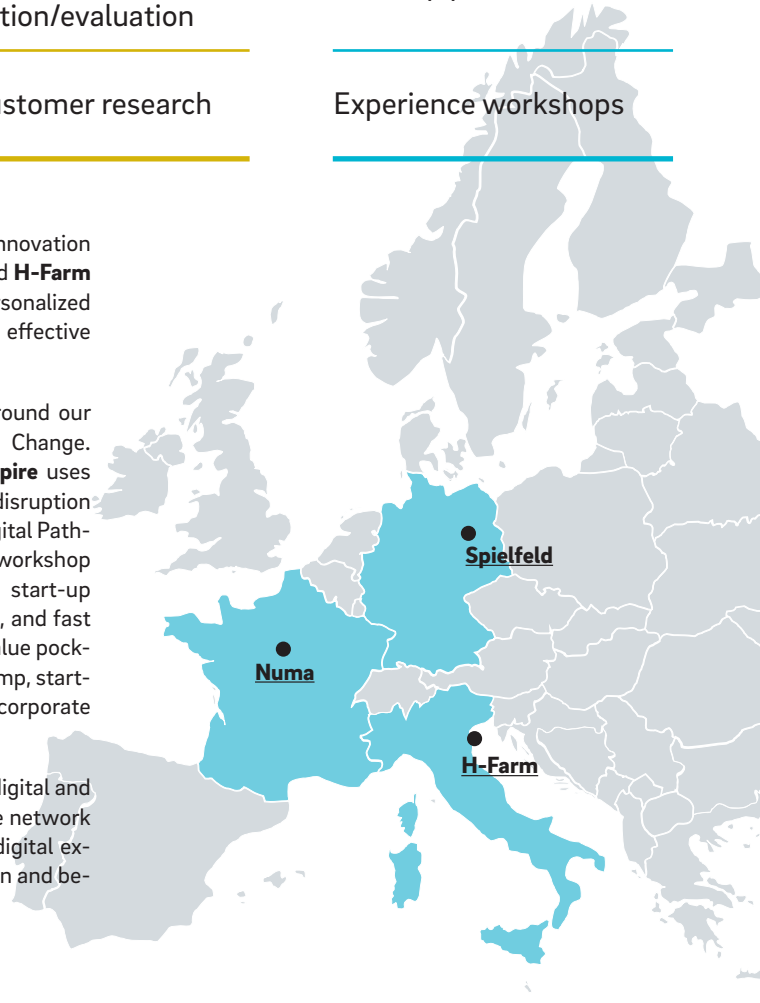
Be part of our digital hubs in Europe – also relevant for Chemicals too

1. INSPIRE	2. IMPLEMENT	3. CHANGE
	ROLAND BERGER TOOLKIT	
Hackathons	Rapid prototyping	Joint corporate teams in hub
Design thinking workshops	Quick start-up building	Digital boot camp
Digital disruption days	Fast internal idea generation/evaluation	Start-up pitches
Learning journey	Fast customer research	Experience workshops

Roland Berger has a number of dedicated digital innovation hubs in Europe: **Spielfeld** in Berlin, **Numa** in Paris, and **H-Farm** in Venice. At these centers of innovation we take a personalized approach to helping chemical companies become effective two-handed players in the digitization arena.

In the hubs we employ an execution toolkit built around our three pillars of innovation: Inspire, Implement and Change. Each pillar has a set of tools associated with it. **Inspire** uses hackathons, design thinking workshops, digital disruption days, and a learning journey. Your results from our Digital Pathfinder for Chemicals are a strong fundament for our workshop formats. **Implement** uses rapid prototyping, quick start-up building, fast internal idea generation and evaluation, and fast customer research to exploit and implement digital value pockets. And **Change** uses formats like the Digital Boot Camp, start-up pitches, and experience workshops to adapt your corporate culture.

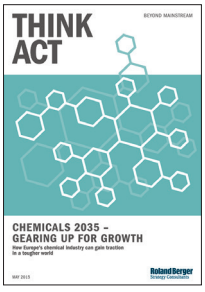
The teams at our digital hubs have their roots in the digital and innovation teams of Roland Berger, with an extensive network throughout the ecosystem. They work closely with digital experts, innovation ambassadors, and consultants within and beyond Roland Berger.



ABOUT US

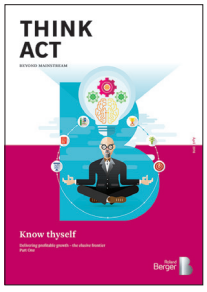
Roland Berger, founded in 1967, is the only leading global consultancy of German heritage and European origin. With 2,400 employees working from 36 countries, we have successful operations in all major international markets. Our 50 offices are located in the key global business hubs. The consultancy is an independent partnership owned exclusively by 220 Partners.

FURTHER READING



Chemicals 2035 – Gearing up for growth

The market for chemical products is expected to grow to some 5.6 trillion euros by 2035. But the industry's dynamism is set to wane: growing at an average annual pace of 4.1% now, the chemicals market will expand by just 3.6% per year between 2030 and 2035.



Know Thyself – Delivering profitable growth – The elusive frontier: Part 1

Discusses how companies can use our Business Essence framework to acquire a simple and true understanding of the business and its competitive advantage. We believe that this understanding is a vital prerequisite to successful growth – both organic and inorganic.

Beware the Similar – Delivering profitable growth – The elusive frontier: Part 2 (forthcoming)

Explores the dangers of businesses being seduced by similarity when assessing inorganic growth options. We help firms understand which of their growth options truly have value.

The Tortoise & The Hare – Delivering profitable growth – The elusive frontier: Part 3 (forthcoming)

Growth is emerging as a fundamental challenge for the chemicals industry. This publication explores the challenges and possible solutions for achieving profitable growth.

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