Business 4.0™

TATA CONSULTANCY SERVICES

BUSINESS 4.0™:

# DIGITALIZING AT SPEED IN LIFE SCIENCES AND HEALTHCARE

**Industry focus:**
**Life Sciences and Healthcare**

Winning in a Business 4.0 world:
A TCS study tracks the adoption and impact of Business 4.0

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usiness 4.0™ is the next wave of change breaking over organizations across the world. Digital technologies such as the cloud, the internet of things (IoT), analytics, automation, robotics, and artificial intelligence (AI) are vital enablers of this transformation, but it is not enough to use these to simply mechanize existing functions.

Instead, firms are using technology as a foundation for four critical business behaviors that will help them move to the next level:

**Driving mass personalization** – personalizing products and services to a market of one customer, often even of one transaction, and at scale.

**Creating exponential value** – adopting business models that leverage value from transactions at multiple levels and address new markets.

**Leveraging ecosystems** – collaborating with partners inside and outside the supply chain to create new products and services.

**Embracing risk** – moving beyond rigid planning and operational barriers with an agile strategic approach.

CS' global research shows the way forward by helping organizations benchmark their progress against peers.

Part of the TCS Business 4.0 Global Study, this report discusses the scale of adoption of Business 4.0 behaviors within the life sciences and healthcare sector, the benefits industry players have seen so far, and their near-term plans (three to five years) in this regard.

ABOUT THE

# RESEARCH

CS surveyed 1,231 respondents from firms across 11 industries and 18 countries. All firms included in the survey report annual revenues of at least $500 million. All survey respondents were either directly involved in or were aware of their firm's digital transformation plans.

The sample included 200 executives working in the life sciences and healthcare industry – 112 from healthcare (public and private), and 88 from life sciences. Almost half of the respondents (42%) were from the C-suite, while the rest were manager-level and above.

The survey was conducted in November–December, 2018. In addition, we conducted in-depth interviews with 30 experts and business leaders from across industries worldwide.

# KEY FINDINGS

Digitalization is creating unprecedented opportunities for life sciences and healthcare organizations. Cloud, IoT, advanced data analytics, and AI are transforming diagnosis and treatment in healthcare while enabling innovations such as digital clinical trials in the pharmaceuticals sector. Organizations across the board – including biotech companies, medtech brands, and public and private healthcare providers and payers – are leveraging these technologies to create new sources of value.

Our research indicates that this sector comprises organizations in all stages of digital maturity – from established businesses upgrading their legacy systems and practices, to digital-native startups. All of them are united in the urgency to adopt Business 4.0 behaviors and compete effectively in the digital era.

Our findings suggest that organizations that adopt all four Business 4.0 behaviors – driving mass personalization, creating exponential value, leveraging ecosystems, and embracing risk – who we refer to as the 'leaders', are more likely to anticipate and report strong financial performance.

**Leaders, early adopters, and followers**

We have identified three distinct groups in the survey, based on their adoption of Business 4.0 behaviors:

- **Leaders:** organizations that have adopted all four behaviors
- **Early adopters:** organizations that have adopted one, two, or three behaviors
- **Followers:** organizations that have adopted none of the behaviors

While most organizations are still at a relatively early stage of the Business 4.0 journey, we find that the 'leader' group is pulling ahead. Within the life sciences and healthcare sample, 9% of the respondents fall in this category, in line with the cross-sector average. Further, life sciences and healthcare organizations comprise 15% of the leader group, 16% of early adopters, and 16% of followers (see Figure 1).

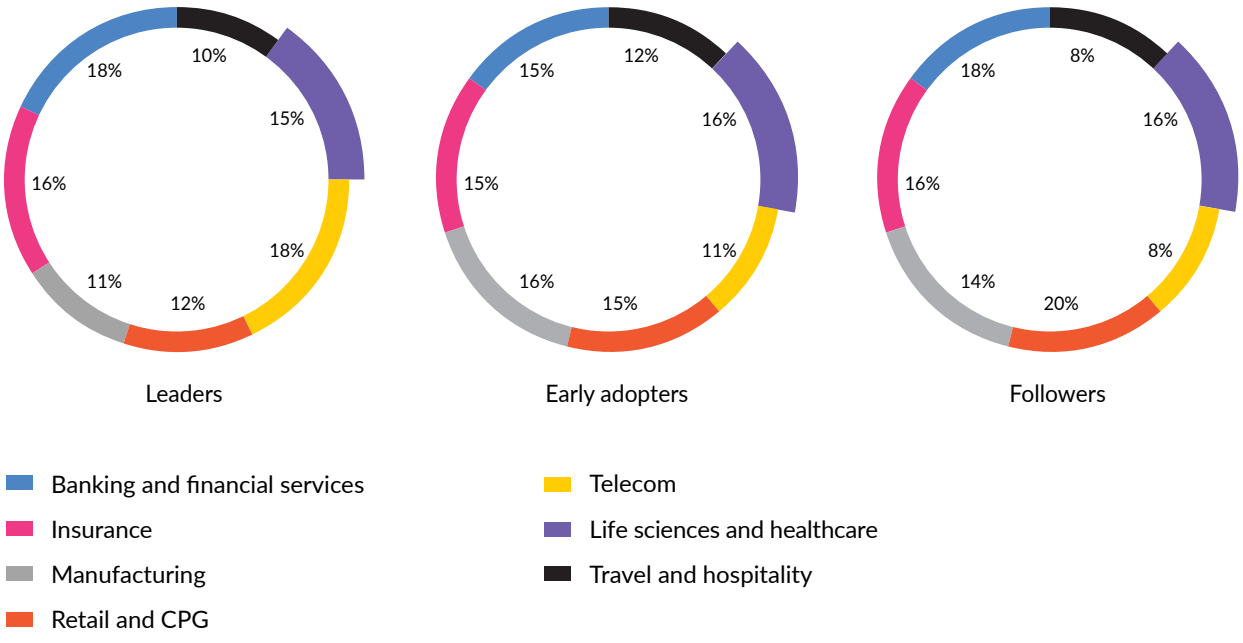


**Figure 1**: Industry-wise share in the leaders, early adopters, and followers groups

**ther key findings specific to the life sciences and healthcare sector are as follows:**

**Personalization is a priority.** The need to address the segment of one – the patient – is understood throughout the sector. Mastering digital capabilities has made personalized medicine, implants, and medical devices a multi-faceted reality. In essence, we find that personalization is the most widely adopted of all Business 4.0 behaviors.

**Business 4.0 is delivering benefits.** Life sciences and healthcare organizations adopting Business 4.0 behaviours report gains in the form of expanded addressable markets (through the use of big data and analytics in drug discovery and development, and opening up of new customer segments). This has also helped significantly boost bottom lines.

**Digital capabilities are being mastered, but there is room to grow.** Remote and self-monitoring medical chatbots, smart pills, and implants – these and other innovations are a testament to the advanced levels of digitalization in the industry. The use of cloud services is also widespread, however, there are many gains still to be realized through automation and the wider adoption of AI.


# RISING TO THE CHALLENGE OF BUSINESS 4.0

Digital technology has transformed the development and delivery of healthcare services and associated products. Advanced data analytics, in combination with IoT and other new technologies, is helping personalized healthcare become a reality. Patient health can be monitored from virtually anywhere. Analytics, AI, and cloud-based computing are driving advances in genomics and creating opportunities for transformation across the life sciences sector.

"In today's era of personalized medicine and digital health, organizations must harness the abundance of digital resources to realize their business objectives of personalized and affordable healthcare and accelerated drug development and approval," says Debashis Ghosh, President, Life Sciences, Healthcare, Public Services, and Energy, TCS.

Digitalization is also changing the competitive landscape. Medtech startups are gaining influence in the industry, as both challengers and partners to incumbents, given their ability to innovate faster. Additionally, the boundaries separating industries from one another are eroding, as technology companies see opportunities to expand their reach even deeper into the lives of their customers.

Seizing these opportunities and meeting the challenges entails a commitment to change as embodied in the idea of Business 4.0. Despite regulatory and other pressures, a large number of life sciences and healthcare organizations are adopting one or more of the Business 4.0 behaviors (see Figure 2).

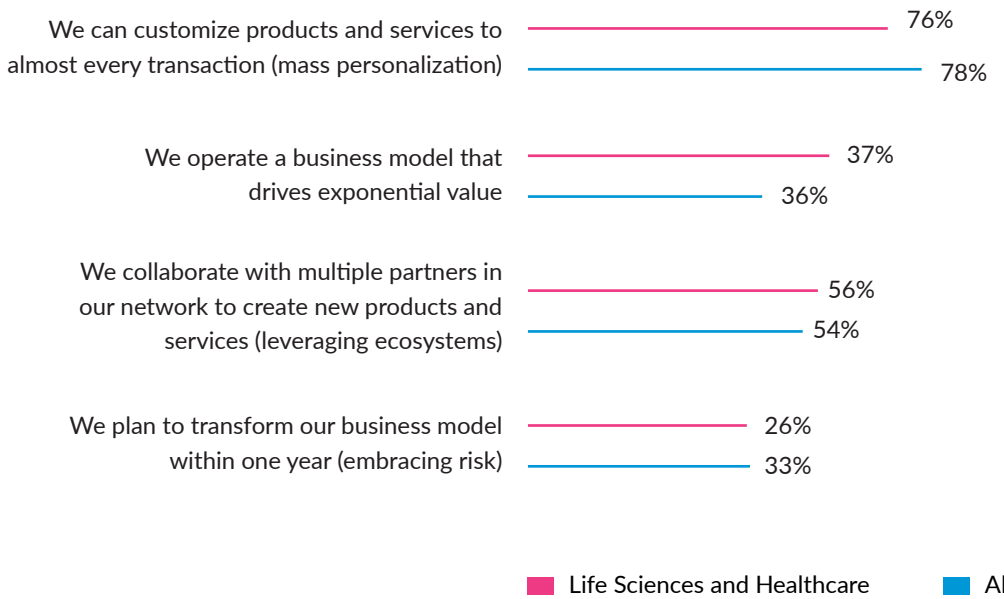


**Figure 2**: : Adoption of Business 4.0 behaviors by life sciences and healthcare organizations

## Personalization of diagnosis, treatment, and care

Technology-enabled personalization is one of healthcare's strongest success stories in recent times. Wearables enable patients to keep an eye on their health indicators. Using smart pills and implants with IoT sensors, physicians can monitor patients in their own homes. Meanwhile, genomics has made possible the potential development of drugs and other treatments that are specific to an individual's genetic characteristics.

These and other types of personalization are clearly gaining traction in the sector: three-quarters of life sciences and healthcare executives say their organizations have developed the ability to extensively customize their products and services, based on individual attributes or preferences.

Most of the organizations pursuing personalization report clear benefits to their bottom lines, in terms of volume and value of customer transactions, as well as customer profitability (see Figure 3).

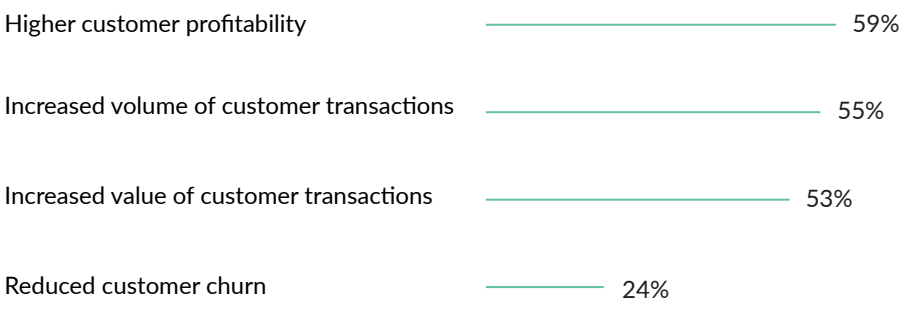


**Figure 3**: Benefits of mass personalization for life sciences and healthcare firms

## xponential growth in value for providers and patients

The individual industries that fall within the life sciences and healthcare sector create new value through digital in different ways. For instance, life sciences companies offer patient-monitoring services to clinical trial organizations to ensure adherence to test conditions.

Additionally, innovative startups are developing new revenue models that are likely to gain traction with established organizations. In the UK, for example, Babylon Health[1] provides online consultations with physicians through mobile video and messaging. In several countries, firms offer patients preventive healthcare and physician services on a subscription basis.

[1] Babylon, How Babylon Works, accessed May 27, 2019, https://www.babylonhealth.com/how-it-works

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group of pioneering life sciences and healthcare organizations in our survey currently operate business models that enable such value creation. Almost one in every two industry executives expect their organizations to have a business model by 2021 that will enable them to pursue such opportunities.

There is good reason for this growing interest in new business models. The organizations that currently operate these models have reported measurable benefits (see Figure 4). More than half of these firms have been able to expand their addressable markets in terms of the range of customers they serve and the geographies they serve in.

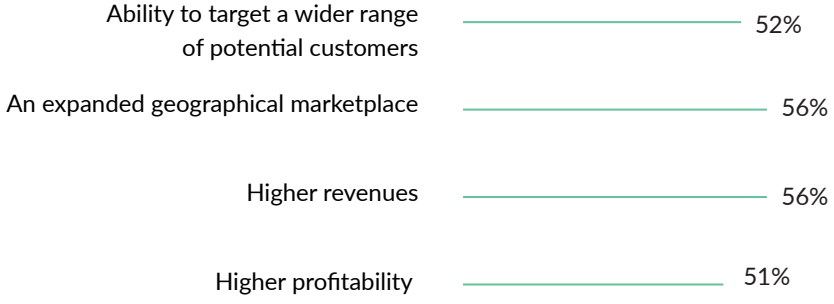



**Figure 4:** Top benefits from operating on an exponential business model

## Getting more from healthcare ecosystems

Alliances, partnerships, and other forms of multi-player collaborations are well established in the life sciences and healthcare sector. Care providers and insurers might work together not only to ensure dispensing of healthcare services, but also to share data and insights in the pursuit of improved health outcomes. Moreover, life sciences firms regularly collaborate with academic institutions to drive medical research.

More than a third of the surveyed organizations participate in such ecosystems with the purpose of developing new products and services (see Figure 5). Alliances are often formed between market rivals, “Collaboration between pharma companies is an important component for adoption because it spreads risk, real or perceived,” says the head of R&D at a global pharmaceutical company. “Centers of excellence in individual companies can generate innovative ideas and help organizations to develop meaningful demonstration projects to test new solutions. If such pre-competitive knowledge is shared cooperatively, hurdles for broad adoption as well as time to scale will be reduced."

Collaborative efforts in life sciences have often been limited by the proprietary approach of the established players toward intellectual property (IP). However, there are some indications of change like leading pharmaceutical company Janssen's iStep platform, developed to automate and streamline product supply and data management in clinical trials. The platform has been opened to pharma companies and other industry players.[2]

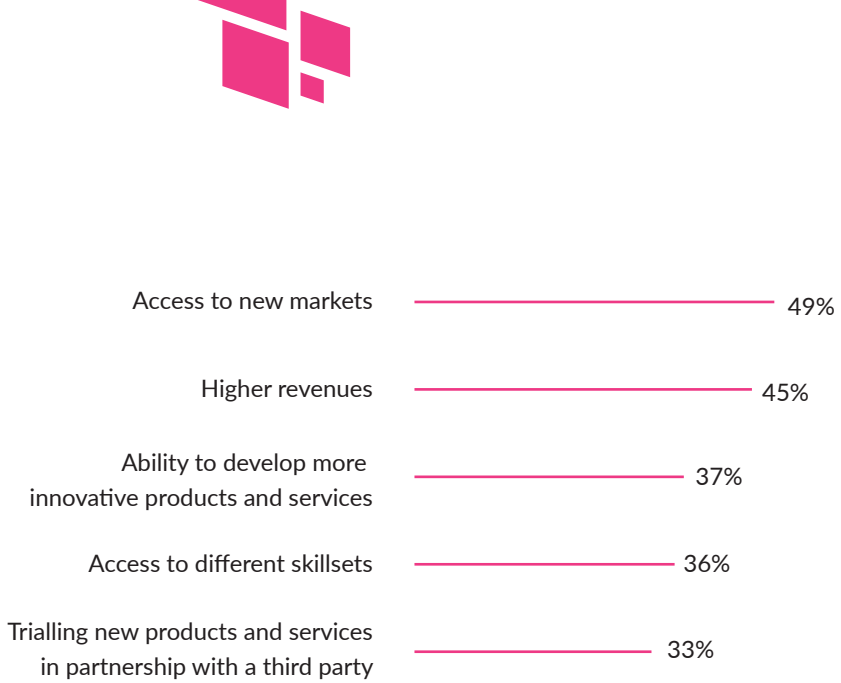



**Figure 5:** Top benefits of leveraging wider ecosystems in life sciences and healthcare industry

[2] Pharmaphorum, Janssen makes iSTEP clinical trials digital platform open to all, accessed May 28, 2019, https://pharmaphorum.com/news/janssen-istep-clinical-trial-adherence/

## Expand opportunities by embracing risk

Our survey shows that embracing risk is the most difficult Business 4.0 behavior to adopt for life sciences and healthcare organizations. There is lower representation for life sciences and healthcare industry in this pillar than other surveyed industries, with only 26% of the firms planning to transform their business model within one year, compared with 33% across industries (see Figure 2). Of the life sciences and healthcare firms we surveyed, 33% are comfortable working to a three-year-cycle with pre-allocated budget and resources, and only 6% adapt and transform continuously to market conditions (see Figure 6). However, this is no surprise, given the enormous financial stakes involved in pharmaceutical R&D and the stringent regulatory landscape.

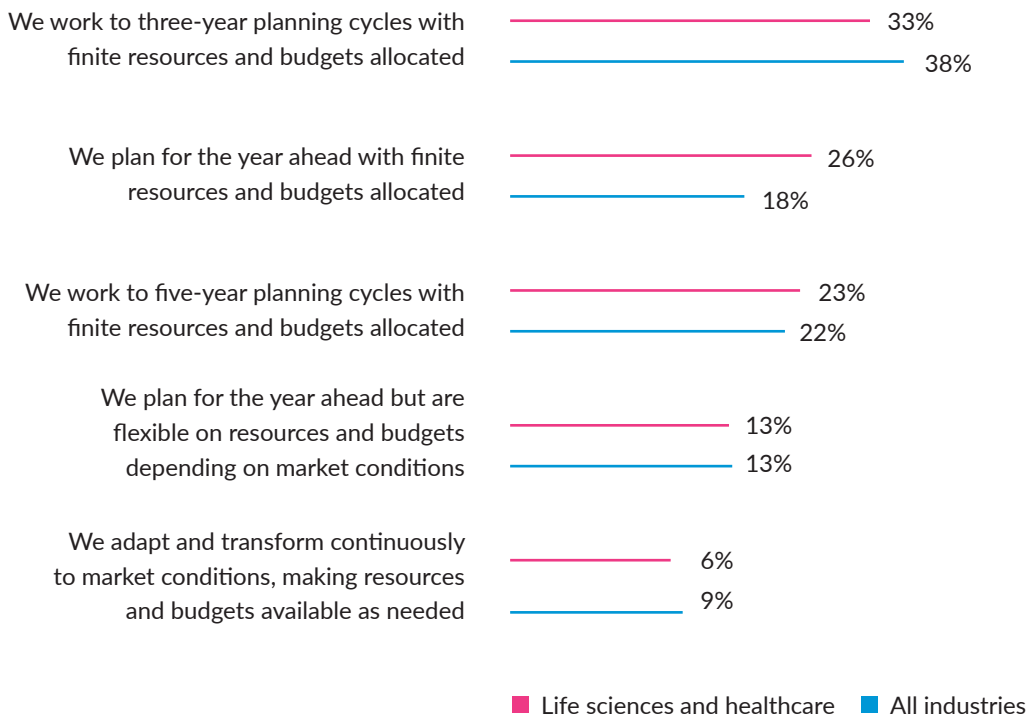



**Figure 6** : Appetite for risk when planning ahead

The average cost of bringing a new medicine to the market rose to $2 bn in 2018[3] from $1.2 bn in 2010. Yet, relatively few drugs get past the trial phase. In the US, for example, no more than 14% of drugs that undergo clinical trials win approval from the Food and Drug Administration (FDA).[4]

Agile approaches, along with the application of analytics, AI, and other technologies, are designed to improve the efficacy of clinical trials, with the aim of shortening development time and improving the prospects of regulatory approval, thereby reducing risk (see Merck case study in the following section).

According to the R&D head of a pharma company: "For us as a global pharma company learning to embrace risk that comes with novel approaches and technologies, in addition to the large risk inherent in the overall drug development process, will be a behavior I can see translating into a competitive advantage."

[3] Economist, Getting medicines to market faster, accessed, May 28, 2019, https://www.economist.com/leaders/2018/03/24/getting-medicines-to-market-faster

[4] MIT Sloan, Measuring the risks and rewards of drug development: New research from MIT shows that the success rates of clinical trials are higher than previously thought, May 28, 2019, https://mitsloan.mit.edu/press/measuring-risks-and-rewards-drug-development-new-research- mit-shows-success-rates-clinical-trials-are-higher-previously-thought

harmaceutical companies are more likely to be embracing risks than healthcare firms (see Figure 7). Again, the most likely explanation for this is that healthcare organizations – by nature – need to focus on patient care above all, which inevitably fosters a culture that is wary of rapid, disruptive change to the status quo.


**Figure 7**: Percentage of respondents who intend to fundamentally change existing business model within the next one year

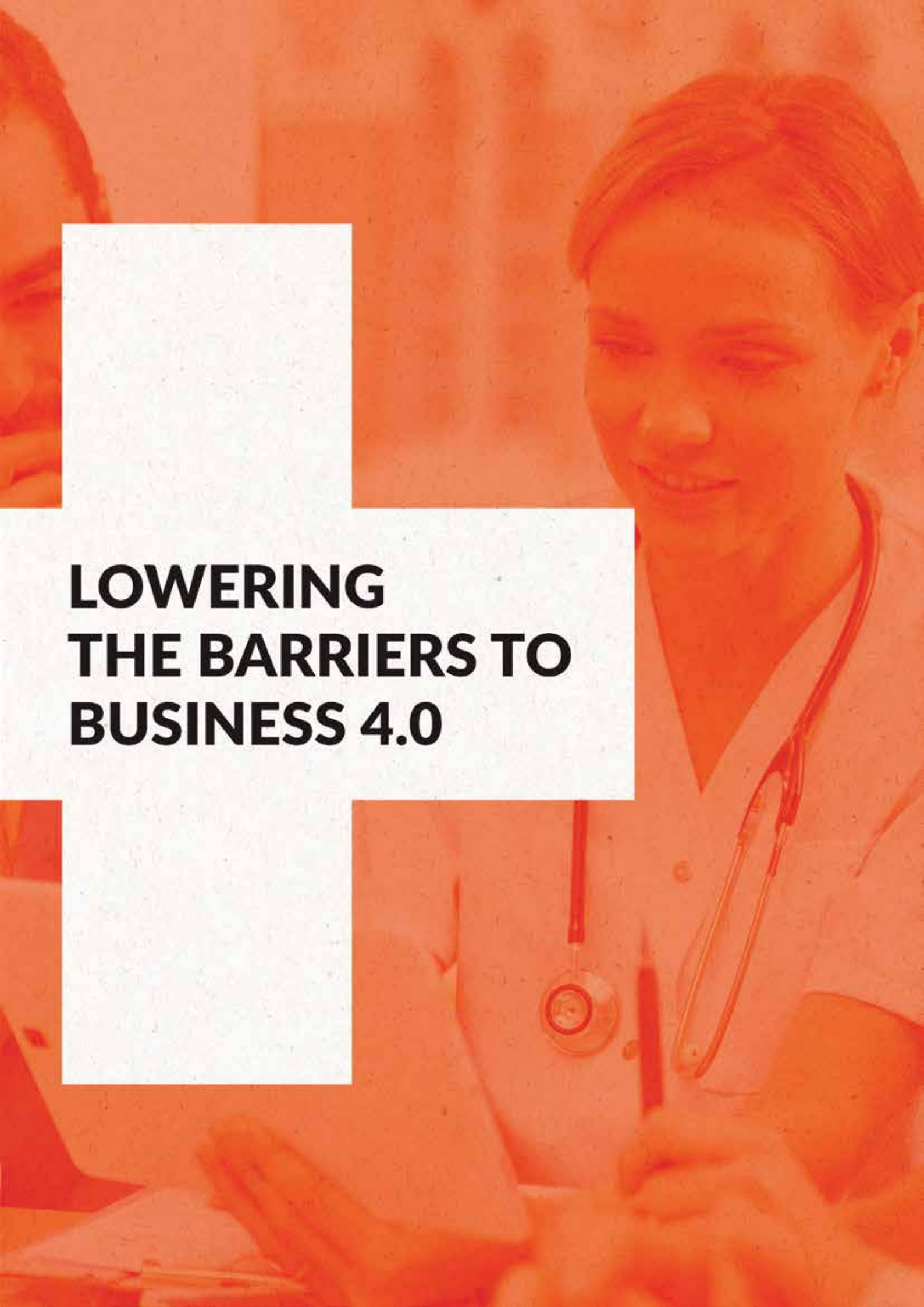
# CASE STUDY

## Merck: An agile approach to new ideas

n Regulatory Affairs at Merck, 'innovation councils' pursue objectives that encompass two of the four Business 4.0 behaviors: leveraging the knowledge of partners and fostering a willingness to embrace risk. According to Chris Lee, VP, Regulatory Affairs Operations and Quality Management, Merck, the councils – which consist of in-house experts along with representatives of its partners and suppliers – are set up to brainstorm ideas in different parts of the business. Ideas that are developed could be productized, Lee says, by Merck or its council partners.

The councils are also part of the company's efforts to adopt agile methodologies of development. "If we have an idea," says Lee, "we're not going out and writing 2,000 pages of requirements, developing it and ten years later seeing it fail. We have scrums, people talk about the idea, and one of the partners then gets something mocked up quickly. It may only take a week."

The councils have another benefit, according to Lee: showing employees that the ideas they submit will be taken seriously. "People are energized and excited to share their ideas, because they're seeing many ideas come to fruition. They no longer think that they're wasting their time doing this."



# LOWERING THE BARRIERS TO BUSINESS 4.0

When asked what they consider the paramount barrier to the industry's progress toward Business 4.0, our interviewees and survey respondents clearly point to ingrained corporate culture and legacy thinking. In our survey, traditional corporate culture came out as the dominant obstacle to embracing risk (see Figure 8).

Legacy also manifests itself in technology. The key obstacle to mass personalization, executives say, is inflexible or outdated technology. This may include databases that are error-ridden or cannot communicate with one another; software applications built on old architecture; or networks that cannot support the bandwidth requirements of real-time analytics or remote monitoring. Shifting their applications and infrastructure to cloud environments will help organizations overcome the drawbacks of legacy systems. For them, migration to cloud cannot happen soon enough.

At one time, the popular belief among executives was that cloud presented security risks. However, life sciences and healthcare firms have fewer qualms today. In fact, half of them believe migration of IT systems to a cloud environment will lead to improved data security.

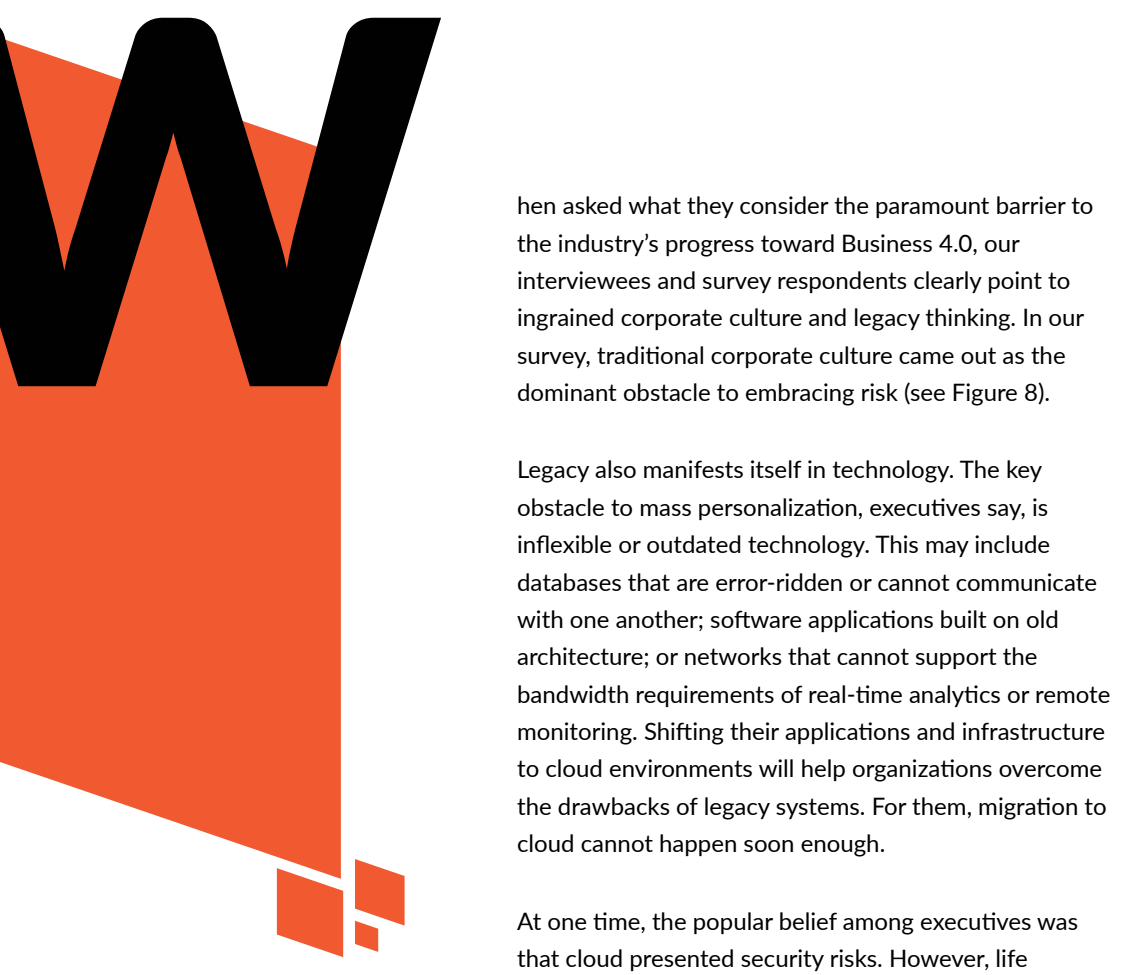



**Figure 8**: The top barriers to adopting Business 4.0 behaviors

# BUILDING DIGITAL ENABLERS

ife sciences and healthcare organizations need little convincing of the advantages conferred by cloud. Most surveyed firms are now active users of cloud services (see Figure 9). “We don’t worry about the storage of data and we don’t worry about the cost because it's all commoditized,” says a senior executive at a large pharmaceutical company. “And the horizontal scale and computing power that you get is a cloud construct. It’s definitely helping us to scale and grow our business.”

The industry is doing well when it comes to IoT. The use of connected sensors is now widespread in many fields of medical science and care. Medical implants, activity monitors, and automated regulation of insulin delivery are just a few of its applications. Additionally, like other manufacturers, pharma companies are also using IoT extensively in the supply chain, not just to increase efficiency but also to ensure the integrity of drugs in transit.

I and automation, however, are two areas where this sector trails others. AI techniques are being used by some organizations to support patient diagnosis and clinical trials; others are using AI chatbots to provide automated medical insights. But life sciences and healthcare organizations have only scratched the surface in terms of what AI can do for business models and patients. There is also considerable room to use automation technologies. As an example, they offer pharma producers the potential to accelerate, simplify, and improve the reliability of processes involved with clinical trials and drug manufacturing.

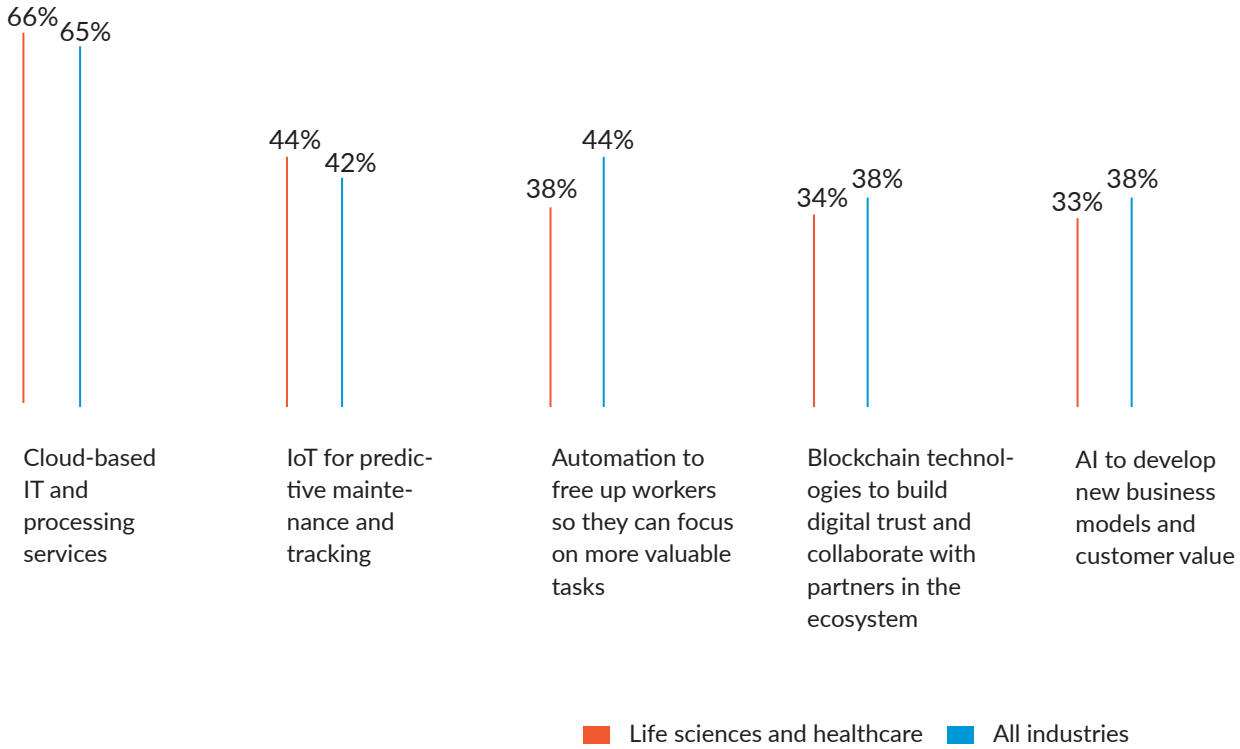



**Figure 9**: Technological capabilities accessed by life sciences and healthcare organizations today

# CONCLUSION

This is a time of profound change for life sciences and healthcare firms – not to mention patients. Organizations that have embedded digital technologies in their operations have been able to find ways of creating new value for not only the firm but also their partners and customers. Many companies are embracing Business 4.0 behaviors, while others are trying to work around the cultural, technological, and other barriers to change.

Here are some lessons from the research that can help companies overcome the hurdles in their Business 4.0 journey:

**trong leadership is non-negotiable.** Tight regulation, reliance on legacy systems, and expensive R&D often combine to limit promising digital initiatives. Strong, consistent direction from senior leaders is needed to ensure that Business 4.0 practices are widely embedded.

**Proprietary mindsets limit the value of ecosystems.** Digital technology is transforming the nature of alliances and networks long familiar to the industry. Blockchain technologies could, for example, be used by researchers to protect their IP by adding immutable time and ownership stamps on their work, thereby enabling them to share data and ideas without fear of infringement.

**Machine First™ must guide all process redesign.** Manual processes dominate most operational areas of the healthcare value chain. The potential for gains from automation – in efficiency as well as innovation – is therefore substantial. AI, IoT, and other technologies must become the default drivers for process execution.

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A part of the Tata group, India's largest multinational business group, TCS has over 424,000 of the world's best-trained consultants in 46 countries. The company generated consolidated revenues of US $20.9 billion in the fiscal year ended March 31, 2019, and is listed on the BSE (formerly Bombay Stock Exchange) and the NSE (National Stock Exchange) in India. TCS' proactive stance on climate change and award winning work with communities across the world have earned it a place on leading sustainability indices such as the Dow Jones Sustainability Index (DJSI), MSCI Global Sustainability Index and the FTSE4Good Emerging Index.

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