2017 Global Digital IQ® Survey: 10th anniversary edition

A decade of digital
Keeping pace with transformation

pwc

Looking back to look forward

The world was a simpler place when PwC first set out to measure Digital IQ 10 years ago.

"Digital" was just another name for "IT." The CIO was not generally regarded as a strategic leader. And although huge shifts were occurring in the ways technology and information were used—think Web 2.0 and startups like YouTube and LinkedIn—this innovation had yet to find its way into the enterprise. There, putting technology to work to improve productivity was a relatively straightforward, and siloed, job. And the lack of IT and business alignment was a common refrain.

A decade later, the scope and scale of digital-driven change has grown immensely, and organizations of all types have spent a lot of time and money to keep up. CEOs have embraced digital as part of their mandate. Enterprises have also (nearly) closed the gap between the IT and business sides of the house. Today, you'd be hard-pressed to find a modern organization that doesn't see technology as integral to business strategy as well as operations.

Yet despite these notable advances, in some ways company leaders are no better equipped to handle the changes coming their way than they were in 2007. In fact, Digital IQ—the measurement of an organization's abilities to harness and profit from technology—has actually declined since we began asking executives to self-assess their own organizations. Enterprises aren't so much falling behind as struggling to keep up with accelerating standards. And looking ahead, it is clear most are not ready for what comes next—and after that—as technologies continue to combine and advance, and new ways of doing business go from inception to disruption seemingly overnight.

How, then, can company leaders be expected to consistently unlock value from digital investments in a rapidly advancing world? The answer is at once simple and infinitely complex: Focus on the human experience. That entails rethinking how you define and deliver digital initiatives, considering employee and customer interactions at every step of the way, investing in creating a culture of technology innovation and adoption, and much more.

Focus on the human experience: Rethink how you define and deliver digital initiatives, consider employee and customer interactions at every step of the way, invest in creating a culture of tech innovation and adoption, and much more.

In the most basic sense, people have been the missing variable in the digital transformation equation. Instead of the prior decade's obsession with business-IT alignment, enterprises must now pursue a more balanced approach to digital transformation that's equal parts business, experience, and technology.

What we've learned, in our own work with clients and by analyzing a decade's worth of data, is that focusing on the human experience can raise an organization's Digital IQ. And we know it will only become more critical as emerging technologies like artificial intelligence (AI) and the internet of things (IoT) define the next decade of digital and fundamentally change the way man and machine work together.

Unlike so many aspects of technological change, how you shape the human experience is something that's in your control. You have the power to create a flexible, sustainable approach to innovation in an era of constant transformation. That is the deeper meaning of Digital IQ in the next decade.

52% of companies rate their Digital IQ as strong.

In our last survey it was 67%, and before that 66%.

Source: PwC, *Global Digital IQ® Surveys*
Bases: 2,216 (2016), 1,988 (2015), 1,393 (2014)

Digital IQ's link to financial performance

Our analysis of data from the 2,216 business and technology executives we surveyed in late 2016 points to a connection between organizations that have more comprehensive digital strategies and those that achieve stronger financial performance.

The top performers in our survey—those reporting revenue growth and profit margin increases above 5% for the past three years and expected revenue growth of at least 5% for the next three years—tend to have broader definitions of digital, encompassing customer-facing technology activities and going beyond technology and into an organizational mindset. Just 16% of top performers say digital is synonymous with IT (the most basic description), compared with 30% of other companies.

These top performers also have a better understanding of the human experience that surrounds digital technology (82%, vs. 69% of other companies). They are more likely to resource digital projects with cross-functional teams of business, technology, and user experience specialists (74%, vs. 65%), and to use agile methodologies for the majority of non-software projects (22%, vs. 7%). More of them say creating better customer experiences is a top expectation from digital investments.

Top performers prioritize innovation and emerging technology. They are higher on most measures of innovation, including dedicated innovation teams (59%, vs. 42%). Three-quarters of them (75% vs. 61% of others) say their innovation process includes identification and commercialization of digital products, and well over half regularly build prototypes to explore new business ideas that involve emerging technologies.

2007–2017: A decade of Digital IQ

Digital progress is fairly consistent.

In 2007, the average Digital IQ was similar across industries. The same largely holds true today, with some exceptions (agribusiness and mining have fallen behind).

Yesterday's technology investments are today's building blocks.

Data mining and analysis, search technologies, service-oriented architecture, and virtual collaboration were top-of-mind technologies in 2007. Attention shifted to mobile technologies, data security, and cloud in the intervening years. Today, emerging technologies like the internet of things and artificial intelligence are seen as the next big things, and other next-generation tools are at their heels.

CEOs have become champions for digital.

Just 33% of the executives in our 2007 survey said their CEO was a champion for digital; that number climbed through the years to reach 68% today.

The CIO has earned a seat at the table.

A mere 40% of executives said the CIO was significantly involved in strategic planning in 2007; today the CIO has strong relationships with other senior leaders and often oversees digital strategy and investments. With the growing importance of digital, the CIO is also joined by new roles like the chief digital officer or chief data officer, whose roles also focus on the strategic use of technology.

Attention to the human experience indicates superior strategy.

In 2007, a focus on the customer experience correlated with high strategic Digital IQ. Respondents that focus on creating better customer experiences today also report better digital strategies—and stronger financial performance.

Why Digital IQ is a moving target

Companies have done a lot to prepare themselves to profit from technology change since we began the Digital IQ program in 2007. The CIO role has grown in stature, organizational charts have sprouted new positions dedicated to innovation, significant investments have been made in technology, and entire business models have been transformed.

Yet most organizations still are not ready for the latest round of technological advance, or the one that comes next—a reality acknowledged by respondents to our latest global survey. The confidence in their organizations' digital abilities is at an all-time low: Just over half rate their Digital IQ as strong or very strong (a score of 70% or greater), down from two-thirds of executives in 2014 and 2015.

The changing definition of digital

How does your organization define digital?

"Digital refers to all technology innovation-related activities."	32%
"Digital is synonymous with IT."	29%
"Digital refers to all customer-facing technology activities."	14%
"Digital refers to all the investments we are making to integrate technology into all parts of our business."	14%
"Digital goes beyond technology alone to reflect a mindset that embraces constant innovation, flat decision-making, and the integration of technology into all phases of the business."	6%
"Digital refers to all data and analytics activities."	5%

Source: PwC, *2017 Global Digital IQ® Survey*
Base: 2,216

What accounts for this disparity between effort and outcomes? Start with the fact that Digital IQ is not measured against a static scale but instead tracks organizational preparedness in a fast-evolving environment. So while companies are smarter about technology adoption than they were previously, the questions keep getting harder.

Powerful new tools continue to crowd into the marketplace, even as organizations struggle to digest the foundational technologies like cloud, mobile, and analytics on which next-generation innovations depend. At the same time, "digital" has evolved from a synonym for IT to a more expansive approach to technology and its impact on customers, culture, and business outcomes, raising the complexity and stakes of the game while it is in progress—and diminishing the confidence of the players along the way.

Why companies struggle to keep pace

Most organizations have not done enough to keep up with the digital revolution. While technology has become a CEO-level concern (68% say their CEO is a champion for digital, up from just 33% in 2007) and the CIO has attained strategic stature, many other senior executives and the functional areas they lead are not yet fully engaged in the project of digital transformation. Most tasks related to digital—including digital investment prioritization, innovation, and the development of new products and services—rest with either the CIO or CEO, and very few functions outside of IT and operations have a leading role in emerging technology exploration.

Despite slow progress in developing strategies for digital and exploring new technologies, executives remain committed to digital as a driver of growth. Nearly three-quarters (73%) cite revenue growth as a top benefit of their digital initiatives, followed by increased profits (47%) and reduced costs (40%). Disruption is less of a focus, despite growing evidence that new technologies and new business models will continue to remake entire industries.

Innovation and emerging technology adoption

A decade of Digital IQ has seen increased awareness of the business value of new technology adoption, but companies have not adapted quickly enough to stay ahead of constant change. In some ways, they have regressed, as many organizations still take a passive approach to seeking out innovation: In 2007, they most often turned to technology vendors and consulting firms to explore how to apply emerging technology to their business. Today, despite a profusion of resources (for example, incubators/startups, crowdsourcing, makers, open source, university labs), most still rely on old-school voices like industry analysts, competitive intelligence, and vendors.

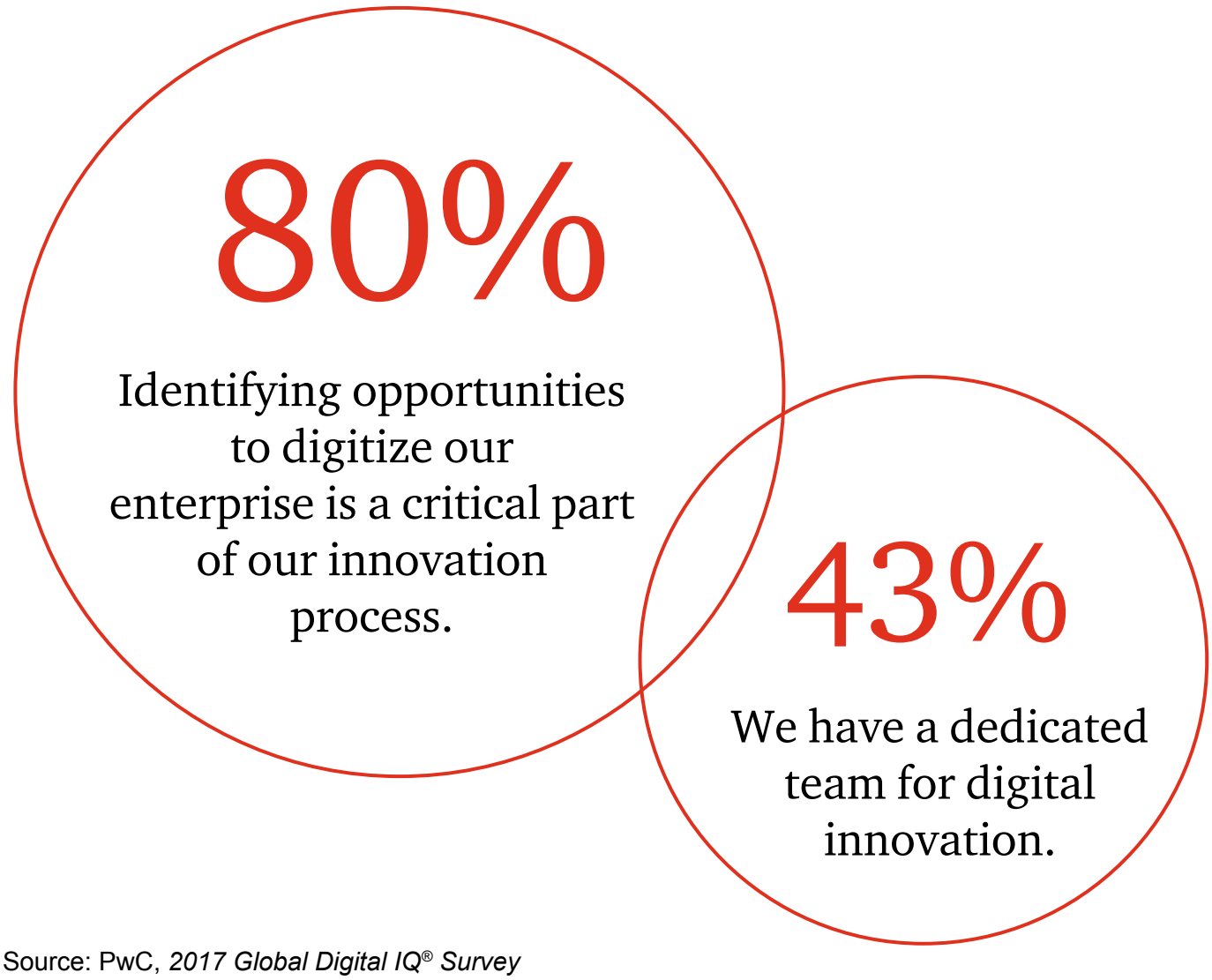
Fewer companies today have a team dedicated to exploring emerging technology than in years past. The rest rely on ad hoc teams or outsourcing, and many (49%) still determine their adoption of new technologies by evaluating the latest available tools, rather than proactively exploring new innovations with specific business needs in mind (40%). And few are focused on how these emerging technologies change the relationship between man and machine—creating new roles, bringing new conflicts, and redefining trust.

A decade of Digital IQ has seen increased awareness of the business value of new technology adoption, but companies have not adapted quickly enough to stay ahead of constant change.

Yet most companies are confident in their approach to new technology assimilation, and strategies for digital investments are more developed than they once were. Two-thirds (66%) of companies say they have a single, multiyear roadmap that includes business and IT processes, up from 54% in 2015. A similar number say they consistently measure outcomes from innovation efforts. These behaviors demonstrate again that, by and large, companies are improving their efforts around digital every year—but that might not be fast enough to keep up with the next wave of emerging technology.

Innovation talk but few resources

To what extent do you agree with the following statements about innovation? *(agree/strongly agree)*



Source: PwC, *2017 Global Digital IQ® Survey*
Base: 2,216

The CIO stays in the picture

The chief information officer has become more strategic, connected, and visible during the past 10 years—and remains so despite predictions to the contrary. Chief digital officers, for example, were expected to move from the media and agency world to the broader corporate scene. Yet despite hype over this new entrant to the C-suite in the last few years, only 7% of organizations have a leader with the CDO title—and the vast majority of organizations do not plan to add the position. Often, the job of digital leadership still falls to the CIO.

The CIO and CEO are the digital leaders for their organizations in most respects. Most companies say the CIO and CEO have near-exclusive control over digital strategy and investments (IT still commands the biggest share of technology spending—28% on average), and those roles lead the way in emerging technology investments and the development of new products and services. It is helpful, then, that most companies report strong relationships between the CIO and other top executives.

While the CIO takes on increasing responsibility for digital activities, the role is becoming more internal-facing. In three years, 49% expect the CIO to be primarily responsible for leading all internal efforts, including innovation—up from 43% today. Does this mean the CIO role will finally yield power to other C-suite executives and business unit leaders? Perhaps, but the pace of change and centrality of digital strategy have kept the CIO in the spotlight for a decade—and that seems unlikely to change in the near future.

Where change might occur in the C-suite, however, is in the attention paid to the human element through the introduction of more chief experience officers (CXOs) or another C-level executive focused on experience. Will the CXO join the CIO and CEO in leading digital, ensuring that the all-important lenses of experience, technology, and business strategy are equally covered?

Considerations for your business

Define digital through powerful perspectives.

Conduct a strategy session with functional and business unit leaders to define and expand your organization's view of digital. Ensure you involve executives from disciplines across your organization, including business strategy, creative and design, and innovation and technology. Bringing together individuals who have different perspectives at the outset of digital transformation initiatives is one of the hallmarks of PwC's BXT method. Together you will develop a shared perspective on digital priorities, backed up by the leadership and organizational roles needed to drive the effort.

Take stock of your digital technology investments.

With the bulk of technology spending occurring outside of IT, you need to understand what and where other functions are investing and how each investment ties back to your digital roadmap. Getting a handle on the full scope of investments again requires bringing together a diverse group of stakeholders.

Sustain the digital dialogue.

Once leaders are committed to your strategy, ensure the rest of the organization is too. People in each function should understand how technology will be used to change the way they work or deliver value. That conversation about how digital is changing your business also extends to your customers and partners. And think about how to use technology—video, social media, and mobile—to engage in this ongoing conversation.

People power: Why human experience matters

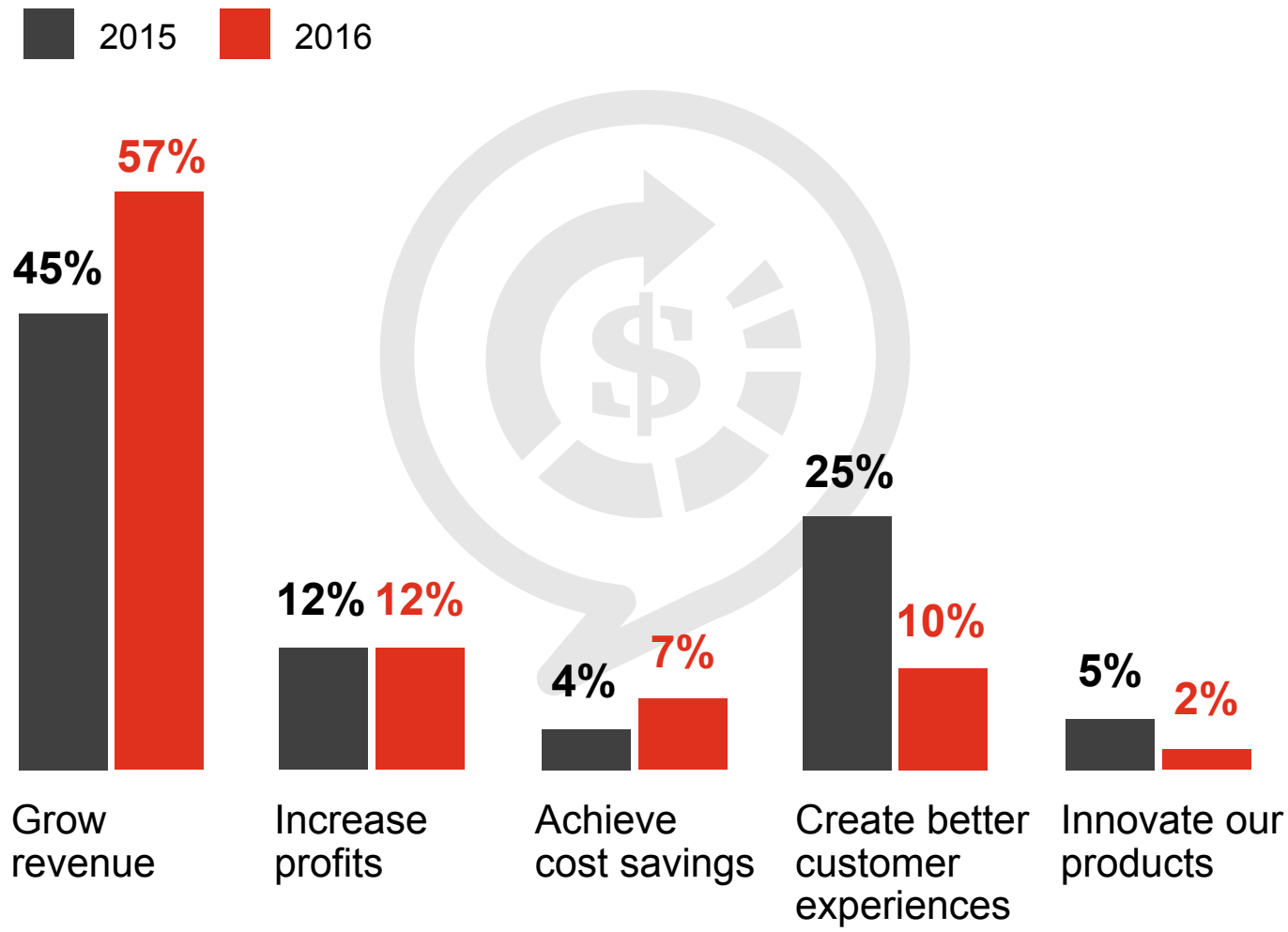
Creating better human experiences is critical to raising Digital IQ, yet customers, employees, and culture continue to get less attention than strategy and technology. This imbalance has far-reaching effects. It creates problems in the marketplace, slows the assimilation of emerging technologies, and hinders the development of organizations that can adapt continuously and anticipate exponential change.

Part of the problem could be false confidence. Most individuals like to think they are sensitive to the people around them, and indeed our 10th anniversary Digital IQ survey shows that most senior executives—70%—say they focus on ways new technologies will affect human experiences, including those of customers and employees.

Yet the details tell another story. The survey also reveals that CEOs and CIOs—the executives most important to driving digital transformation—are much less likely to be responsible for customer-facing services and applications than digital strategy or investments. Perhaps unsurprisingly then, better customer and employee experiences are secondary goals for digital investments, ranking behind broader business objectives such as revenue growth and increased profitability. The goal of creating better customer experiences has declined in importance from just the prior year: 25% ranked it as the top priority; today, just 10% do.

Experience is an afterthought

What value do you expect from your digital technology investments? They will enable us to... *(top-ranked choice)*



Source: PwC, *Global Digital IQ® Surveys*
Bases: 2,216 (2016), 1,988 (2015)

The customer experience dividend

Developing a high-quality user experience for employees and customers is a critical component of maximizing Digital IQ—and getting full value from digital investments. Our survey shows that organizations that focus on creating better customer experiences through technology tend to have more mature strategies for digital in a range of areas—and to realize better outcomes.

These customer-centric organizations understand that creating a high-quality user experience demands specialized skills—another sign of their focus on human factors. They are more likely to report more developed employee skills in user experience and human-centered design (49%, vs. 38%).

Emerging technology exploration is also a focus for customer-centric organizations; dedicated teams for innovation are more common (55%, vs. 43%), as is the use of customer advisory groups to gather ideas (27%, vs. 19%). These organizations also plan to spend more on augmented reality (32%, vs. 24%) and virtual reality (19%, vs. 15%) during the next three years, tools that could create stronger connections with customers as the technologies mature.

Although the survey cannot untangle cause and effect, these customer-centric organizations tend to report stronger financial performance and are somewhat more likely to be earning revenue from digital products and services.

Another set of findings makes the case for focusing on human experience, both inside and outside the organization, in the most basic of business terms: Those companies that pay more attention to people also report superior financial performance compared with their peers.

Falling short on skills

Digital work takes a toll on employees, from burnout related to constant connectivity to the fear (and reality) of losing jobs to disruptive new competitors and automation. But as important as those issues are to morale, turnover, and performance, the lack of attention to employee needs has even more direct implications for Digital IQ in the form of a skills gap that puts transformation efforts at risk. Respondents say skills in their organization lag across a range of highly important areas, including cybersecurity and privacy, business development of new technologies, and, yes, user experience and human-centered design. Worse, skill levels have declined since our last survey, even as the demands of digital keep advancing.

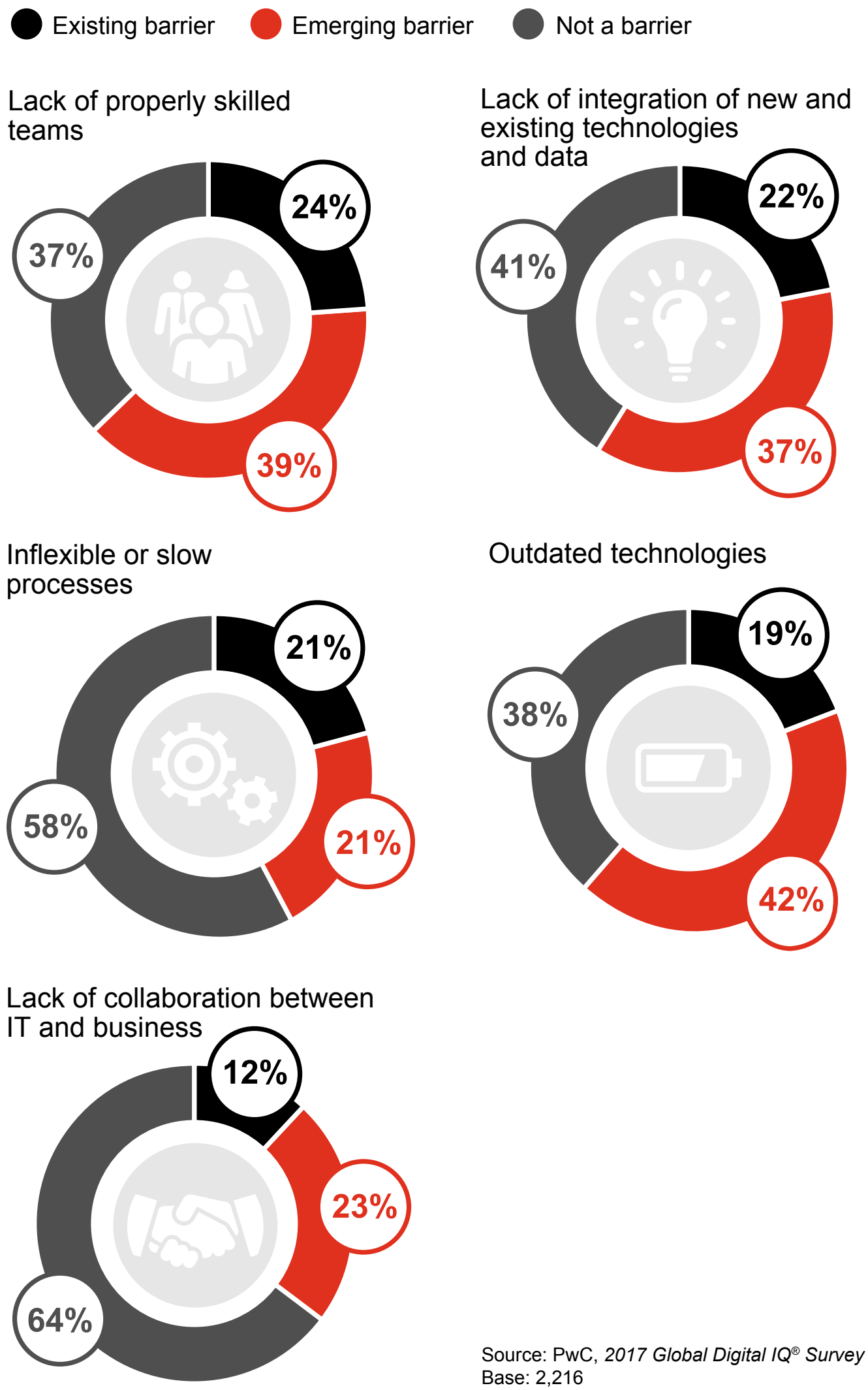
Corporate culture also seems less than healthy. Even companies with the necessary skills often cannot put them to use. One-quarter (25%) of respondents say they use external resources even when they have skilled workers in-house, because it is too difficult or too slow to work with internal teams; 42% say third parties are less expensive. This management malaise extends even to our top performers, those organizations that do well in other measures of Digital IQ.

There are signs that executives are beginning to recognize the relevance of human experience, even if most are not focused on addressing it in a systematic way. When asked to identify emerging barriers to getting results from digital investments, one of the top responses was a lack of skilled teams.

Addressing the full spectrum of human experience remains a serious challenge for most organizations. Yet challenges also present opportunities, and those organizations that combine rigorous strategies for technology adoption with a personal touch will emerge as winners in the digital era.

What's stalling digital transformation efforts?

How would you characterize the following obstacles to achieving expected results from your digital technology initiatives?



Source: PwC, *2017 Global Digital IQ® Survey*
Base: 2,216

Considerations for your business

Create an environment conducive to learning and collaboration.

Rather than encourage people to work in isolation or with only their peer groups, enable a cross-section of specialists to be in close virtual or physical proximity to one another. This approach helps you develop a common working language that facilitates the seamless collaboration and increased efficiency vital to moving at the speed of technology. When they speak a common working language, deep specialists across the organization—lawyers, marketers, designers, programmers—can harness the power of perspective to get a firmer grasp on what their colleagues are saying and on what the business is asking for. Cohesive teams of big thinkers and solution drivers address business issues that are no longer isolated to one discipline but intertwined across many.

Commit to executive education.

Addressing the skills gap starts at the top. Company leaders must understand and engage with digital technology to see how it could help or hurt the business, including how it affects the employee and customer experiences. Three easy ways to get started: Get hands-on with technology, become a maker or a mentor to those who are building and experimenting with emerging technology, and keep learning through online offerings.

Train your workforce.

Now, more than ever, upskilling is needed. This training includes teaching employees the skills to harness technology, whether that's a new customer platform or a new breed of collaborative robot. It also means cross-training workers to be comfortable and conversant in disciplines outside their own, as well as in skills that can support innovation and collaboration, such as agile approaches or design thinking.

Emerging technology: Next-generation digital

We began measuring Digital IQ soon after the convergence of computers and telecommunications started to have real consequences for business and society. Today, ongoing advances in computational power and science, mechanical design, and network infrastructure are spawning a new generation of technologies that leverage and combine these forces to bring digital applications deeper into the physical world and further beyond the industrial age.

This next wave of emerging technologies brings dramatic advances in what computers can do. It includes what we call the "essential eight": the IoT and AI—the foundational elements for the next generation of digital work; robotics, drones, and 3-D printing—machines that extend the reach of computing power into the material world; augmented reality (AR) and virtual reality (VR)—which merge physical and digital realms; and blockchain—a radical new approach to the basic bookkeeping behind commercial transactions. This group can also be roughly divided into three subsets, based on primary functions: input (IoT, drones), processing (AI, blockchain), and output (AR, VR, robotics, 3-D printing).

Despite the promise of these tools—and the risks of falling behind—spending on emerging technologies is not much greater today, relative to overall digital technology budgets, than it was 10 years ago. In 2007, the average investment in emerging technology was 16.8% of technology budgets (we remarked that it was robust). Today, the share of technology spend is consistent: 17.9%. Business leaders tell us they are more focused on digital priorities like implementing cloud-based platforms for workforce automation or investing in digital tools to improve operational performance, rather than exploring emerging technology. And we wonder if companies are over the fear of disruption so prevalent in the past few years. Just 7% of executives say that combatting new industry entrants drove their digital investments.

Executives expect the internet of things and artifical intelligence to bring about the biggest change.

73% say they are investing in IoT and 54% in AI.

Source: PwC, *2017 Global Digital IQ® Survey*
Base: 2,216

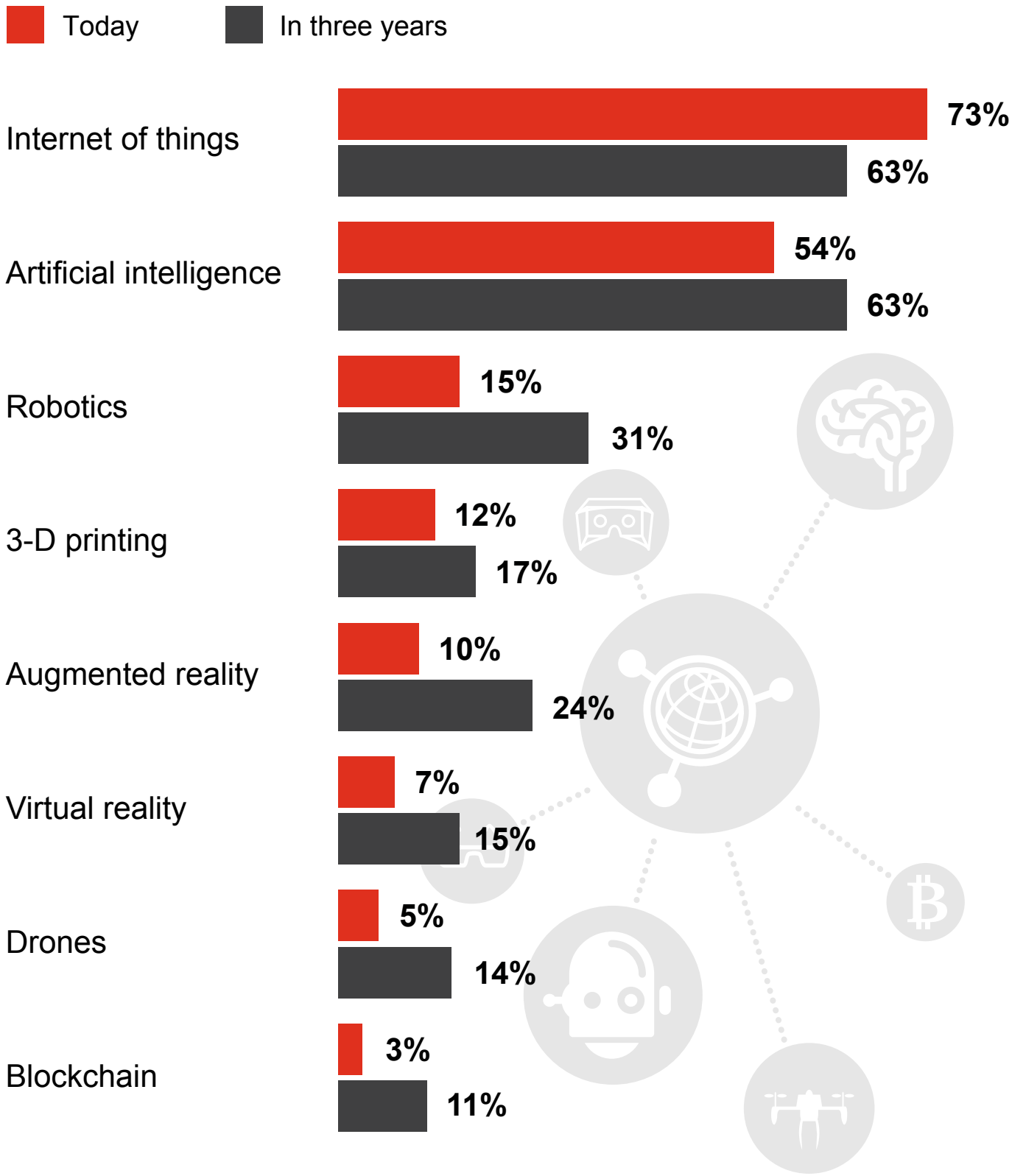
Emerging technologies must compete for attention with yesterday's game-changers, such as cloud, mobile, and analytics, which still command sizable spending and mindshare, and often are necessary precursors to the latest tools. Concerns about maturity and cost will slow adoption. And here, again, a lack of attention to the human experience is holding companies back. In particular, the survey reveals a shortage of relevant skills, which are insufficient to keep up with investment trends and are quite scarce for many emerging technologies. And so is a holistic focus on how emerging technology changes the customer or employee experience.

Meaningful investments are flowing to the IoT and AI, however, and substantial growth is expected across a broader spectrum of technologies during the next three years, in both the enterprise and startup communities. Robotics and AR are the technologies poised for the greatest near-term growth.

The survey reveals a shortage of relevant skills, which are insufficient to keep up with investment trends and are quite scarce for many emerging technologies.

Betting on the internet of things and artificial intelligence

Which of the following technologies are you making substantial investments in? *(select all that apply)*



Source: PwC, *2017 Global Digital IQ® Survey*
Base: 2,216

Investment levels for different technologies vary greatly by sector and business model, depending on the needs of particular industries and the strategic goals and desired outcomes of individual companies. Much of the spending is directed at technologies perceived as disruptive and those that could lower costs. Manufacturers are more interested in robotics and 3-D printing, for example, while financial services firms are eyeing blockchain.

Greater than the sum of its parts

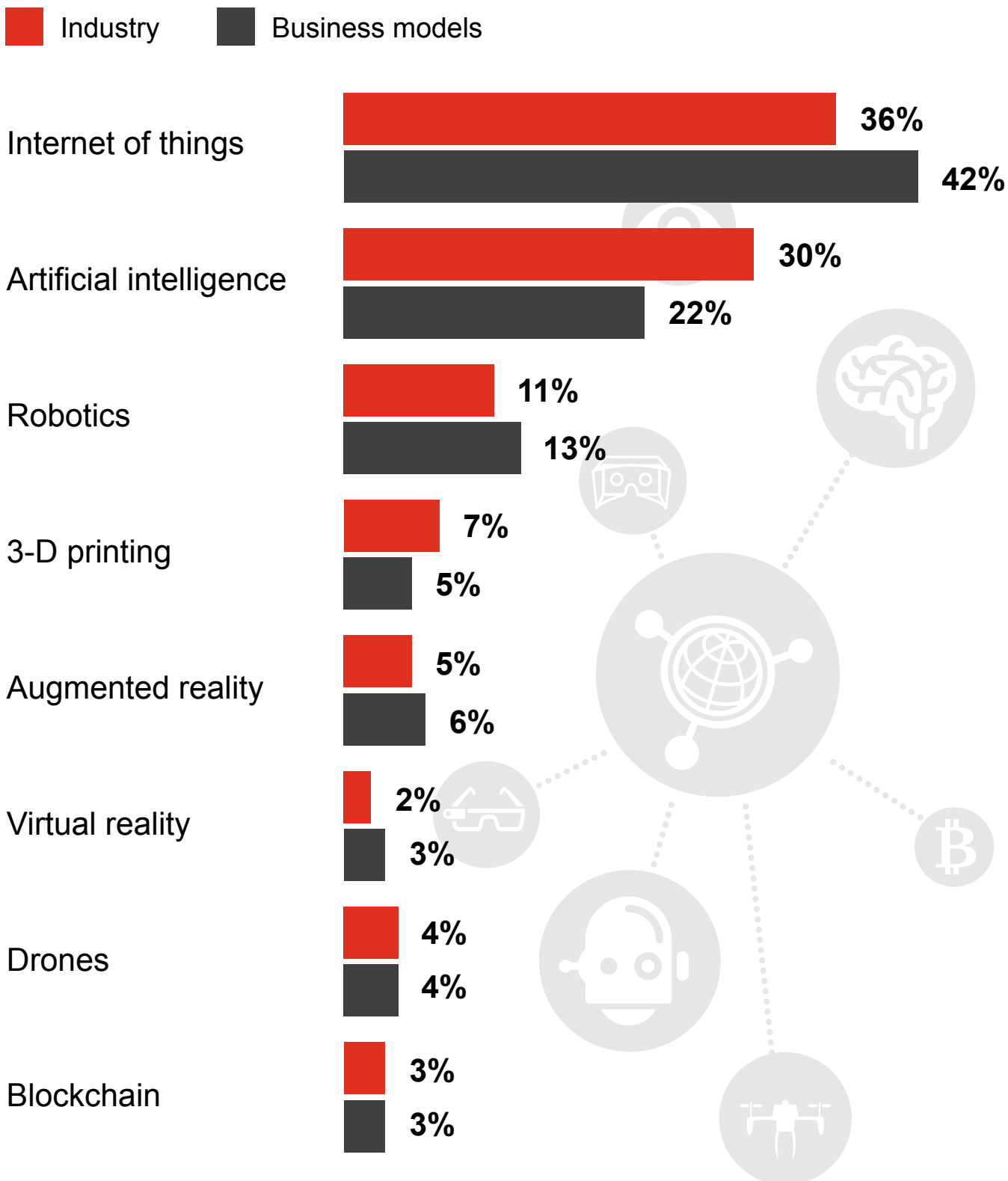
While the potential around these essential eight is considerable, it's crucial for organizations to think beyond individual technologies, as well as beyond their own four walls. Executives need to develop a rigorous approach to emerging technology, one that includes a formal framework of listening to those on the bleeding edge, learning the true impact of these technologies, sharing results from pilot projects, and quickly scaling by implementing them throughout the enterprise. They also want to think about what role to play in emerging platforms and ecosystems, such as those arising from the IoT.

We will take a detailed look at how Digital IQ companies are wielding emerging technology in our forthcoming deep-dive on *Next in Tech*, coming in March.

Develop a rigorous approach to emerging technology—establish a formal listening framework, learn the true impact of bleeding-edge technologies, share results from pilots, and quickly scale throughout the enterprise.

Sizing up disruption

In the next five years, which of the following technologies will be the most disruptive to your...? *(select one)*



Source: PwC, *2017 Global Digital IQ® Survey*
Base: 2,216

Considerations for your business

Make emerging tech a priority.

Your leadership team should view emerging tech as a core competency of the organization. If emerging technology is considered a side project, it is unlikely ever to have any lasting impact on the organization as a whole. Get your C-suite and your board excited about the potential for emerging technology by showing demos at your next board meeting or encouraging hands-on homework to experiment with consumer technology like home automation systems or AI assistants.

Appoint an emerging tech evangelist.

While emerging technology needs broad support, it also needs a single individual who has ownership over your emerging tech initiatives. At the same time, the emerging tech leader can't go it alone. He or she will need to rely on the expertise of other executives, as your organization thinks about applying emerging technology to solve business problems. Identify those at all levels and in all functions who are passionate about different technologies, and create a team responsible for emerging tech scouting and experimenting.

Focus on the human experience.

As you experiment with emerging technology, don't shortchange the customer or employee experience. You can develop a digital product that leverages AI, for example, but have you sufficiently thought through issues like whether you've created the necessary trust and transparency your customers and employees need, so your innovation becomes indispensable?

Develop a scouting plan.

Most organizations don't look broadly enough to identify how and where emerging technology can make a difference. Beyond analyst reports, white papers, and technology publications, a proper plan should go much deeper. Look to underutilized sources, such as engaging with the startup ecosystem, participating in open source development projects, and joining the maker community.

www.pwc.com/digitalIQ

To have a deeper conversation about Digital IQ:

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About PwC's Digital IQ research

We've been conducting Digital IQ research since 2007, and this year marks our eighth survey of business and IT executives globally. The 2017 edition was fielded September through November 2016 and included 2,216 respondents from 53 countries. Respondents were evenly divided between IT and business leaders. Reflective of the distribution of respondents globally, 62% work in organizations with revenues of $1 billion or greater and 38% have revenues between $500 million and $1 billion.

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