The disruptors are the disrupted

Disruptive technologies barometer: Technology sector

KPMG International

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Executive summary

As agents of change, technology companies have always been at the forefront of disruption. Today, as an ever-increasing range of new technologies disrupt the sector with exponential speed, tech business leaders are focused on how to create new value propositions for their customers, and how to run their own organizations more effectively. The disruptors are being disrupted, and any company that fails to acknowledge and embrace this new reality runs the risk of being left behind.

For this global study, KPMG International commissioned Forrester Consulting to conduct a survey of 580 senior technology decision makers. It reveals that, while many technology leaders express optimism about disruptive technologies, they are also aware that they lack the organizational capability, culture, strategic vision and a solid understanding of the impact disruptive technologies will have on their sector, in order to successfully navigate this revolution.

At its best, disruptive technology:

— **Changes your relationship with your customers.** Disruptive technology can, and should, be harnessed in service of customers. Today, a growing number of tech sector leaders link investments in disruptive technology to customer outcomes: 54 percent say they track their success with these investments by tracking customer satisfaction or experience metrics.

— **Improves your company's business model.** In our survey, 56 percent of tech leaders who claim that disruptive technology has a positive impact on their company leverage it to reshape their organization's business model, and develop new ways to deliver and capture value.

— **Solves difficult operational problems.** Sometimes a lack of operational excellence inhibits successful monetization strategies. But savvy investments in disruptive technologies can bridge the gap and drive quantum improvements in efficiency.

So how can business leaders make the best bets when approaching disruptive technologies? One key indicator is how technology leaders are prioritizing their investments and assessing the impacts of disruptive technologies. Companies want to use disruptive tech to improve their products and services, reduce costs, and outpace the competition.

Based on our insights, we have put together a framework to help technology sector leaders navigate the disrupted landscape and provide a guide as to which technologies to adopt and when.

We would like to thank all the technology leaders that gave their valuable time to participate in the survey. If you would like more information on our findings and how disruptive technologies will impact your organization, please contact us.

Gary Matuszak
Global Chair
Technology, Media and
Telecommunications
KPMG International

Richard Hanley
US Advisory Industry Leader
Technology, Media and
Telecommunications
KPMG in the US

Philip Wong
Principal
Technology, Media and
Telecommunications
Global Strategy Group
KPMG in the US

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Highlights

About the Survey

KPMG International surveyed 580 senior executives within technology companies from 16 countries. Respondents represented a cross section of the industry, and the questions covered the key disruptive technology adoption trends, the impact of these technologies on their businesses and their investment strategies.

1. Technology leaders admit their companies are not fully prepared for the impact.

A majority of respondents feel disruption has had a positive effect on their organizations, helping them enter new markets, reach new customer segments, and create more agile, efficient business and operating models. A combination of cloud, data and analytics (D&A) and digital payments, for example, lets enterprise software providers target small businesses with subscription-based or 'pay-as-you-go' solutions, replacing complex and outdated sales and marketing methods. But executives also fear that this very flexibility is opening up their traditional markets to competition from outside and within the industry, whether it's automotive companies developing their own software — as well as software businesses — or computing and data storage firms being superseded by cloud offerings from Amazon, Google and Microsoft.

2. The technology sector is investing in a wide range of disruptive technologies — in a bid to increase operational and customer effectiveness.

Links are emerging between the use of certain key technologies and improvements to the business. The Internet of Things (IoT), enabled by ubiquitous connectivity and intelligent D&A, is bringing a step-change in productivity and customer experience, thanks to remote monitoring and maintenance. In addition, tech firms are increasingly using artificial intelligence (AI) and software robotics to autonomously manage customer transactions, predict customer needs, and prevent service problems.

Investment strategies appear to be quite broad, suggesting a challenge for tech executives in prioritizing the appropriate technologies that could deliver competitive advantage. IoT tops the list of investments, followed by cloud and D&A. Respondents are especially keen to enhance their products and services, to improve productivity, cut costs and improve competitive advantage.

3. In a fast-moving marketplace, tech companies are uncertain as to which disruptive technologies will be the real game-changers.

With so many emerging technologies like virtual/augmented reality, robotics and 3D printing, picking the winners is a tough call. The global tech leaders taking part in our survey say their companies are investing heavily in more strategic technologies such as IoT and marketing platforms. But while these technologies are helping their product development marketing and operations, they are not necessarily performing better than investments in some earlier stage technologies.

That's why tracking investments against key indicators like productivity, operating costs and customer experience is so important. Although this practice is on the rise, only around half of the survey respondents are routinely measuring these and other key performance metrics, leaving considerable room for improvement.

4. Disruptive technologies are not a high enough priority on tech industry leaders' agendas.

Given its potential for transforming the business model and driving a competitive edge, disruptive technology is, surprisingly, often considered the domain of the IT department. This may explain why just 18 percent of the executives taking part in the survey feel strongly that they have a clear strategy and mission – and just 21 percent strongly agree that their C-level executives keep a close eye on disruptive technology. Without firm guidance from the top, the chance of making the right investment decisions — and gaining the most from the technologies they adopt — is likely to be compromised.

Strategic agility is another essential ingredient in a world where markets can transform in a very short timescale. Many tech businesses admit that a failure to adapt quickly to trends has cost them dearly. Neither are they leveraging the potential of partners like vendors and/or consultants who could help them move faster and more decisively. They also lack the people and skills to get the most out of disruption, which again, could slow the pace of change and leave them trailing more flexible competitors.
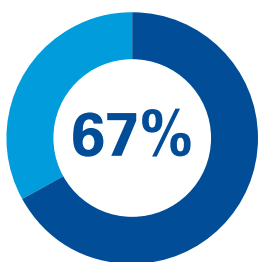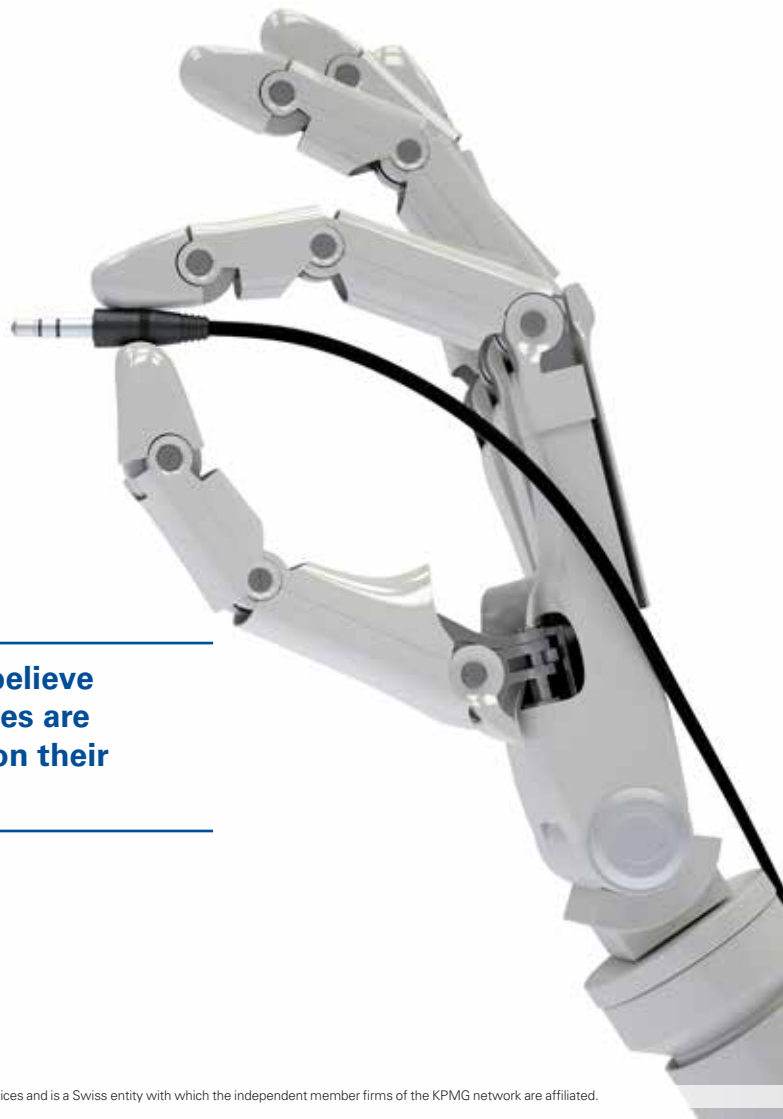
Contents

The disruptors are the disrupted

Disruptive technologies are forcing the industry's leaders to reassess their competitive positions and their rules of engagement.

Whether it's designing new software, building futuristic devices or pushing the boundaries of the internet, technology companies are accustomed to shaking up other sectors. So, what happens when these disruptors discover that new technologies are changing the face of their own industry? Are they ready — or are they getting caught in the headlights of disruption?

The impact of disruptive technology on an organization can be multi-faceted and hard to pin down. Disruption acts as a driver of change across many business disciplines. Its effects are pervasive, requiring firms to invest differently, act bravely and adapt their corporate cultures.

Given that technology companies tend to be innovators and are primarily responsible for much of the disruptive technology out there, it's little surprise that most seem to be upbeat about its potential. More than two-thirds of respondents (67 percent) say they've seen a positive impact on either their organizations or their industry. Fifty-one percent are excited about the ability to enter new markets on the back of disruptive technologies, and 46 percent see opportunities to develop new monetization models.
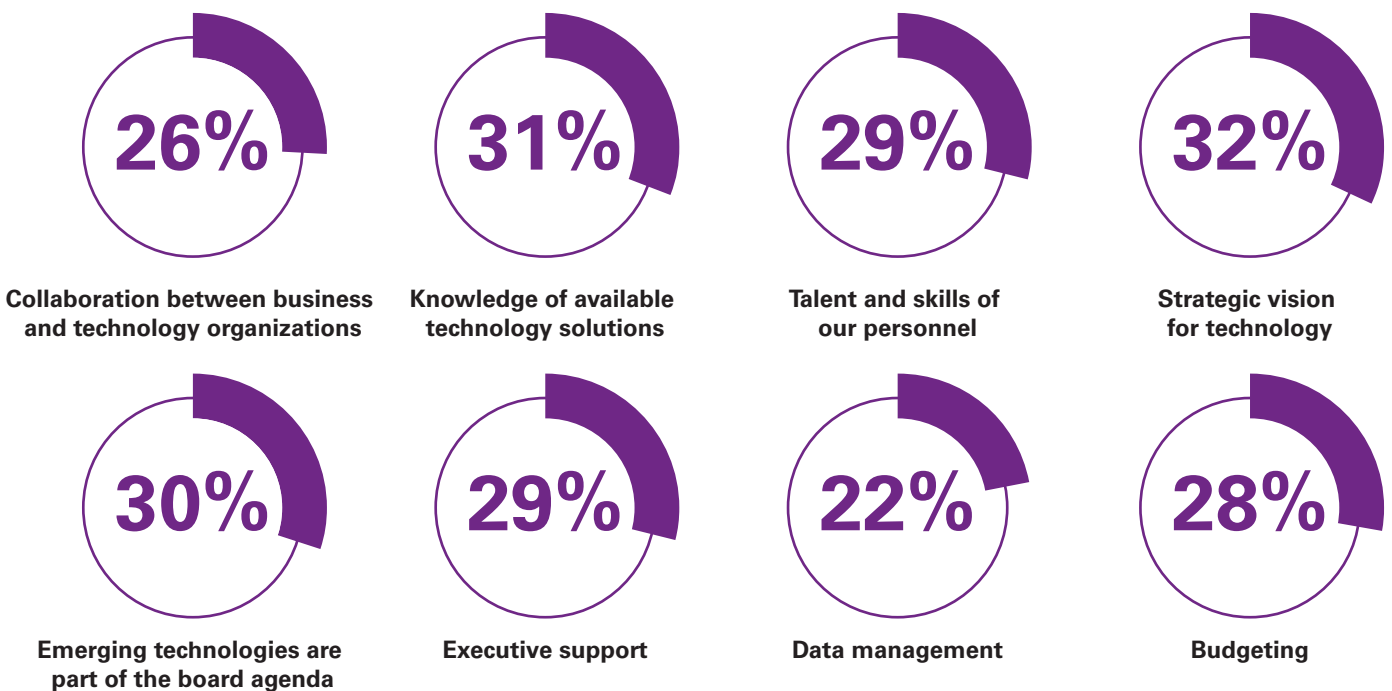
67% of tech leaders surveyed believe that disruptive technologies are having a positive impact on their company's performance.

In spite of this apparent optimism, many leaders of technology firms admit that their organizations may not be ready for disruptive technologies and the changes they bring. Less than one-third of respondents believe their companies are "very prepared" in their strategic vision and only 31 percent feel they have a strong knowledge of available technology solutions.

Less than one-third of technology companies are very prepared for disruptive technology

"How prepared is your company to address each of the following opportunities/issues as they relate to new, disruptive technologies?" (Responses indicate percentage that are "very prepared.")

26%
Collaboration between business and technology organizations

31%
Knowledge of available technology solutions

29%
Talent and skills of our personnel

32%
Strategic vision for technology

30%
Emerging technologies are part of the board agenda

29%
Executive support

22%
Data management

28%
Budgeting

Base: 580 business and IT decision makers at technology companies.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

"Technology firms are both creating disruption and being disrupted as companies in all industries from healthcare to retail to automotive look to incorporate leading software, mobile, D&A and platforms into their product and service offerings. In many ways, all companies are becoming technology companies."

Gary Matuszak
Global Chair
Technology, Media and Telecommunications
KPMG International

The disruptors have become the disrupted — and the sheer speed at which disruptive technologies are changing the landscape is replacing optimism with concerns for technology executives.
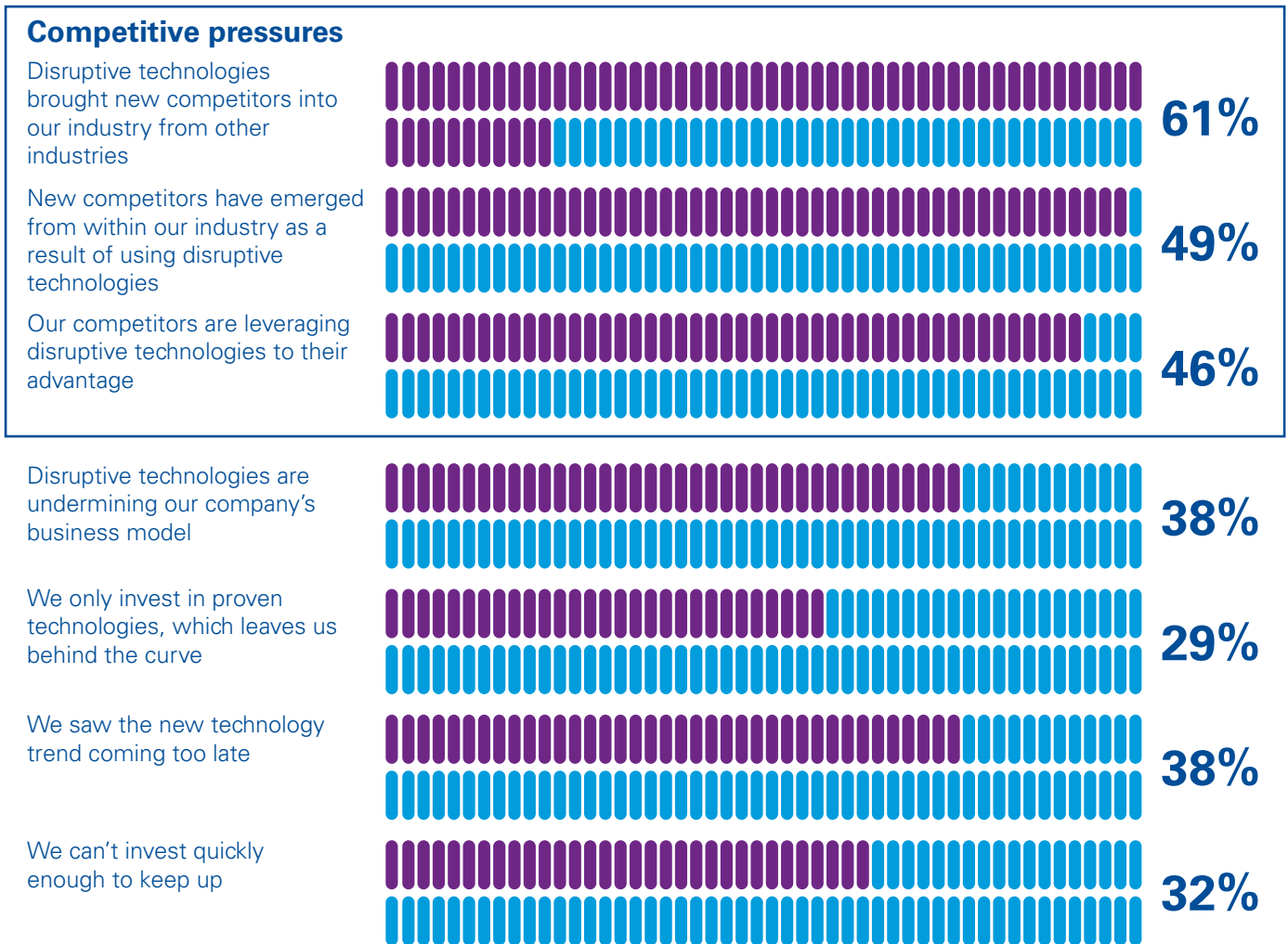
Disruptive technology is breaking down traditional boundaries between industries. Almost four out of five technology leaders taking part in the survey are worried about non-technology firms becoming technology firms, and of those respondents citing a negative impact from disruption, 61 percent say it's because of new competitors entering from other industries.

The biggest fear for technology leaders is competition from both within and outside of the industry.

Competitive pressures drive disruptive technology fears

"To what do you attribute the negative impact of disruptive technologies on your organization's performance?" (Select all that apply.)

Competitive pressures

Disruptive technologies brought new competitors into our industry from other industries
61%

New competitors have emerged from within our industry as a result of using disruptive technologies
49%

Our competitors are leveraging disruptive technologies to their advantage
46%

Disruptive technologies are undermining our company's business model
38%

We only invest in proven technologies, which leaves us behind the curve
29%

We saw the new technology trend coming too late
38%

We can't invest quickly enough to keep up
32%

Base: 99 business and IT decision makers at technology companies where disruptive technologies are having a somewhat or significant negative impact on their organization.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

Disruption presents openings for traditional rivals. Half of the respondents (49 percent) that have had a negative experience of disruption say it's due, in part, to pressure from other companies within the sector. Hardly a day goes by without news of how a large platform company is moving into a new area, whether it's cloud computing or AI, home security or connected vehicles, payments or drones.

On top of this, venture capital or crowdfunded startups are a growing challenge, capable of quickly becoming major players within a few short years. For example, the democratization of technologies — through the web, inexpensive cloud computing, open source and ubiquitous connectivity — means that technology companies can emerge from anywhere in the world. Alibaba, the Chinese e-commerce giant, began as a humble startup and is now one of the world's biggest online retailers.

All of these factors combine to obscure the way forward for tech firms, and technology leaders are struggling to determine which disruptive technologies to adopt in a way that adds the most value to their businesses.

⬤ KPMG insight

Who's eating your lunch?

Today, everyone is a tech company. Automotive companies are pushing ahead in customer interface technology, using AI and image processing to enhance their autonomous vehicles. Rather than going to a technology player, they're doing it themselves, and in the process creating powerful technology and business platforms. Other companies such as Tesla and Uber consider themselves as being tech companies as much as being in the mobility or automobile business.

But disruptive technology doesn't just let in new competitors from other sectors; it also breaks down boundaries within the tech industry. Often this is a result of innovation by firms looking for new solutions not currently available on the market. Google, Facebook and Amazon have all come up with their own ways of managing computing power and networks, in the process developing solutions that they themselves can monetize, threatening the established order of computing and network equipment firms like HP, Cisco and Ericsson.

Richard Hanley
US Advisory Industry Leader
Technology, Media and
Telecommunications
KPMG in the US

Seismic shifts: The organizational impacts of disruptive technologies

Across a broad spectrum of technology areas, from D&A to digital payments, IoT to robotics, senior technology business leaders say they're using disruption to change how they run their operations and serve their customers. In order to effectively navigate through the array of disruptive technologies, tech executives need to understand their impact on an organization's operating and business models.
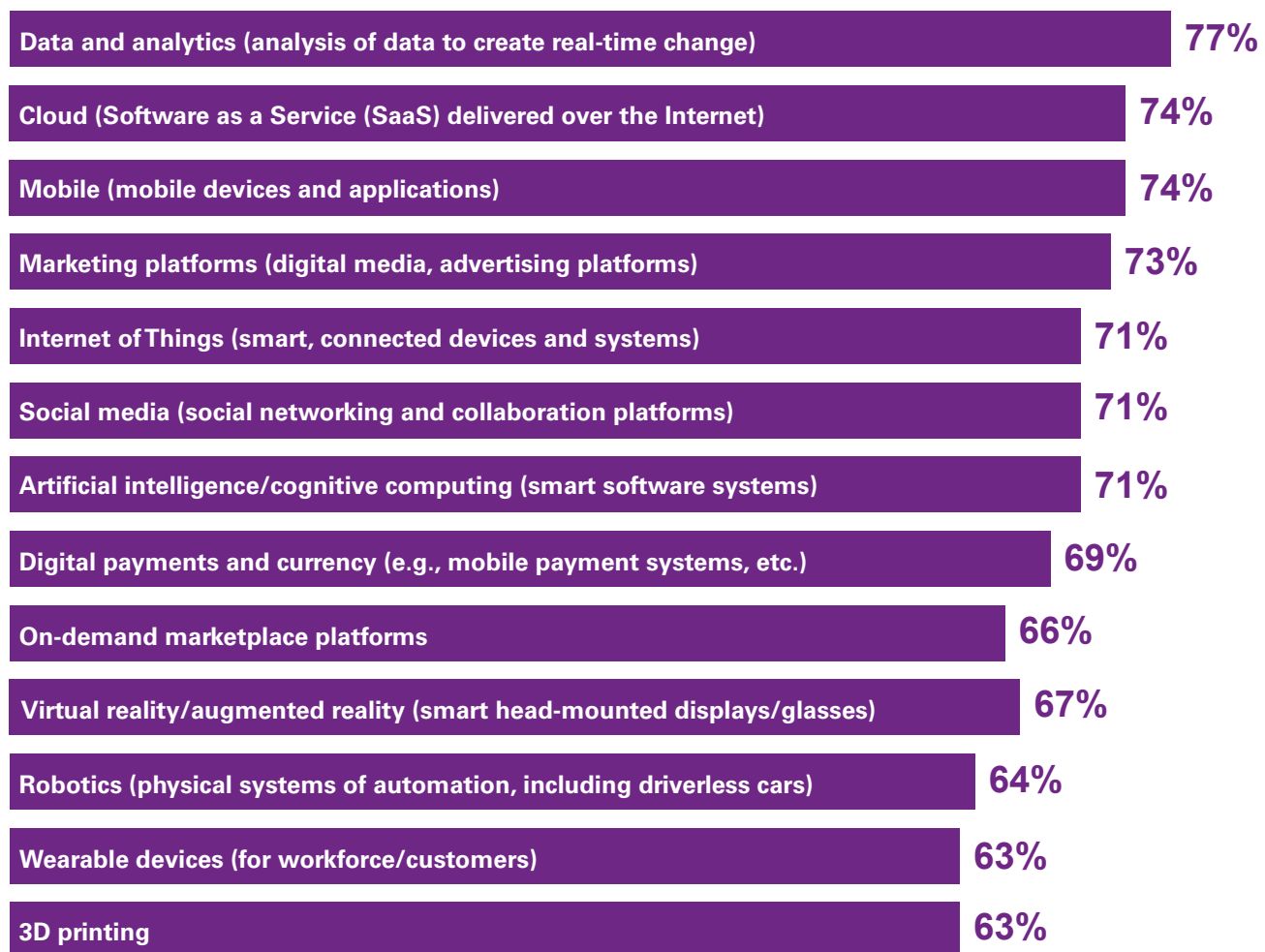
Disruptive technologies are improving the operating model

Disruptive technologies have enormous potential to enhance the underlying economics of specific business processes, to drive higher productivity, make workflows more efficient, speed up the supply chain and transform the back-office. These advances are especially relevant to tech manufacturers, but software and service-based players can also enjoy a step-change in operational performance. Technology organizations are seeing an impact from a wide range of technologies. The top three are not that surprising (D&A, cloud and mobile are well-established); but of possibly greater importance is the readiness to embrace emerging and less proven technologies like virtual and augmented reality, robotics and 3D printing.

Impact of disruptive technologies on the way technology companies run operations

"To what extent are each of the following technology areas changing how you run your operations (i.e., driving productivity, running workflows, moving goods and services, operating infrastructure, and other internally focused business activities)?" (Moderate or significant impact.)

Technology	%
Data and analytics (analysis of data to create real-time change)	77%
Cloud (Software as a Service (SaaS) delivered over the Internet)	74%
Mobile (mobile devices and applications)	74%
Marketing platforms (digital media, advertising platforms)	73%
Internet of Things (smart, connected devices and systems)	71%
Social media (social networking and collaboration platforms)	71%
Artificial intelligence/cognitive computing (smart software systems)	71%
Digital payments and currency (e.g., mobile payment systems, etc.)	69%
On-demand marketplace platforms	66%
Virtual reality/augmented reality (smart head-mounted displays/glasses)	67%
Robotics (physical systems of automation, including driverless cars)	64%
Wearable devices (for workforce/customers)	63%
3D printing	63%

Base: 580 business and IT decision makers at technology companies.
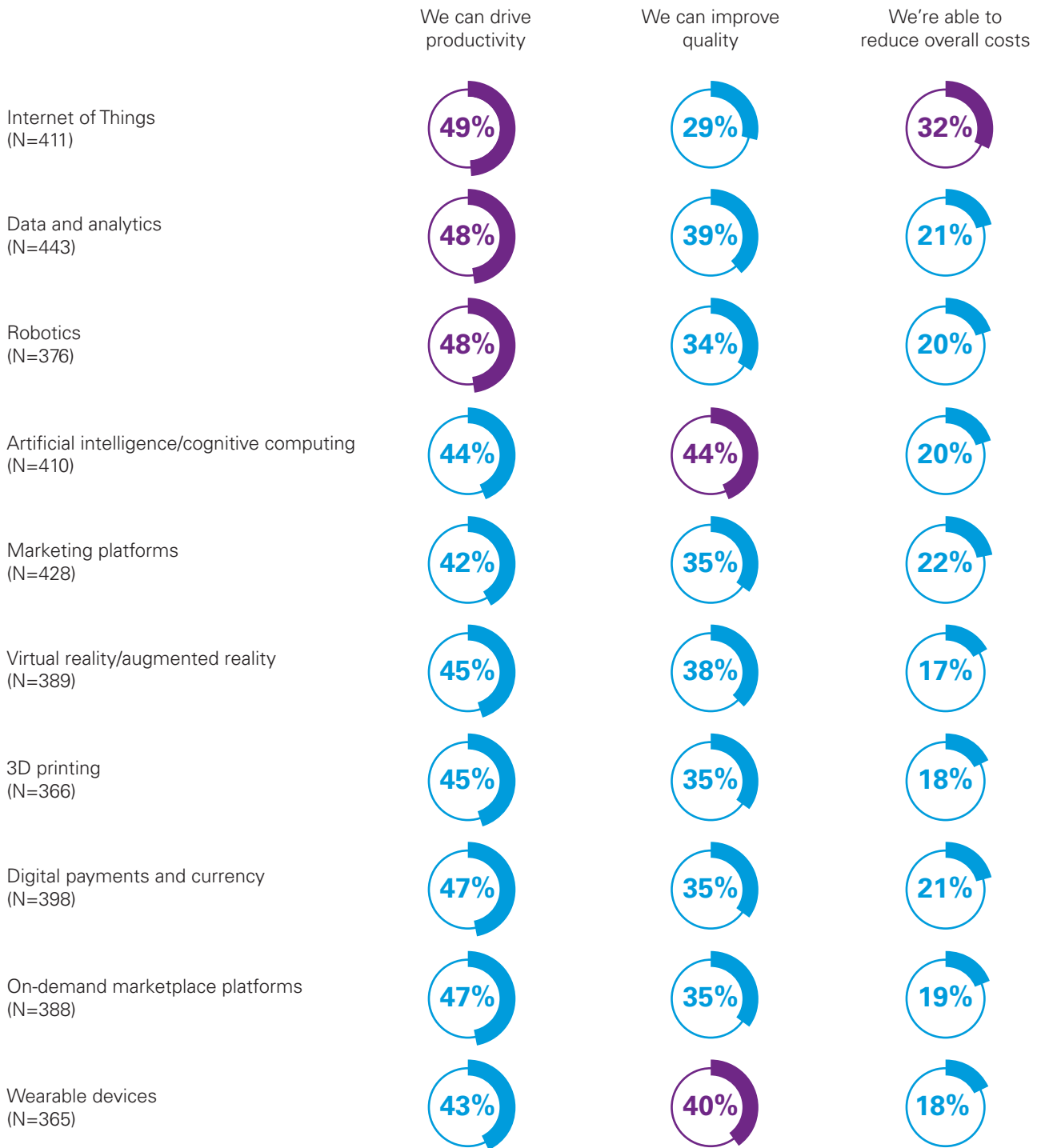Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

So, how are today's technology players using disruptive technologies in practice? Tech firms are using a range of disruptive technologies to drive productivity. However, these technologies are also making a difference in improving quality and reducing costs.

Ways disruptive technologies are changing how technology companies run operations

"How are each of the following technologies changing how you run your operations?" (Select all that apply.)

	We can drive productivity	We can improve quality	We're able to reduce overall costs
Internet of Things (N=411)	49%	29%	32%
Data and analytics (N=443)	48%	39%	21%
Robotics (N=376)	48%	34%	20%
Artificial intelligence/cognitive computing (N=410)	44%	44%	20%
Marketing platforms (N=428)	42%	35%	22%
Virtual reality/augmented reality (N=389)	45%	38%	17%
3D printing (N=366)	45%	35%	18%
Digital payments and currency (N=398)	47%	35%	21%
On-demand marketplace platforms (N=388)	47%	35%	19%
Wearable devices (N=365)	43%	40%	18%

■ Top-ranked technologies in each category.

Base: Varies; business and IT decision makers at technology companies where disruptive technology is having a moderate or significant impact on how they run their operations.

Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

Productivity

IoT, D&A and robotics are the three biggest aids to productivity. Almost half (49 percent) of survey respondents state that IoT is a key driver of business productivity — from improving employee efficiency and project timelines to restructuring supply-chain processes and more. For example, when every aspect of a production process is connected 24/7 through IoT devices and supported by the cloud, those responsible for control can monitor in real-time, spotting faults, and proactively maintaining and repairing equipment — often without the need for human intervention.

D&A, on the other hand, can drive better forecasting by analyzing sales patterns and linking these to the supply chain to optimize purchasing and inventory, and react faster to changes in demand. And many routine, repeatable, back-office tasks are using software robotics to automate and speed up processes. Likewise, progressive Software as a Service (SaaS) providers are using D&A to better understand what drives customer consumption and outcomes, leading to improvements in sales and service efficiencies.

Quality

When it comes to improving operational quality, AI, wearables and D&A have the greatest potential. AI, in combination with D&A, can help analyze data from production lines or service delivery processes to recognize patterns and predict breakdowns, helping to improve performance. Wearables provide a useful tool for employees responsible for diagnosis and inspection, giving them more information at their fingertips to make decisions on quality control of production and packaging.

Reducing overall costs

The disruptive technologies that respondents most frequently attributed to cutting costs are IoT, D&A, marketing platforms and digital currency. Digital currencies are quickly emerging with a promise of reducing the costs of transactions, enabling firms to exchange payments with unknown third parties, raising the level of trust and reducing risk. Many companies are starting to experiment with newer transaction technologies, such as Blockchain, to reduce costs in business operations by carrying out small transactions without the need for laborious and expensive invoicing processes. With the potential for fast and widespread adoption, this is just the beginning.

Disruptive technologies are transforming business models and the customer experience
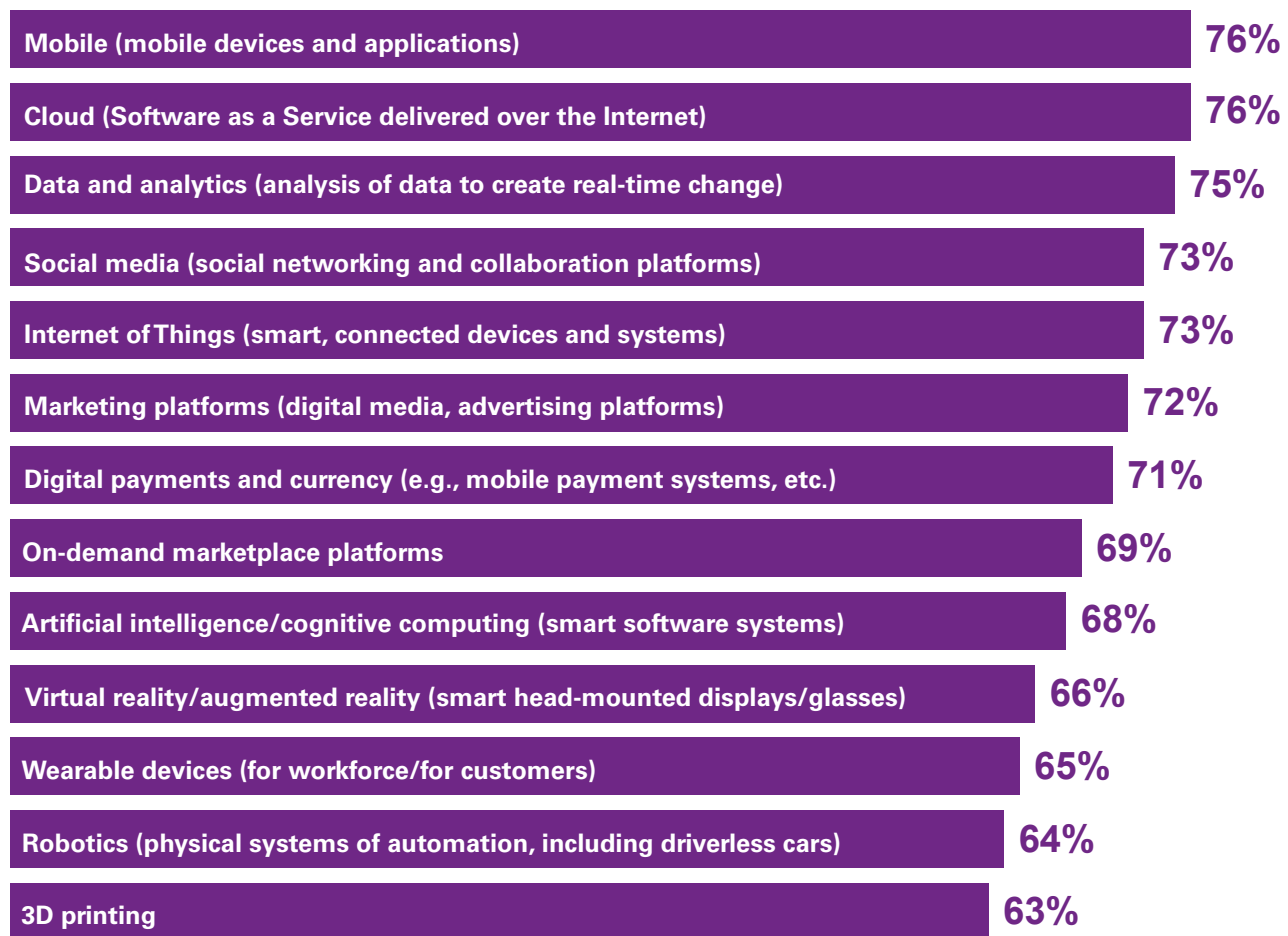
Everywhere we look, technology companies are seeking new ways to service customers digitally, using the power of D&A to understand needs and make offerings personalized.

Tech executives believe that a wide range of disruptive technologies are aiding this transformation, with mobile, cloud and D&A leading the way, and many others close behind.

Impact of disruptive technologies on the way technology companies serve customers

"To what extent are each of the following technology areas changing how you serve your customers?"
(Moderate or significant impact.)

Mobile (mobile devices and applications)	**76%**
Cloud (Software as a Service delivered over the Internet)	**76%**
Data and analytics (analysis of data to create real-time change)	**75%**
Social media (social networking and collaboration platforms)	**73%**
Internet of Things (smart, connected devices and systems)	**73%**
Marketing platforms (digital media, advertising platforms)	**72%**
Digital payments and currency (e.g., mobile payment systems, etc.)	**71%**
On-demand marketplace platforms	**69%**
Artificial intelligence/cognitive computing (smart software systems)	**68%**
Virtual reality/augmented reality (smart head-mounted displays/glasses)	**66%**
Wearable devices (for workforce/for customers)	**65%**
Robotics (physical systems of automation, including driverless cars)	**64%**
3D printing	**63%**

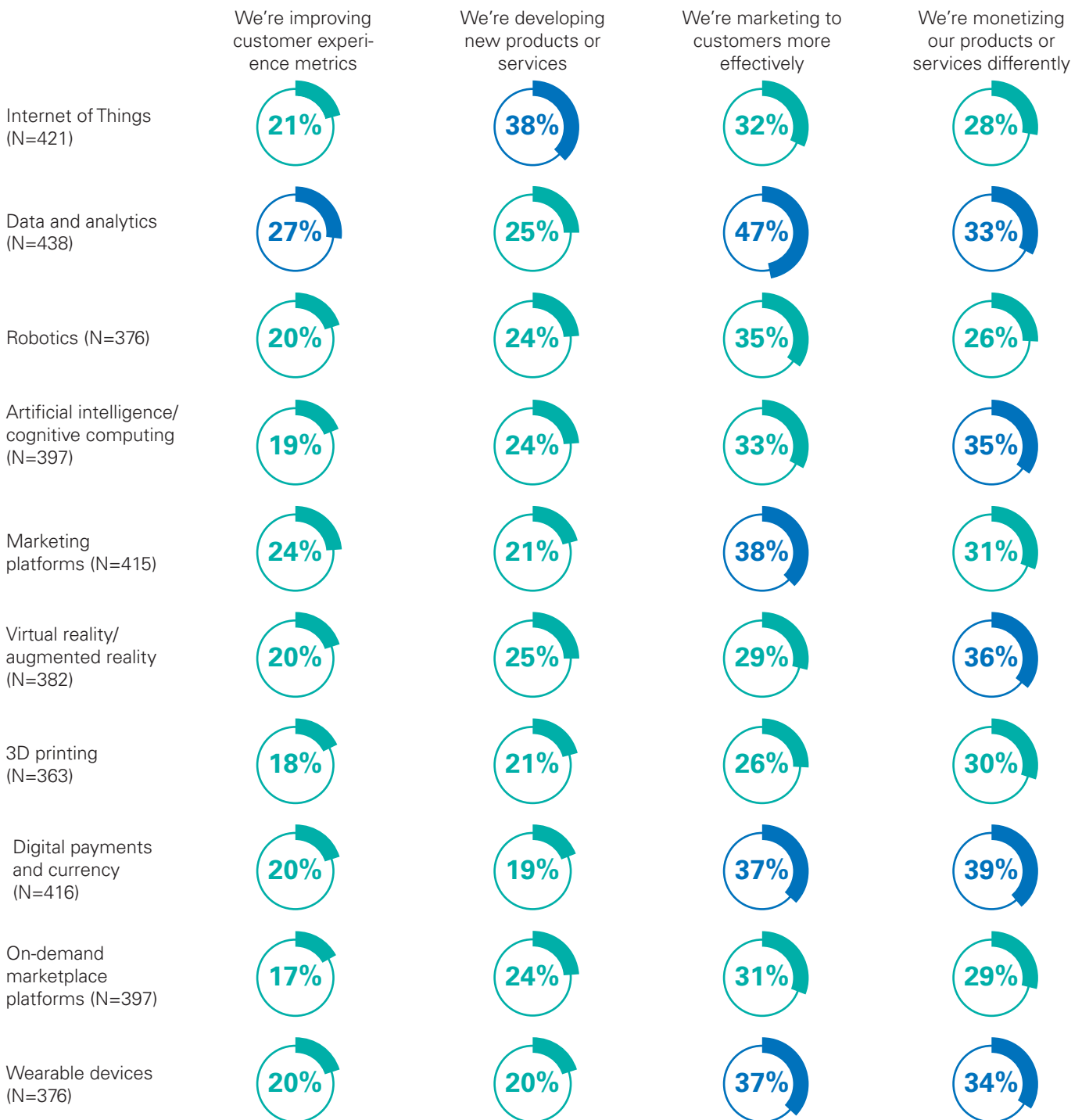Base: 580 business and IT decision makers at technology companies.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

Looking at which technologies have the most impact, IoT is the leader in developing new products and services, D&A in marketing to customers more effectively, while digital payments and currency are being used to monetize products and services more effectively.

Ways disruptive technologies are changing how technology companies serve customers

"How are each of the following technologies changing how you serve your customers?" (Select all that apply.)

	We're improving customer experience metrics	We're developing new products or services	We're marketing to customers more effectively	We're monetizing our products or services differently
Internet of Things (N=421)	21%	38%	32%	28%
Data and analytics (N=438)	27%	25%	47%	33%
Robotics (N=376)	20%	24%	35%	26%
Artificial intelligence/ cognitive computing (N=397)	19%	24%	33%	35%
Marketing platforms (N=415)	24%	21%	38%	31%
Virtual reality/ augmented reality (N=382)	20%	25%	29%	36%
3D printing (N=363)	18%	21%	26%	30%
Digital payments and currency (N=416)	20%	19%	37%	39%
On-demand marketplace platforms (N=397)	17%	24%	31%	29%
Wearable devices (N=376)	20%	20%	37%	34%

■ Top-ranked technologies in each category.

Base: Varies; business and IT decision makers at technology companies where disruptive technology is having a moderate or significant impact on how they serve their customers.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

Developing new products and services

Most tech companies are now driven by software, with the hardware increasingly becoming commoditized. IoT opens up opportunities to remotely connect to products like network equipment and instantly adjust their configuration to carry out remote upgrades (e.g., software-defined networks). This is faster, cheaper and, most importantly, adaptive, requiring little human intervention. And because IoT is connected, you can extract data to offer additional services like benchmarking, enabling customers to compare the performance of their operations with their peers. Not surprisingly, these kinds of advantages have led respondents to consider IoT the most important technology for developing products and services.

Marketing

For marketing purposes, D&A is the most valuable technology, followed by marketing platforms and wearables. Data analytics can improve the accuracy of targeting and push up conversion rates. Marketing platforms enable companies to reach customers digitally, expanding the target market, significantly lowering the cost of reaching the desired customer base, and launching new products and services. For this, D&A and marketing platforms are at the heart of many subscription-based, 'everything-as-a-service' offerings.

KPMG insight

Using disruptive technology to increase monetization

With the advent of digital, powered by the cloud, many tech companies can now reach customers that were previously inaccessible. Take enterprise software as an example. The traditional go-to-market model involved a large sales force and integration team, focusing on bigger, often multinational, corporate clients demanding tailored solutions. All this was out of reach for small or medium-sized businesses (SME) — until now. Cloud enables a largely online sales process and a more standardized solution, with a cloud-enabled model of after-sales support — which puts these offerings within the price range of a far wider audience.

Electronics contract manufacturers, which make a range of wearables and other products for tech companies, have harnessed D&A to expand their solutions. Making use of their knowledge of clients' supply chains and sales patterns, these producers can offer important intelligence on costs, demand trends and customer needs. Their clients are willing to pay for these valuable insights for benchmarking, operational and marketing purposes.

Philip Wong
Principal
Technology, Media and Telecommunications
Global Strategy Group
KPMG in the US
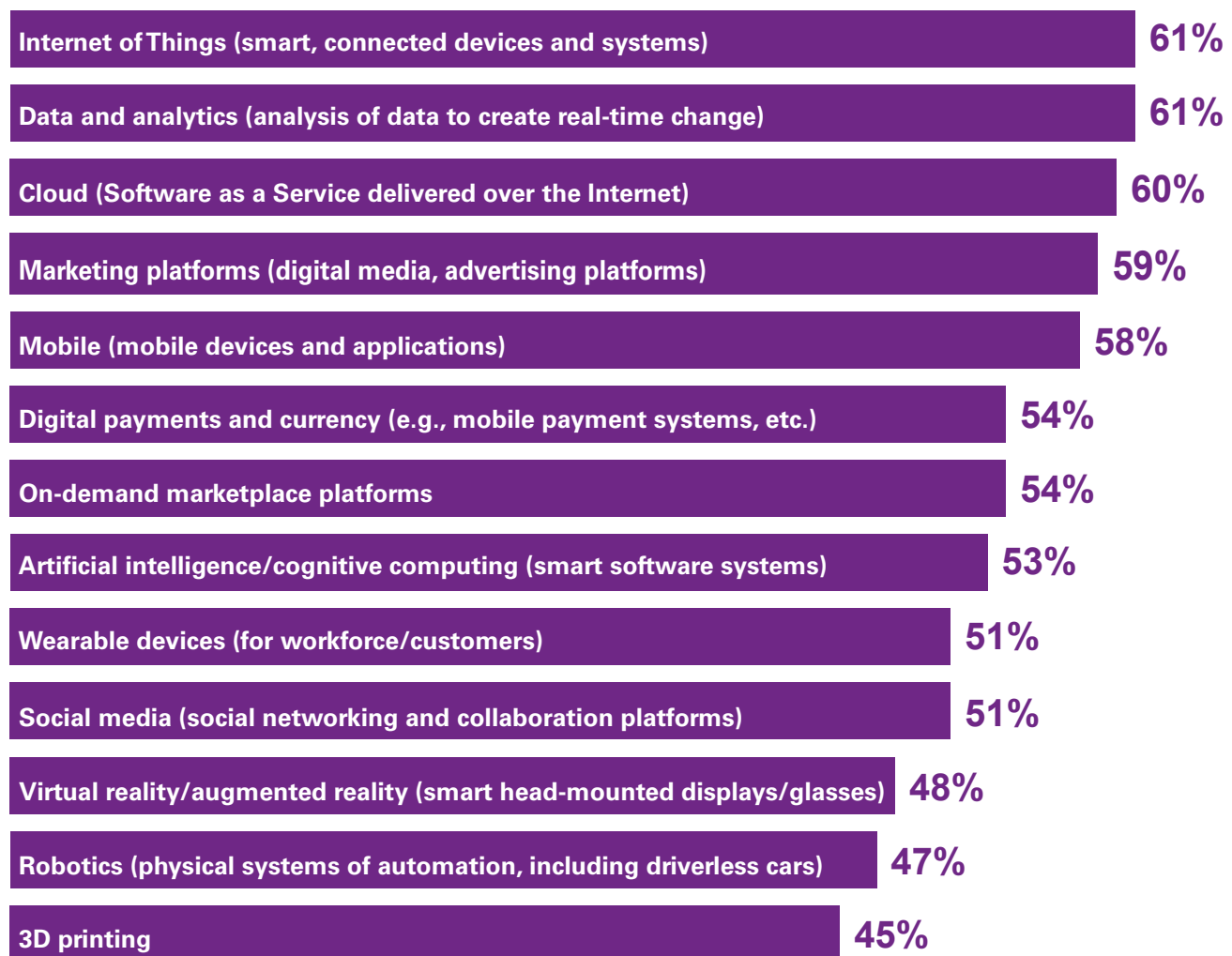
Tech firms are investing in many areas of disruption

Investments are an indicator of the emergence of disruptive technologies and reveal where the technology industry is placing its bets. In a fast-moving sector, leaders need to know where competitors' priorities lie and whether particular technologies can bring them an advantage.

Our survey findings suggest that most firms are casting the net widely, investing in a number of different technologies simultaneously. Such a broad investment strategy reflects the uncertainty over which technologies are likely to bring the greatest impact and the lack of a clear strategy for investing in disruptive technologies.

Disruptive technologies investment: organization

"To what extent is your company investing in each of the following technologies?"
(Tangible or strategic, significant investment.)

Technology	%
Internet of Things (smart, connected devices and systems)	61%
Data and analytics (analysis of data to create real-time change)	61%
Cloud (Software as a Service delivered over the Internet)	60%
Marketing platforms (digital media, advertising platforms)	59%
Mobile (mobile devices and applications)	58%
Digital payments and currency (e.g., mobile payment systems, etc.)	54%
On-demand marketplace platforms	54%
Artificial intelligence/cognitive computing (smart software systems)	53%
Wearable devices (for workforce/customers)	51%
Social media (social networking and collaboration platforms)	51%
Virtual reality/augmented reality (smart head-mounted displays/glasses)	48%
Robotics (physical systems of automation, including driverless cars)	47%
3D printing	45%

Base: 580 business and IT decision makers at technology companies.
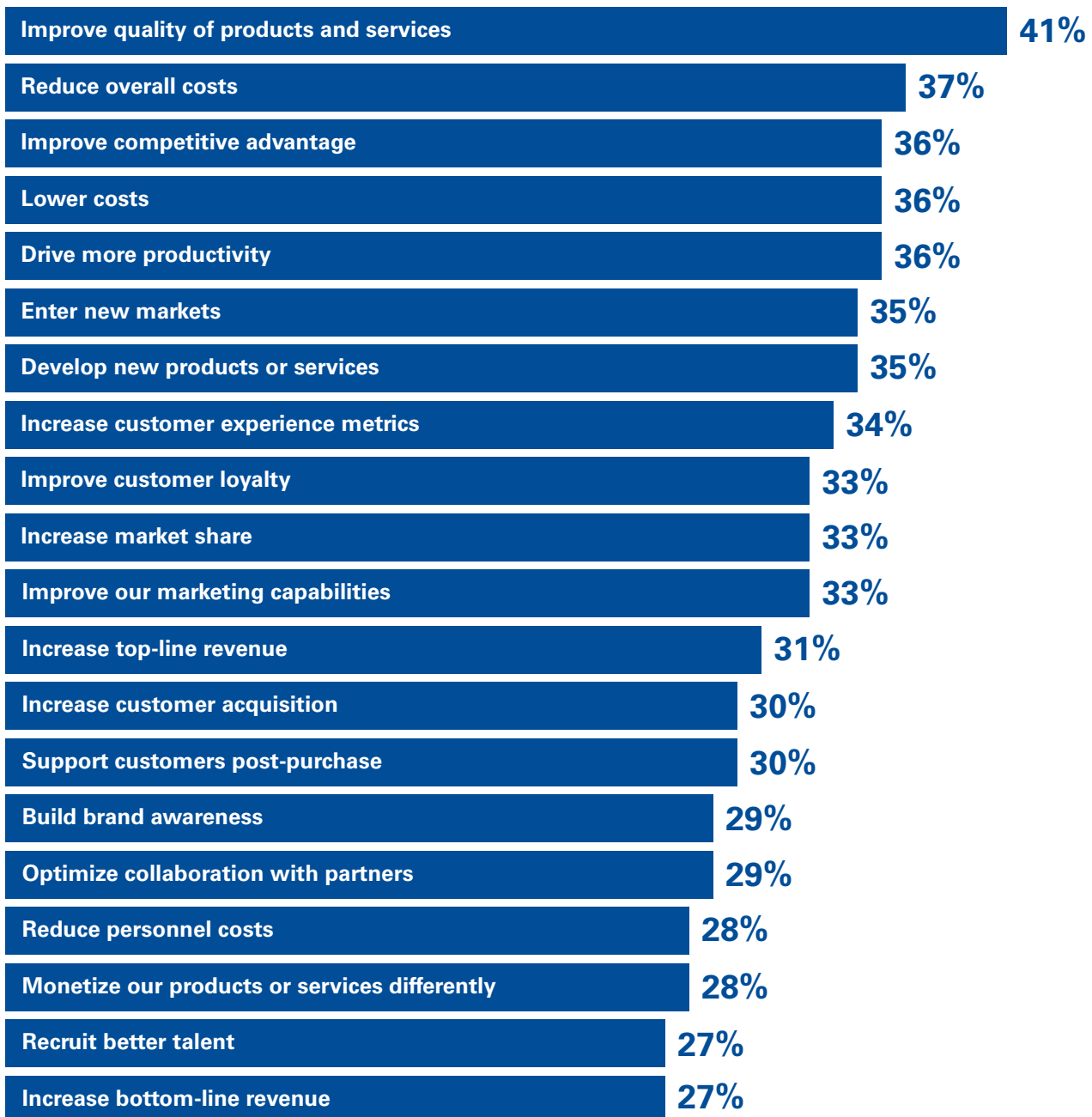Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

In our view, investment objectives should be determined by the sector a company is operating in (software, hardware, e-commerce, etc.) and its strategic objectives (fast growth, low-cost, mass-market, premium positioning, etc.). The technology industry leaders taking part in the survey appear to have two over-riding priorities when investing in disruptive technologies: product strategy and business operations.

Most-important business goals

"When investing in a disruptive technology, what are your company's most important business goals?"
(Select all that apply.)

Goal	%
Improve quality of products and services	**41%**
Reduce overall costs	**37%**
Improve competitive advantage	**36%**
Lower costs	**36%**
Drive more productivity	**36%**
Enter new markets	**35%**
Develop new products or services	**35%**
Increase customer experience metrics	**34%**
Improve customer loyalty	**33%**
Increase market share	**33%**
Improve our marketing capabilities	**33%**
Increase top-line revenue	**31%**
Increase customer acquisition	**30%**
Support customers post-purchase	**30%**
Build brand awareness	**29%**
Optimize collaboration with partners	**29%**
Reduce personnel costs	**28%**
Monetize our products or services differently	**28%**
Recruit better talent	**27%**
Increase bottom-line revenue	**27%**

Base: 580 business and IT decision makers at technology companies.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

> **"** Increasingly, tech firms are 'eating their own dog food' by testing out the potential of different disruptive technologies in their own enterprise environment first, to showcase their impact. **"**

Gary Matuszak
Global Chair
Technology, Media and Telecommunications
KPMG International

Product strategy

Tech business leaders' single most important investment goal is to improve the quality of products and services (41 percent) followed by developing new products and services (35 percent). Their companies are using disruptive technologies to bring greater functionality to existing products or create completely new value propositions to delight the customer.

When investing in disruptive technology, tech companies are using them to develop products and services, and move into new markets. "We are seeing the technology sector and other sectors eroded by companies that can't find products and services to satisfy their needs. So they are forced to innovate and create their own products and solutions that end up being a threat to the traditional leaders within this category," says Philip Wong, Principal, Technology, Media and Telecommunications, Global Strategy Group, KPMG in the US. For example, when Amazon faced an unprecedented level of transactions from its e-commerce business, it was concerned with the cost and performance of using established computer and network equipment companies to support this growth. Instead, Amazon chose to internally

develop new ways to deploy and manage a vast amount of computing and networking resources, at a reasonable cost and with good performance. These same technologies now power a multi-billion dollar cloud computing business that has become a threat to the very companies that originally vied for Amazon's business!

Business operations

Technology leaders continue to invest in technologies to drive improvements in fundamental operational performance. Some of the main goals are increased productivity (36 percent) and reduce overall costs (37 percent). These days the solutions are high-tech, with advances like robotics raising the efficiency of technology manufacturing operations and business processes. Similarly, cloud-based infrastructure and platform as a service vendors provide highly cost-effective ways for many companies to almost instantaneously scale their computing capacity.

> **"** We use rapid prototyping because we can turn around a customer need and develop a new style of machine within 4 months, which allows us to capture the early customer. So, we may well get the first five or six million users before anybody knows there's an application. **"**

Technology leader based in Europe, on how disruptive technologies are transforming product strategy

The disruptive technology value map: The intersection of investment and impact

Are tech firms getting value from their investments in disruptive technologies? Are they placing too much priority on today's 'table stakes' like D&A, cloud and mobile? Or are they risking it all on future stars, such as robotics, virtual and augmented reality (VR/AR), and 3D printing?

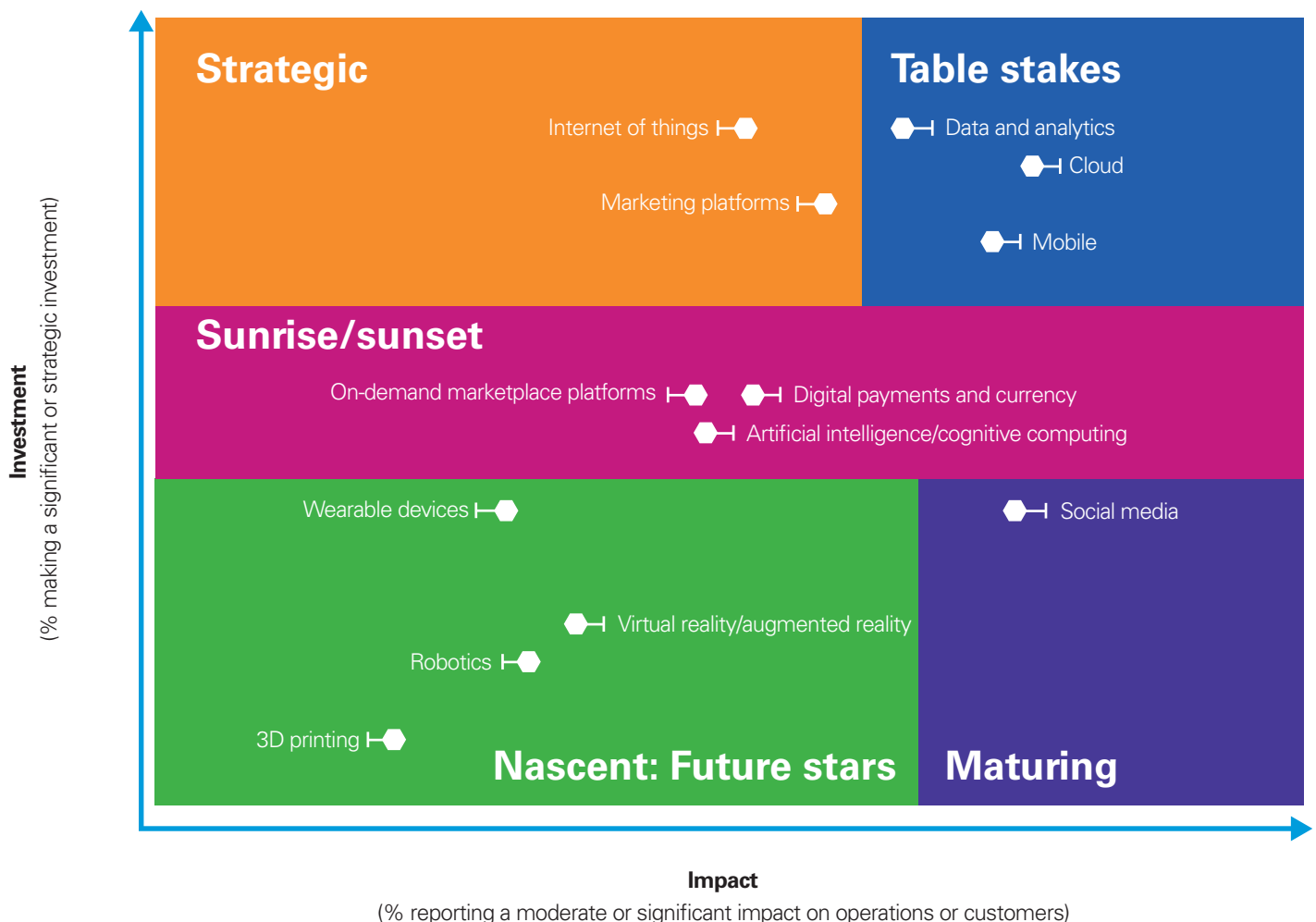## Disruptive technologies: Table stakes or future stars?

Building on data and insights from our research, we evaluated the 13 measured disruptive technologies using the following metrics: impact on operations, impact on business models and level of investment.

Combining these three metrics we have created the disruptive technology value map to help tech sector leaders guide investment decisions on disruptive technologies. The focus of investment needs to be determined by the business goals of the company as well as the stage of development of each technology.

It can also help companies benchmark themselves against their peers to prioritize different disruptive technologies. If tech companies are getting more value than their peers out of a 'sunrise' innovation like AI, they may feel they're ahead of the game. Alternatively, if they're not comfortable with the returns from a 'strategic' technology — for instance IoT — then they may wish to reassess both the level of investment and the application of this technology within the business.

KPMG framework: Disruptive technology value map

Base: 580 business and IT decision makers at technology companies.

Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

The five stages of disruptive technology

Based on investment-versus-impact model

01

Table stakes

Receives high investment and generates strong impact today. They have reached an initial phase of business maturity but remain vigorously innovative and challenging to master.

These technologies have become ubiquitous. Any tech business failing to embrace cloud, mobile and D&A risks falling behind in terms of efficiency, productivity and customer experience. But it's not just a case of adopting for adoption's sake. A good example is D&A: everyone is using it to some extent, but most businesses fail to reap the full benefit because they become overwhelmed with information but unable to deliver workable insights.

02

Strategic

Receives significant investment today in search of strong impact tomorrow. They are high on investment and medium-to-low on current impact.

Strategic technologies are starting to deliver, but carry exceptional future promise. More survey respondents say they're making a tangible or strategic investment in IoT (61 percent) than any other technology. IoT has a great potential to develop new products or services and support customers post-purchase. By connecting via smart, increasingly wearable devices, customers can become an intrinsic part of the product development process. The data generated from these devices can be used to improve the customer experience, leading to highly personalized offerings.

03

Maturing

Generates strong impact, but no longer requires high investment. They now receive medium-to-low investment, as systems hum along at producing value.

For technology firms, social media has reached maturity. It's an indispensable tool that doesn't require a great deal of ongoing investment. But are companies getting the most out of social media to interact with customers and stakeholders, respond to trends and track competitive activity? Respondents say "yes" but with new D&A algorithms emerging, this could be an area where savvy users can gain an edge in predicting, adapting and reacting faster to opportunities and threats.

04

Sunrise/sunset

Receives medium levels of targeted investment and have begun to generate medium levels of impact as well. Sunset technologies have passed their era of effectiveness, and see declining levels of investment and impact.

In both cases, these technologies fall into the medium investment, medium impact center of the technology value map. Tech firms are more likely to invest in sunrise disruptive technologies. One example is AI and cognitive computing. Thirty-five percent of respondents believe AI gives them the means to monetize products more effectively. Such solutions are already making their mark on the technology sector, raising operational quality, reducing human error and speeding up many routine business processes.

05

Nascent: future stars

Receives lesser levels of targeted investment and have yet to generate serious impact, but are seen as potential future stars.

The relative maturity of these technologies places a higher risk on investment. However, as in the example with VR/AR, tech firms appear to be getting a significant impact today even though its full potential won't be achieved for a few more years. Meanwhile, robotics is digitizing labor in tech companies' customer services as well as onshore and offshore shared services functions for Finance, HR and IT, raising efficiency and freeing up staff to concentrate on more analytic and strategic activities.

> **"** VR/AR could be the next major disruptive platform. It has the power to reshape how we interact with the world, disrupt existing business models and enable other disruptive technologies. For example, it will embed new, immersive experiences into social media offerings and change monetization opportunities for businesses ranging from retailers to realtors. **"**

Tudor Aw
Partner and Technology Sector Head
KPMG in the UK

Getting your timing right

The speed at which new disruptive technologies emerge, and the wide choice of ever-changing options, creates a dilemma for technology leaders. Do they spread their bets — and risk having their efforts diluted? Or do they focus on a few selected technologies — and risk choosing the wrong ones? Should they aim to be first-movers — or take a more cautious 'wait and see' approach?

This is a tough question as it may be risky to bet the ranch on new, unproven technologies or business models — but it's equally dangerous to wait too long and let events overtake you. Some 38 percent of respondents whose companies have suffered from disruptive technology admit that they saw trends coming too late. Conversely, 54 percent of those who say disruptive technologies are helping their business, claim they saw the new technology trend earlier than their competitors — and 46 percent invested in them at an early stage.

Whether tech businesses want to be first movers or fast followers, they need, above all, to be agile, to ensure they don't get left behind by others making better use of new technologies.

> **"** AI/cognitive is a disruptive technology that could revolutionize how we look at human labor. It provides significant monetization potential, which can vastly expand the capabilities of software/apps and services as we know them, by adding the kind of insights that traditionally required humans. **"**

Philip Ng
Partner and Head of Technology
KPMG China

Reshaping your organization for disruptive technologies

Leadership and vision are vital components in establishing a disruptive technology strategy — along with the resources, funding and strategic execution capabilities to successfully adopt the right technologies for your business.
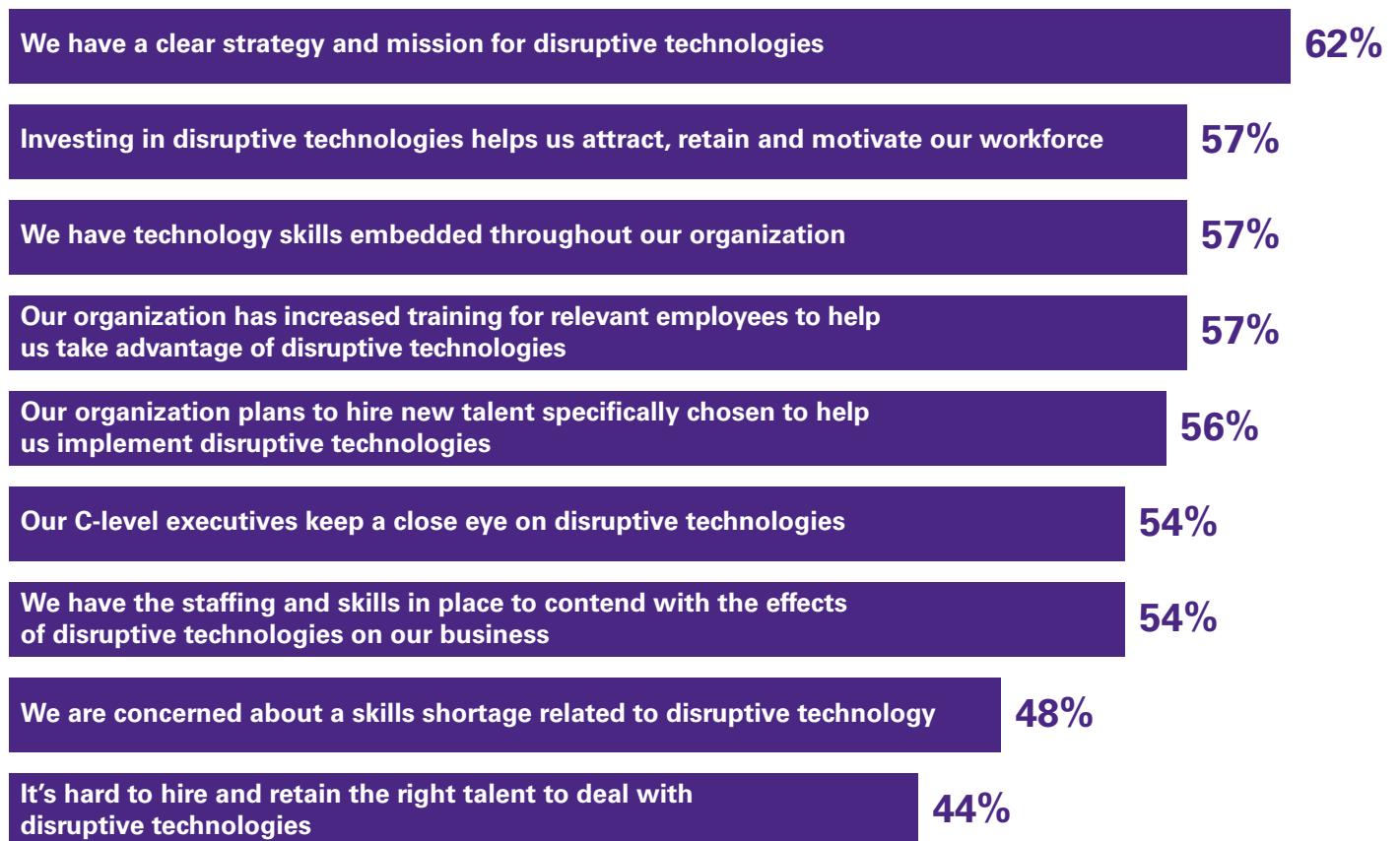
Disruptive technologies require a clear strategy

With so many exciting opportunities — and in many cases, existential threats — presented by disruptive technology, you would imagine that all technology leaders have made it a top priority. Here, the data reveals a mixed record.

Technology leaders' sentiments

"To what extent do you agree or disagree with each of the following statements?" (Agree or strongly agree.)

We have a clear strategy and mission for disruptive technologies	**62%**
Investing in disruptive technologies helps us attract, retain and motivate our workforce	**57%**
We have technology skills embedded throughout our organization	**57%**
Our organization has increased training for relevant employees to help us take advantage of disruptive technologies	**57%**
Our organization plans to hire new talent specifically chosen to help us implement disruptive technologies	**56%**
Our C-level executives keep a close eye on disruptive technologies	**54%**
We have the staffing and skills in place to contend with the effects of disruptive technologies on our business	**54%**
We are concerned about a skills shortage related to disruptive technology	**48%**
It's hard to hire and retain the right talent to deal with disruptive technologies	**44%**

Base: 580 business and IT decision makers at technology companies.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

Not all technology companies appear to be ready to adapt fully to disruptive technologies. A senior executive from an Asian technology firm, notes there is plenty of work to do: "When you've been in the industry for 20 years, you have this monolithic system, and traditionally we were perceived to be an organization that is happy getting on with what was running well. Nothing is broken, so there's no need to do anything different."

It seems that this company is not alone: 38 percent of the technology leaders taking part in the survey say their organizations do not have a clear strategy and mission for disruptive technologies.

And likewise, even with a clear strategy and mission, many companies failed to realize the full-potential of the changes brought on by the disruptive technologies as day-to-day business and "organizational inertia" get in the way of real transformation.

Despite the transformative potential of disruptive technologies, many tech companies appear to treat it as an IT issue — rather than a C-level strategic imperative. Respondents say that only 24 percent of investment decisions about new disruptive technologies are shared between technology and business management. And just half (53 percent) report that business and IT teams work together to co-create technology investment roadmaps.

To tap the full potential of these disruptive technologies, highly successful technology firms should articulate a clear strategy and mission that addresses disruptive technologies, integrates their business and IT capabilities into a single innovation vector, and puts in place a comprehensive transformation program to harness the full potential of the disruption.

KPMG insight

Disruption has to be on the executive agenda

The impact of disruptive technologies is so pervasive that no tech firm can afford to be without a clear strategy. Just over half of respondents (54 percent) say their C-suite keeps a close eye on disruption — and these companies are reaping the benefits. They are more likely to see key trends sooner and to invest in disruptive technologies at an earlier stage. And they are also making greater use of a wide range of technologies like D&A, IoT, cloud, mobile and AI/cognitive

to boost both their business models/customer offerings and their operations — all of which should bring a competitive advantage.

Pär Edin
Principal
Technology, Media and
Telecommunications Sector Lead
Global Strategy Group
KPMG in the US

Investment decision makers

Which constituencies at your company make investment decisions about new, disruptive technologies?

47%
Technology management — the IT department and/or the CIO's organization

24%
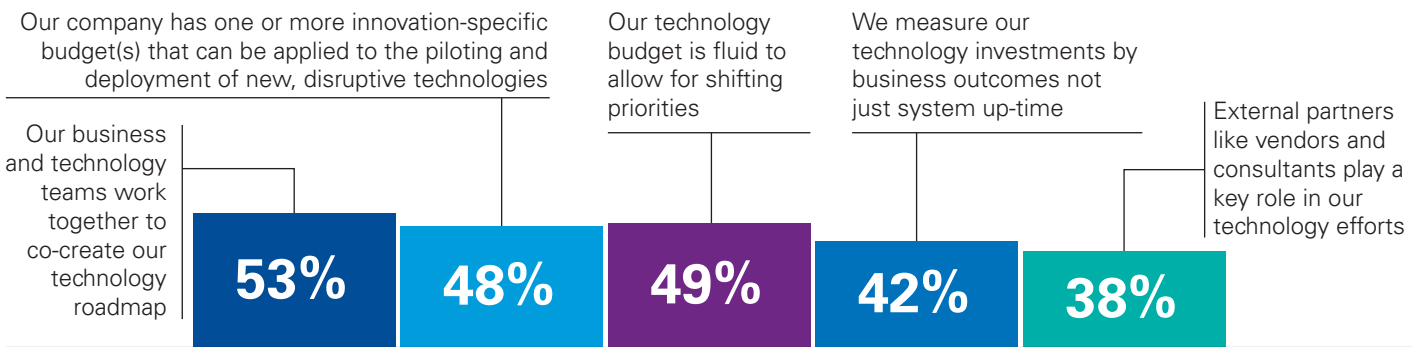Shared between technology management and business management

29%
Business management — product leads, the CMO, heads of sales, manufacturing/operations leads, or other business roles

Base: 580 business and IT decision makers at technology companies.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

How tech leaders make investment decisions

Which of the following statements characterize how your company makes investment decisions about technology?
(Select all that apply.)

Our company has one or more innovation-specific budget(s) that can be applied to the piloting and deployment of new, disruptive technologies

Our technology budget is fluid to allow for shifting priorities

We measure our technology investments by business outcomes not just system up-time

External partners like vendors and consultants play a key role in our technology efforts

Our business and technology teams work together to co-create our technology roadmap

53% **48%** **49%** **42%** **38%**

Base: 580 business and IT decision makers at technology companies.
Source: A commissioned study conducted by Forrester Consulting on behalf of KPMG, January 2016.

Integrating disruption into the business

Tech organizations need to be agile and quick-moving to make the right decisions on which technologies to adopt. Budgets are a vital part of this process to free up investment funds for new opportunities. However, less than half of respondents (49 percent) claim to have flexible budgets, and only a minority ring-fence money for disruptive technology pilots.

The survey results suggest that many are not making the most of assistance: only 38 percent of respondents say that vendors or consultants play a key role in their technology strategies. There is an easier path to success by working more closely with the vendors (who are developing new technologies) and consultants (who can help with both deployment and business implications like auditing, organizational structure and business strategy.

Measure, measure, measure

Tech leaders say they have a number of key objectives when investing in disruptive technologies — to improve operations, marketing and the way they interact with customers. But how are they tracking these investments?

There are signs that investments are becoming more integrated into strategy, performance and, in some cases, incentives — but there is some way to go. Fewer than half of respondents (42 percent) say their organizations measure the success of technology initiatives in terms of business outcomes — rather than just system uptime.

On a positive note, 54 percent of respondents state their organizations link investments to customer experience related measures, but fewer track campaign promotion, sales or channel metrics.

On the operational side, 51 percent measure investments against productivity and 47 percent against operating costs. Measuring ROI is important from a business perspective and as one technology executive told us, they measure the impact of productivity of field salespeople in terms of revenue: "Right now the very clear impact is incremental revenue: We witnessed a 22 percent increase in 4 months' time. You can't have any better parameter than this. It's a very, very clear change. There's no incremental cost attached to it, so our revenue is increasing. I think that's a very clear method we have."

The talent challenge

Is there a skills shortage holding back tech companies' ability to make the most of disruptive technologies? Talent is an ongoing issue for the entire sector, but there is a particular need for people with an understanding of disruption and its impact upon the organization. Specialists in areas like IoT, AI, robotics and D&A are in high demand — especially those that can combine technical skills with a wider business understanding.

The tech sector executives in the survey are highly aware of this need (48 percent are concerned about a skills shortage) and a majority are planning to hire and/or train existing employees specifically to help implement disruptive technologies. Disruption ultimately affects the way everyone works, so a change in mindset and incentives, coupled with new skills development, will be key factors in determining success.

"Finding talent is an industry-wide problem — talent is expensive at the moment, so you need to redesign thinking. You need people who can work with different technologies, people who can converge with business, and people who can take business understanding and technology understanding to bring solutions to life."

Account Director from an Indian technology company

Conclusion: Successfully navigate disruption

New, disruptive innovations are emerging at a rapid pace. With so many options to choose from it's extremely difficult to methodically scan, assess, pilot and deploy new technologies. Yet, it's critical to try. From the trends we are seeing globally among tech organizations, it's evident that tech leaders need to not only embrace disruptive technologies, but examine their own technology investments and determine if they are leveraging them effectively.

Some organizations are striving to be leaders in adopting disruptive technologies, while others may be playing a game of 'fast-follower' or 'wait and see.' At the other end of the spectrum, there are leaders that may not even realize they are being disrupted, and others who choose to ignore disruption or let short-term priorities blind them to its possibilities, convinced that their current path will continue to bring success. We strongly believe that technology leaders and their business partners have to be actively engaged in investing in disruptive technologies and leveraging them effectively — or they risk being left behind.

We have identified five key actions technology organizations should take as they invest and implement disruptive technologies within their organizations. When combined with changes in organizational mindset and behavior, the right investments can translate the undisputed potential of technology into true transformation, bringing measurable benefits in customer experience and operational excellence.

1. Understand the organizational impact of disruptive technologies

Identify the significant technologies that could be most useful to your organization, and the potential benefits to be gained from early adoption. Examine how technology organizations are utilizing disruptive technologies — are they being leveraged to improve operations or transform business models? Technologies might develop over time, and the advantages they could bring over your current ways of working. For example: will IoT on your production lines increase productivity in a way that pays back the initial and ongoing investment? Or can D&A help you measurably improve your marketing campaigns through more effective targeting of tailored products and services? And will virtual and augmented reality dramatically enhance the customer experience in a way that improves loyalty and margins?

2. Align investment in disruptive technologies with corporate strategy

You can't achieve tomorrow's goals in today's organization. The C-suite needs to get behind disruption and align investment objectives with strategic imperatives, like market share, premium positioning, low-cost, high-volume operator, innovation leader, etc. A clear set of performance indicators can help ensure that you continue to track the effectiveness of these critical investments, to encourage a fact-based approach to decision making.

3. Strike the right balance between investing in today's and tomorrow's technologies

With tech companies under immense pressure to deliver quarterly earnings growth, it takes a bold leader to invest significantly in new innovations that may not produce immediate results — especially if you already have a strong market share in your sector, and are generating positive revenues. Your organization's expectations can influence whether you're investing in 'table stakes' technologies or 'nascent future stars'. However, as we've seen on many occasions in recent years, failure to make transformational changes to the business model, or to the way you interact with customers, can leave you vulnerable to existing and new competitors and could ultimately threaten your company's very existence.

4. Demonstrate investment agility

The speed and unpredictability with which disruptive technologies can emerge — and disappear — is astounding. If a particular investment, in say robotics or a type of D&A tool, looks like it's not going to pay off, then tech companies need a process for quickly disengaging these from the business. Equally, if a new technology is working well for competitors, then you need to be able to introduce it quickly. The concept of 'failing safe' has been utilized for new innovations, but should be applied to internal operations as well.

5. Set the organization on the path to transformation

Realizing the full potential of disruptive technologies ultimately means adopting new ways of doing business — whether it's connecting and engaging with customers, monetizing customer relationship and internal innovations, or executing and collaborating internally. It's easy to underestimate the degree of change and transformation involved, which impacts every part of the organization. The leaders of tech firms should first articulate a compelling vision and translate this into an achievable strategy. They then need to put in motion organizational and cultural transformation by empowering individuals to try out 'disruptive' ways of working, recruiting and developing the right talent, and demonstrating and celebrating each success.

It's not just about providing the finance for investment; management time and commitment is needed to get fully behind new technologies and embed them into operations and business models. You can't underestimate the importance of matching executive rewards against key performance indicators that measure the impact of disruptive investments.

About the global survey

In January 2016, KPMG International commissioned Forrester Consulting to conduct a global study on disruptive technology adoption trends within the technology sector to better understand the organizational and customer impact of these technologies on the main players. KPMG International surveyed 580 senior executives within technology companies from 16 countries.

The respondents represent hardware manufacturers, software providers, equipment vendors, semiconductors producers, Internet companies, social media technology vendors and other similar organizations. The study offers insights into the fears, opportunities, organizational changes, investments and key performance indicators deriving from disruptive technology.

Quantitative questions covered:

— The key disruptive technology adoption trends within the technology sector.

— How these technologies are impacting companies' business models, operations, marketing and customer-facing activities.

— Which disruptive technologies are the interviewees' companies investing in.

— What they hope to achieve from these investments.

Respondents represented major technology companies from the following countries: Australia, Brazil, Canada, China, France, Germany, India, Israel, Japan, Portugal, South Africa, South Korea, Spain, Taiwan, the UK and the US.

The findings have been augmented with the views of technology leaders, subject matter experts and KPMG's technology experts from across its global network of member firms.

This survey is part of a wider body of research into the technology, media and telecommunications industries, involving 1,740 senior executives (580 from each industry).

How KPMG can help

KPMG's technology professionals understand the changing and challenging disruptive environment, and the impact it can have on your business models and operations. We combine industry knowledge with technical experience to provide insights that help technology leaders deal with complexity.

Our professionals go beyond today's challenges to anticipate the potential long- and short-term consequences of shifting business, financial and technology strategies. We also help clients explore potential obstacles to change and collaborate on critical decisions that can deliver real value to their businesses.

Our aim is to help technology companies become agile, disrupted organizations that can move quickly to embrace the appropriate innovations — and equally discard those that aren't supporting their strategic growth.

Aligning resources (notably financial, people and leadership), and executing the most significant change initiatives — not just every few years, but, if necessary, every few months.

Acknowledgments

Contacts

Gary Matuszak
Global Chair
Technology, Media and
Telecommunications
KPMG International
E: gmatuszak@kpmg.com

Richard Hanley
US Advisory Industry Leader
Technology, Media and
Telecommunications
KPMG in the US
E: rhanley@kpmg.com

Philip Wong
Principal
Technology, Media and
Telecommunications
Global Strategy Group
KPMG in the US
E: philipswong@kpmg.com

Local contacts:

KPMG Australia
Kristina Kipper
National Sector Leader, TMT
E: kkipper1@kpmg.com.au

KPMG in Brazil
Luiz Viotti
Head of TMT
E: luizviotti@kpmg.com.br

KPMG in Canada
Yvon Audette
Partner & National Leader
IT Advisory & ITA Technology
E: yaudette@kpmg.ca

KPMG China
Philip Ng
Partner and Head of Technology
E: philip.ng@kpmg.com

KPMG in France
Marie Guillemot
National Head of TMT
E: mguillemot@kpmg.fr

KPMG in Germany
Peter Heidkamp
National Head of Technology
E: pheidkamp@kpmg.com

KPMG in India
Akhilesh Tuteja
Technology Sector Head
E: atuteja@kpmg.com

KPMG in Israel
Arik Speier
Technology Sector Head
E: aspeier@kpmg.com

KPMG in Japan
Hiroto Kaneko
Head of TMT
E: hiroto.kaneko@jp.kpmg.com

KPMG in Portugal
Diogo Eloi de Sousa
National Head of TMT MC
E: dsousa@kpmg.com

KPMG in South Korea
Seung Yeoul Yang
Head of TMT, National Technology
Leader
E: seungyeoulyang@kr.pmg.com

KPMG in South Africa
Frank Rizzo
Technology Sector Leader
E: frank.rizzo@kpmg.co.za

KPMG in Spain
Celso Garcia Granda
National Head of TMT
E: celsogarcia@kpmg.es

KPMG in Taiwan
Samuel Au
National Head of TMT
E: syau@kpmg.com.tw

KPMG in the UK
Tudor Aw
Partner and Technology Sector Head
E: tudor.aw@kpmg.co.uk

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