



The Changing Landscape of Disruptive Technologies

Tech disruptors outpace the competition

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Foreword

KPMG recognizes the importance of innovation to the technology industry and the global economy as a whole. KPMG's publication series, *The Changing Landscape of Disruptive Technologies*, now in its sixth year, provides perspectives about global technology innovation trends, barriers to commercializing innovation, and insights into tech innovation leading practices.

As in prior years, we include results from our annual survey of more than 750 global technology industry leaders (85 percent C-level) including start-up entrepreneurs and FORTUNE 500 executives. This annual publication is issued in two parts, featuring the following topics:

Part 1 | Global technology innovation hubs released in March 2018, unveiled the cities, regions, and countries that are outpacing others as tech innovation hubs. With stakes so high to compete in the global technology industry ecosystem, the publication also provides global leadership views on innovation management.

Part 2 | Tech disruptors outpace the competition In this issue we examine the game-changing technologies and companies around the world that are enabling new business models and disrupting the way we live and work. This chapter also identifies the opportunities and challenges faced by tech industry leaders to market new technologies.

Today, technology innovation is core to all kinds of businesses around the world and impacts our society greatly. We are living in one of the most disruptive periods of tech evolution since the Internet first entered the scene decades ago. The Fourth Industrial Revolution is quickly unfolding as the evolution of artificial intelligence, IoT, and robotics move firmly into the mainstream and upturn media, transportation, healthcare, security, retail, telco, and many other fields.

As reported recently in KPMG's global CEO survey, leaders across different industries have a greater focus on the tremendous economic and social power that has resulted from the tech industry's leadership style and innovation. More than ever the leaders of tomorrow need to embrace change in a proactive, effective way. The acceptance to fail fast and pivot quickly, will spark the creativity that provides a competitive edge. The promise is a better future as global technology innovation developments unfold at a faster pace.

We trust you find this publication insightful, and we welcome your feedback and suggestions for the next edition.



Tim Zanni

Global and U.S. Technology Sector Leader
Chair of Global and U.S. TMT Line of Business,
KPMG in the U.S.



Technologies unlocking massive opportunities

Tech disruptors driving the greatest
business transformation

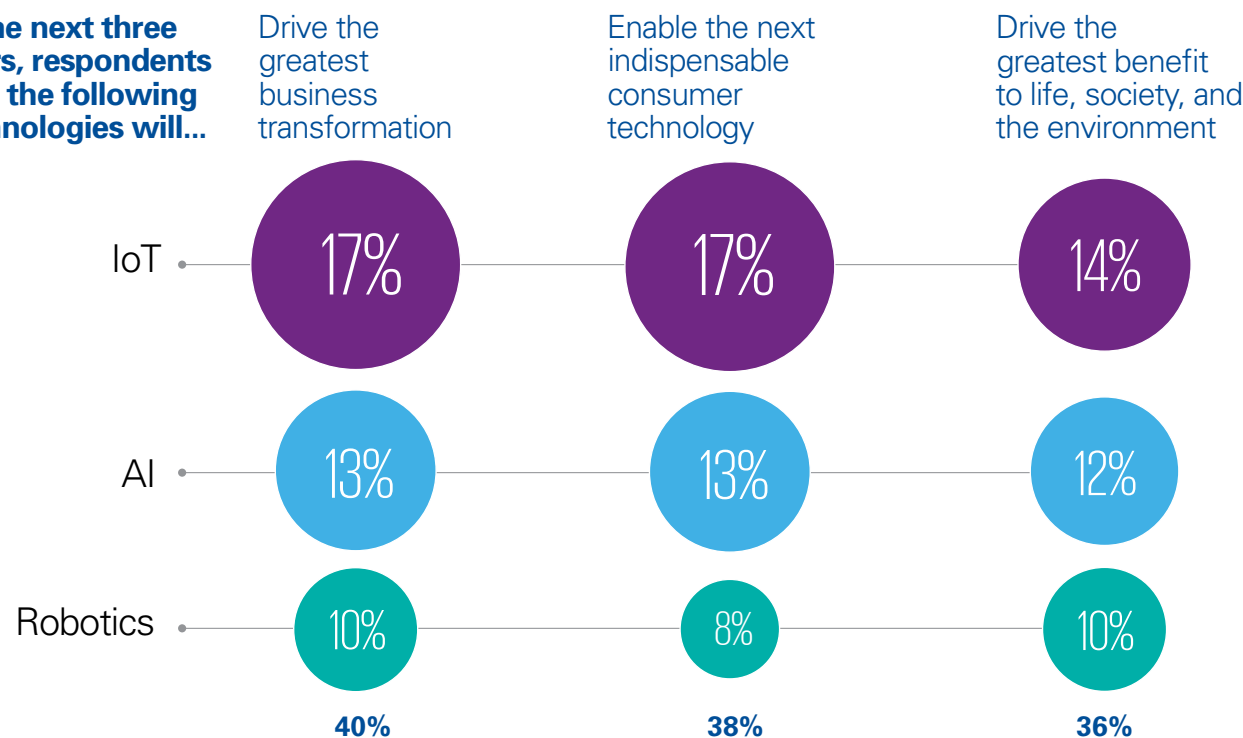
- IoT
- AI
- Robotics

Technologies driving the most benefit to
life, society, and the environment

Technologies driving unprecedented
change in consumer markets

KPMG’s global technology industry innovation survey captured the opinion of over 750 global tech industry leaders in identifying the technologies that will have the greatest impact in driving change in the next three years. The Internet of Things (IoT), artificial intelligence (AI), and robotics led the charts.

In the next three years, respondents said the following technologies will...



“The technology industry continues to drive massive economic value as platform companies—the largest by market cap—make big investments in AI, IoT, robotics, and other technologies that have great influence on the way business and consumers engage with the world. The convergence of these technologies is enabling profound changes that impact enterprises, consumers, societies, and the environment.”

— Tim Zanni, Global and U.S. Technology Sector Leader
Chair of Global and U.S. TMT Line of Business,
KPMG in the U.S.

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Survey, January, 2018

Tech disruptors driving the greatest business transformation

IoT – the digital economy leader

IoT is massive in terms of data and continues to grow exponentially. These connected devices are becoming intelligent things enabling the creation of new business models.

17% of the global respondents identified IoT as the top technology game changer in driving business transformation. High ratings reflect investments in scaling up IoT initiatives as new types of sensors expand use cases. The U.K. and Japan tech industry leaders give stronger marks to IoT followed closely by the United States and China.

Over the last few years, IoT has moved from experimentation to driving business value as it digitizes the physical world. From optimizing the supply-side through more visibility, transparency, and efficiency and meeting the ever-increasing customer expectations through contextual data on the demand-side.

Worldwide IoT spending
\$1.1 will total
trillion
by 2021

Source: IDC Worldwide Semiannual Internet of Things Spending Guide press release - December 7, 2017

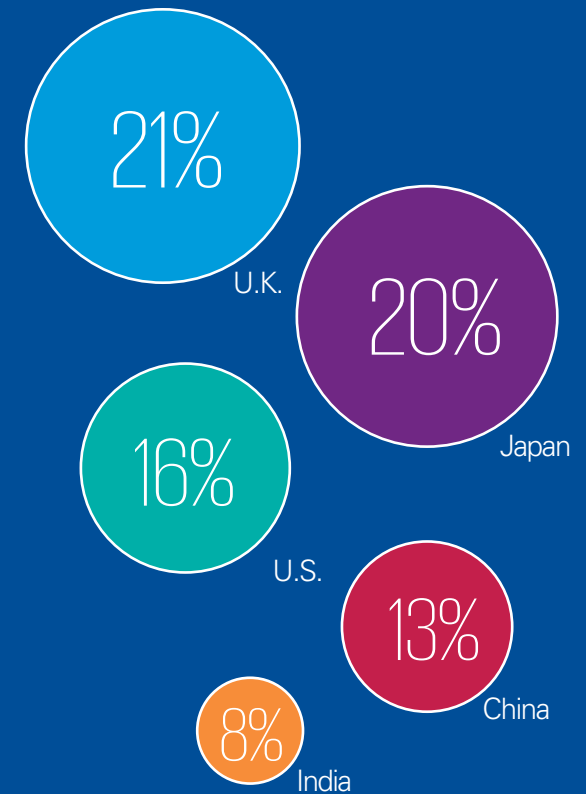
IoT providers are maturing and moving from basic connectivity to full-blown platforms that are now getting bundled with cloud offerings.

From our survey, the top benefits and challenges of IoT adoption:

Top Benefits: Improved business efficiencies, increased profitability, cost reductions, with the biggest change since our last survey being new revenue streams. This maps to the move from proofs-of-concept to full-blown services.

Top Challenges: Technology complexity, risk management, and security. With the rise of IoT platforms and cloud offerings, companies are looking for more mature services to meet those challenges.

IoT is the top technology expected to drive business transformation over the next three years



Partial list. Percentages do not sum to 100%.
Source: KPMG Technology Innovation Survey, January, 2018

For many organizations, the IoT will drive a significant shift from selling products to providing services. The convergence of IoT, AI, and robotics is enabling the creation of new business models. The data captured by sensors can be processed by AI algorithms to enable deeper analysis of real-time IoT data streams to drive more powerful decision making.

Although IoT is rapidly advancing, with a growing number of sensors in the market and dozens of platforms, there is still a significant need for interoperability.

“With the events of the last year, cybersecurity and privacy are top-of-mind for customers. IoT brings great opportunity through omniscience across the entire business, but this super-power comes with a liability around security and privacy. Companies need to be cognizant of the data that their IoT systems are collecting about their customers and be transparent and diligent about protecting their customers.”

— Kes Sampanthar, Executive Director,
Innovation Labs, KPMG in the U.S.



AI ranks second – fueled by investment and innovation

AI is transforming the business world. The competition for technology leadership and talent is fierce.

13% of the global tech leaders identified AI as the top technology game changer in driving business transformation. The U.S. and Japan tech leaders gave stronger marks to artificial intelligence followed closely by India and the U.K. China, which has unleashed a major AI strategy to dominate this field, had a stronger showing this year—on par with the global findings.

AI is a transformational technology and tech companies have great ambitions. Significant investment is foreseen in R&D and M&A among top tech players especially in the United States and China.

Platform companies are now investing in chip development. These companies have the capital to

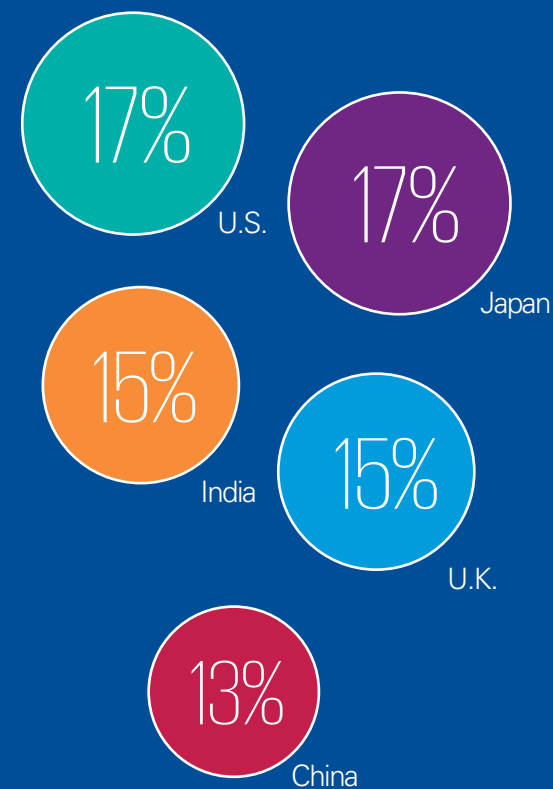
make the significant investments in technology and human talent to make chips. In addition to controlling their hardware and software road map, these companies now have the ability to create computing chips to power their artificial intelligence systems to accelerate the development of new products and services.

While the adoption of AI, cognitive computing, and machine learning will continue to accelerate in organizations worldwide, many platform companies already have a distinct competitive advantage. Amazon's and Alibaba's e-commerce platforms are great examples of digital-first companies leading in AI innovations. These companies are already experiencing the benefits of algorithms in dynamic pricing, staff scheduling, and machine learning to accelerate sales, build customer loyalty, and drive product and service innovation.

Worldwide spending on cognitive and AI systems
\$52.2 billion in 2021

Source: IDC Worldwide Semiannual Cognitive Artificial Intelligence Systems Spending Guide press release - March 22, 2018

AI/cognitive is the second ranked technology expected to drive business transformation over the next three years



Partial list. Percentages do not sum to 100%.
 Source: KPMG Technology Innovation Survey, January, 2018

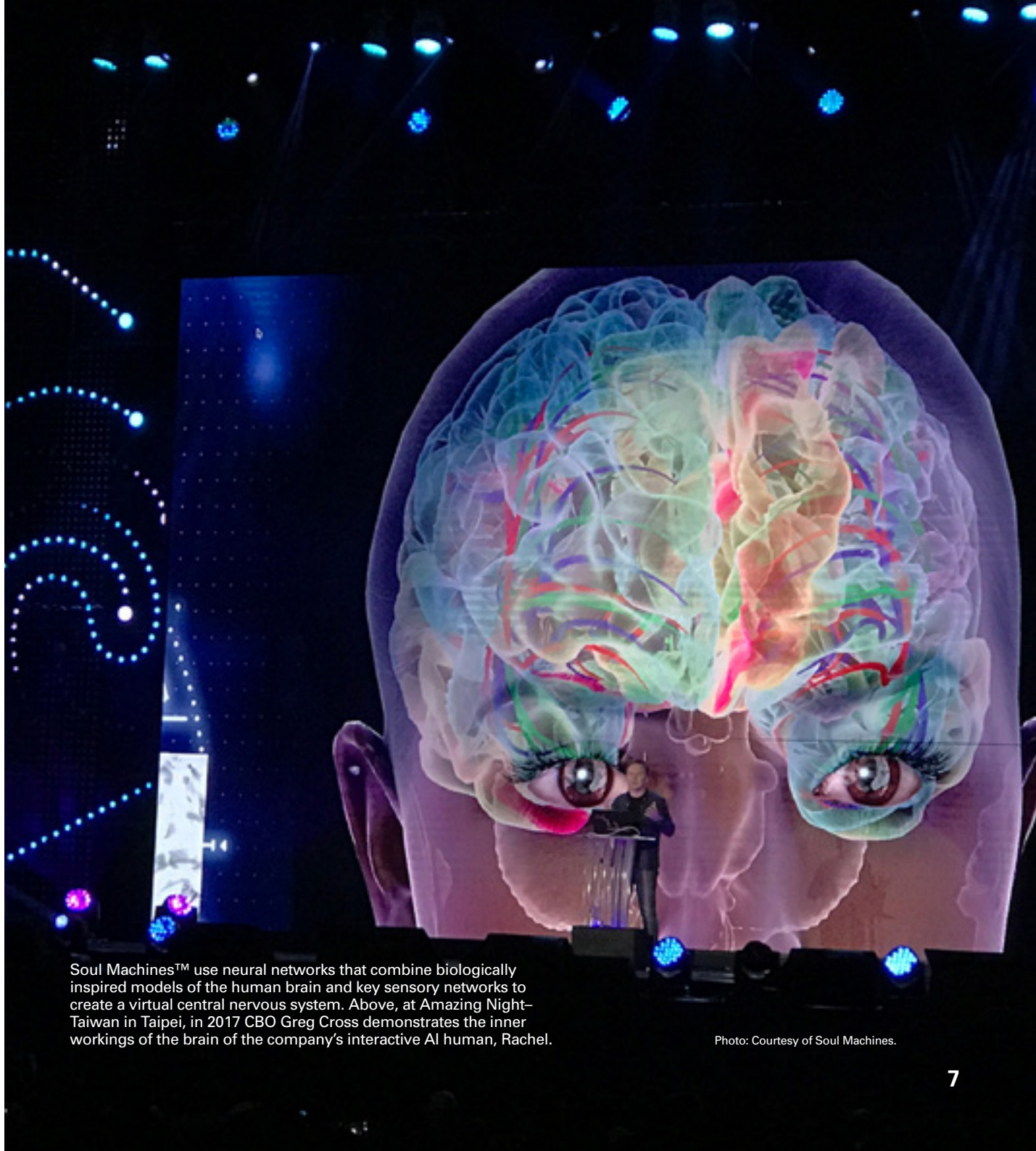
The future of work

Ultimately humans and bots will work side by side—and, in many cases, bots will be able to analyze data and answer questions, often faster and better than humans. There are many distinctive human capabilities that will continue to focus our talent to a higher purpose. For example, bots are not likely to ask questions about problems that need to be solved or have the emotional intelligence and empathy that is required in many business and consumer interactions.

All innovation developments represent a big shift in the nature of work as well as the skills and talent companies will need to be successful. Visionary leaders across industries are redefining the talent requirements and jobs of the future to succeed in the digital age.

“Assessing opportunities to train the existing workforce to be future ready is critical for digital first companies. The workforce of the future is being redefined to free up resources and focus on innovation and growth. Developments in intelligent automation are dramatically driving down processing costs, sometimes by as much as 75%, while improving speed, accuracy and control.”

— Cliff Justice, Innovation & Enterprise Solutions and leader of Intelligent Automation initiatives, KPMG in the U.S.



Soul Machines™ use neural networks that combine biologically inspired models of the human brain and key sensory networks to create a virtual central nervous system. Above, at Amazing Night-Taiwan in Taipei, in 2017 CBO Greg Cross demonstrates the inner workings of the brain of the company's interactive AI human, Rachel.

Photo: Courtesy of Soul Machines.

Robotics takes third – robots change the limits of what humans can do

Robotics is enabling enhanced dexterity, intelligence, and sensors. Robotics will continue to unlock more innovation and revenue streams in many industries.

10% of the global respondents identified robotics as the top technology game changer in driving business transformation. A positive outlook for robotics as a game changer in the workforce of the future is reflected again in this year's survey.

Advances made in industrial and service robotics innovation are enabling new use cases. At the same time, demand continues to grow for robots as a service or easily hired industrial robots as an alternative to adding employees. The factory with minimal employees will increasingly be a reality. Connecting the steps in the supply chain—from raw materials to the final product—through a digital first business model makes the outlook for automation and robotics very positive.

Japan is becoming increasingly dependent on robots to address a chronic labor shortage and gave a strong rating.

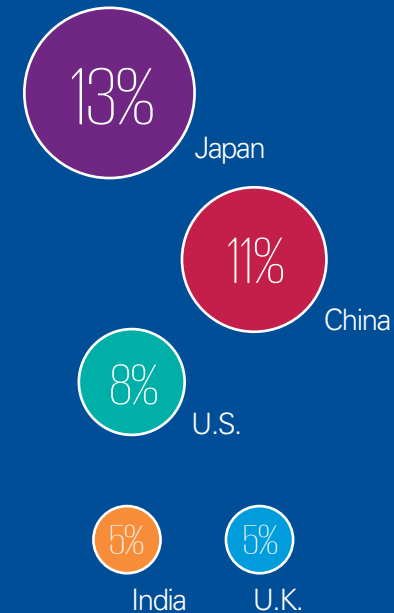
The global service robotics market is expected to be greater than the industrial market. Over time, personal robots will likely help people to achieve their potential, overcoming weaknesses with capabilities we are just beginning to imagine. In addition to industrial and service robots, there is also great investment and demand for robotics in the defense industry to develop surveillance, unmanned aerial devices, and other applications.

The recent ability for robots to safely interact with humans is enabling new use cases demonstrating increased efficiencies and different revenue streams. IoT and robotics innovations are creating new levels of accuracy enabling new applications such as remote surgery. Robots are tackling jobs considered unsafe for humans and preventing accidents by using sensors as warnings. Service robots in hotels and retail have demonstrated that in addition to cutting cost and increasing efficiencies, they can improve customer service.

Spending globally on robotics and drones
\$218.4 billion in 2021

Source: IDC Worldwide Semiannual Robotics and Drones Spending Guide press release - January 23, 2018

Robotics was the third technology expected to drive business transformation over the next three years



Partial list. Percentages do not sum to 100%.
Source: KPMG Technology Innovation Survey, January, 2018

The robotics market continues to undergo tremendous transformation with an increased demand for service robots for professional, personal, and domestic use. Examples include:

- Autonomous aircraft navigation, data acquisition, and analysis solutions for a variety of industrial and defense-related applications.
- Robotic-assisted surgical systems that allow surgeons to perform surgical procedures faster and with better outcomes.
- Human-like robotic limbs. These systems are evolving and achieving highly dexterous tasks that were once unthinkable for robots.

“Robotics demand from the non industrial segments (including consumer robots and unmanned aerial vehicles) now generates the majority of revenues. As scale grows further and functionality continues to improve, a global mass-market for robotics products and services is emerging that can impact the lives of millions in the decade ahead.”

— Per Edin, Strategy Practices Leader, Technology, Media & Telecommunications, KPMG in the U.S.



Blockchain's likelihood to disrupt your business

The disruptive prospect for blockchain is apparent: One in three of the global tech industry leaders predicts blockchain will likely upturn their companies. These results are more pronounced in Japan, where 50 percent of the tech industry leaders say blockchain is likely to disrupt their company.

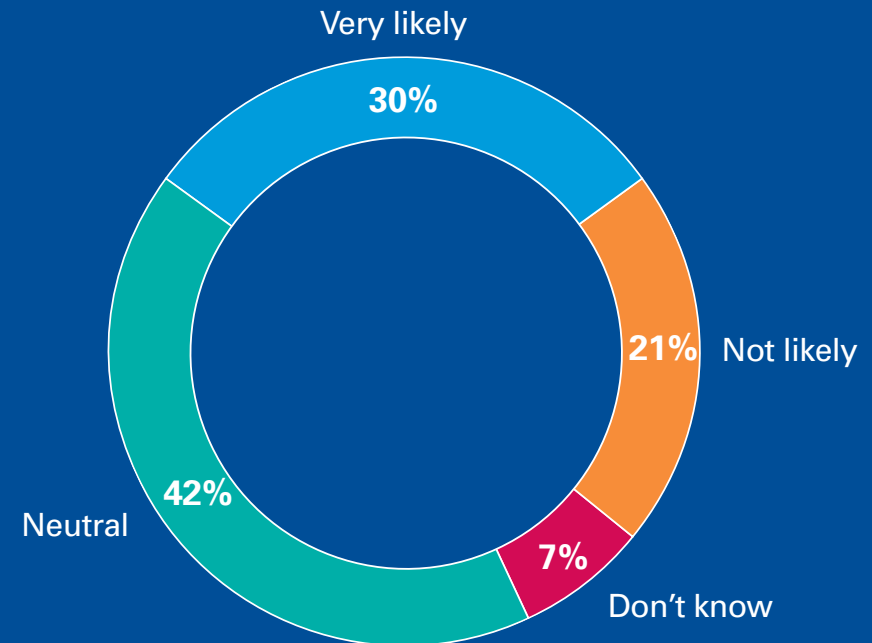
Some are comparing blockchain technologies with the impact of the Internet two decades ago. Entire value chains can be shortened by it leading to new business models. Blockchain can eliminate the need for intermediaries in transactions; as a digital transaction system, blockchain enables secure data storage and the execution of smart contracts in peer-to-peer networks. Transactions are performed in real time, and integrity and security are guaranteed by the blockchain. Blockchain platforms have the potential to radically change industries and business models.

In financial services there are many examples of the benefits of blockchain. The Know Your Customer (KYC) processes provide the backbone of financial institutions' anti-money laundering efforts to detect and prevent criminal behaviors around the world. Despite the importance, KYC at many financial institutions is inefficient with tedious processes, duplication of effort, and risk of error, which is costly and could negatively impact customer experience.

The immutability and transparency of blockchain provides a streamlined way for financial institutions to gain swift and secure access to clean and up-to-date customer data. This results in greater operational efficiency, increased trust between institutions, and reduction of labor-intensive data gathering, processing time, and costs.

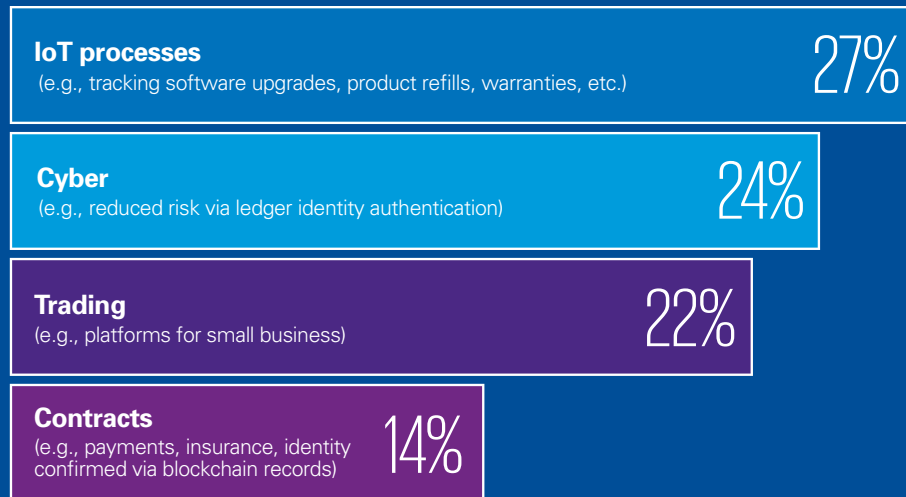
For regulators, the use of blockchain provides a single source of customer data for better understanding and visibility of customer activity across financial institutions. From a customer standpoint, an institution's use of a blockchain-enabled KYC utility could reduce onboarding wait times and eliminate the need to repeatedly provide the same information to their financial services providers.

Likelihood that blockchain will disrupt your company in the next three years



Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

What will be the greatest disruption resulting from blockchain initiatives in the next three years?



Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Critical factors for blockchain to succeed

Cybersecurity concerns are identified by more than one-quarter as a critical success factor for blockchain to succeed. The challenges faced by bitcoin exchanges and hacks are likely to contribute to this result. China and India gave security higher ratings.

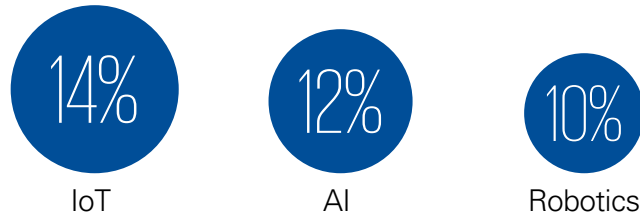
In the fast-moving fintech arena, blockchain technologies are gaining as disruptors and increasingly seen as "must-haves." However general acceptance/international integration continues to be an adoption challenge and this is likely why some are comparing blockchain investments with the Internet bubble two decades ago.



Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Technologies driving the most benefit to life, society, and environment

IoT and AI outshine other technologies named for societal good by the global respondents. The robotics revolution also is spotlighted by 10 percent of the global poll.



Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Tech's innovation work for societal good

Technology evolution presents new opportunities for challenges to be solved. Even though some concerns exist about robots, AI, and IoT taking over too much of our world, their advantages in improving daily life, society, and the environment are becoming more evident.

More IoT devices are helping to proactively manage health and fitness. Robots are becoming personal assistants to the elderly and handicapped. Examples of AI for good include creating new ways for AI to aid with natural disasters. AI and IoT for social good also covers developments to deliver personalized citizen services in smart cities and provide banking and healthcare in underserved and rural areas.

These emerging technologies will continue to be used to address key challenges facing humanity such as the eradication of certain medical conditions and increased effectiveness in providing humanitarian aid.

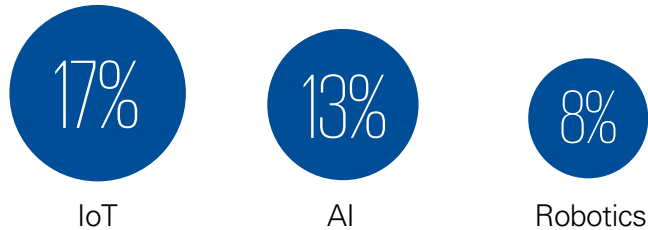
Turning to geographic tech industry leaders' responses, Japan highlights robots such as Pepper, as driving the most benefit to life, society, and the environment. China underscores social networking tools such as the widely used WeChat and blockchain technologies. The United Kingdom pinpoints IoT particularly strongly as smart city projects are launching in major cities, and smart home gadgets are rolling out to British households. India leans toward digital payments on the strength of its homegrown e-payments and e-commerce brand Paytm.

	China	India	Japan	U.K.	U.S.
IoT	12%	14%	10%	21%	13%
AI	11%	18%	10%	13%	14%
Robotics	8%	5%	20%	15%	13%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Technologies enabling unprecedented change in consumer markets

Over the next three years, IoT is identified as the leading game changer by 17 percent of the global poll—a slight uptick from the prior survey. Both IoT and AI score high marks in most major geographic regions.



Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

The quick consumer adoption of connected computerized sensors combined with massive data gathering and machine learning are driving unprecedented change in consumer markets. Two of the most popular technology buzzwords—IoT and AI—are evolving together to provide smart homes with Amazon’s Alexa, Apple’s Siri, and Google’s Nest.

The survey reveals three main benefits derived from adopting IoT, AI, and robotics: improved management of personal information, increased personal productivity, and improved customer experience through personalized real-time information. Security concerns continue to be viewed as the top challenge in AI, IoT, and robotics adoption.

In a few country differences, India ranks artificial intelligence at the top. Mumbai is preparing to launch the country’s first artificial intelligence center, and AI’s impact is expected to continue to transform e-commerce, digital healthcare, and e-banking in India. The United States rates IoT higher as innovations continue to evolve quickly, whether it is the rapid rise of connected home devices, health and medical wearables, and/or automotive autonomy.

China, which has unleashed a major AI drive to dominate this field, rates AI high—on par with the global findings. China rated robotics higher at 11 percent, followed by Japan and the U.K. showing 10 percent each. Humanoid service robots are beginning to be used to increase efficiencies and customer satisfaction in retail.

Cryptocurrencies gets a 7 percent selection globally and notably increasing in Asia—Japan (17 percent) and China (13 percent)—at the forefront of the rapidly developing digital currency craze.

Virtual reality (7 percent) and augmented reality (6 percent) are gaining traction. Augmented reality in particular is catching on, becoming popular for everything from an overlay for user-generated content on mobile apps, to in-store marketing.

	China	India	Japan	U.K.	U.S.
IoT	11%	14%	13%	13%	21%
AI	13%	22%	7%	11%	12%
Robotics	11%	9%	10%	10%	8%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018







A personal look into app global trends

Global app category trends

Which is your favorite app category?

The selections differ by region. China favors games, lifestyle, and entertainment app categories the most. In the U.S. games are at the top. Japan and India go all in for ranking business apps as the favorite category. The United Kingdom gives entertainment apps the highest mark, followed closely by games and navigation.

We are navigating a wide variety of apps daily with limited threads of attention. There is new research underway to determine the average number of screenshots viewed by individuals via their digital devices and the session duration. Preliminary data indicates 14 to 17 seconds per session. How will companies compete to get your attention?

	Global 	U.S. 	China 	India 	Japan 	U.K. 
Games	8%	11%	12%	6%	0%	10%
Business	7%	6%	6%	14%	17%	6%
Entertainment	7%	7%	10%	5%	3%	11%
Travel	7%	7%	7%	8%	13%	3%
Lifestyle	7%	6%	11%	3%	0%	6%
Social networking	7%	8%	9%	11%	3%	5%
Photo & video	6%	8%	6%	2%	13%	5%
News	6%	8%	2%	5%	13%	8%
Navigation	5%	3%	8%	9%	7%	10%
Sports	5%	7%	6%	2%	7%	5%
Music	5%	5%	6%	0%	7%	5%
Education	5%	4%	8%	9%	3%	6%
Books	4%	2%	3%	3%	3%	2%
Food & drink	4%	5%	2%	5%	3%	2%
Finance	3%	1%	0%	3%	3%	2%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018







Favorite apps

The global responses to this open-ended question reflect the fragmentation, variety, and complexity of our digital lives. The survey underscored the broad geographic reach of the most popular apps, many of them with U.S. origins.

Professional social network LinkedIn edged out in first place as the most favored app followed closely by many other apps based on the global responses.

A few notable distinctions by country could be seen with some nationalistic bias apparent. Among U.S. respondents, Amazon attracts the highest response rate. For the China segment poll, search engine Baidu earns the highest marks. In India, LinkedIn is voted tops. The United Kingdom gives its highest rating to the BBC and Japan favors its leading mobile messaging company Line. Our digital trail is providing massive insights about us and impacting the way we live and work. Consumer digitization will continue to transform industries, business models, and society.

What is your favorite app? [open ended]

Global 	China 	India 	Japan 	U.K. 	U.S. 
LinkedIn 4%	Baidu 7%	LinkedIn 11%	Gmail 7%	BBC 8%	Amazon 5%
Facebook 3%	Google Maps 4%	Whatsapp 9%	Line 7%	Tinder 6%	Tinder 3%
Google Maps 3%	Line 4%	Google Maps 6%	Google Maps 3%	LinkedIn 6%	LinkedIn 3%
Instagram 3%	QQ 4%	Facebook 6%	Instagram 3%	Netflix 5%	Netflix 3%
Airbnb 3%	Tinder 2%	Youtube 5%	Airbnb 3%	Facebook 5%	Youtube 3%
Tinder 3%	LinkedIn 2%	Instagram 5%	Netflix 3%	Google Maps 3%	Airbnb 3%
Netflix 3%	NBA 2%	Kindle 3%	Snapchat 3%	Snapchat 3%	Golf Clash 3%
Youtube 2%	ESPN 2%	Amazon 2%	NY Times 3%	Gmail 3%	NBA 3%
Amazon 2%	Chess 2%	Twitter 2%	Adobe 3%	Golf Clash 3%	Facebook 3%
Whatsapp 2%	Amazon 1%	Airbnb 2%		Shazam 3%	Instagram 3%
Uber 2%	Accuweather 1%	Uber 2%			Whatsapp 3%
	Kindle 1%	Scanner 2%			Snapchat 3%
	Weather Live 1%	Gmail 2%			ESPN 3%
	Spotify 1%				NY Times 3%
	Twitter 1%				

Partial list.

Source: KPMG Technology Innovation findings, March 2018

The third-party apps mentioned within this publication are registered trademarks or trademarks and are the intellectual property of their respective owners.

As the digital revolution continues to accelerate and expand at an astonishing pace, business leaders are grappling with emerging technologies, fueling simultaneous disruptions across all aspects of the enterprise. The transition from an industrial economy that favored mass production and scale, to a digital economy that favors information, is challenging the very nature of what it means to be a successful firm. What made a high performer in the 20th century is fundamentally different from what is required to secure competitive advantage in the 21st century.

The 21st century enterprise is characterized by its ability to adapt to and capitalize on changes taking place across four key business attributes critical to success in the digital era. By focusing on delivering the best customer experience, unlocking value from nontraditional assets, accessing external services versus growing internal infrastructure and utilizing AI or skills on demand, organizations can be more lean, agile, and responsive.

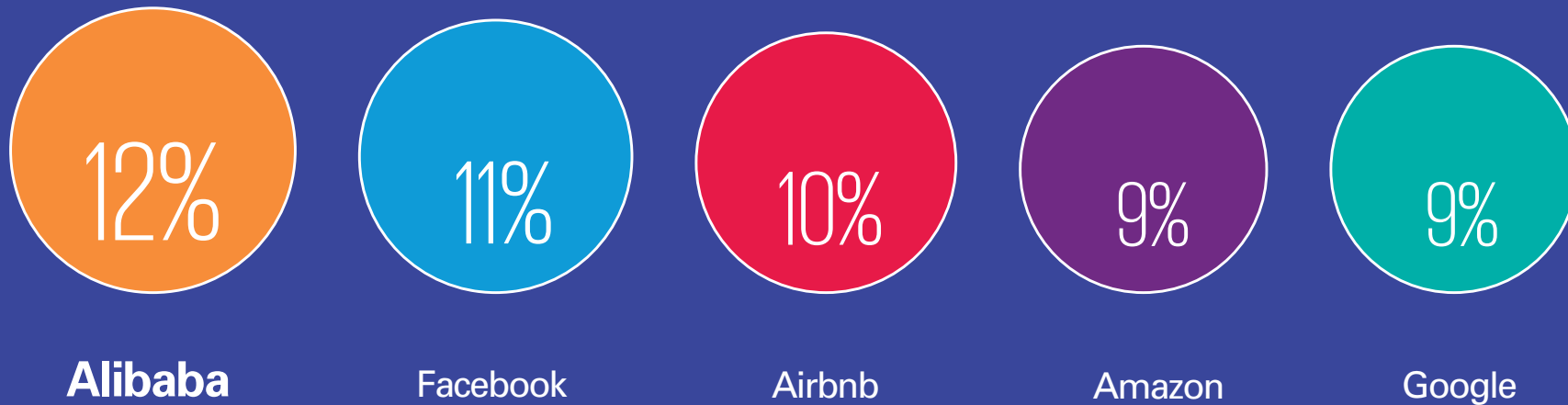
In digital-first companies, the implementation of IoT, AI, and robotics technologies will contribute to the erosion of traditional functional boundaries that have separated human resources, finance, procurement, and other functions. The “boundary-less” enterprise will be redesigned to build on institutional knowledge with machine learning technologies to ultimately produce a more customer-focused business model, with 24/7 automation drawing on data and applying prescriptive analytics across the organization. Speedier decision making, lower costs, increased efficiencies, and improved user and customer experiences will be the outcome.

“As the digital revolution continues to accelerate and expand at an astonishing pace, business leaders are grappling with emerging technologies, fueling simultaneous disruptions across all aspects of the enterprise. The transition from an industrial economy that favored mass production and scale, to a digital economy that favors information, is challenging the very nature of what it means to be a successful company.”

— Rick Wright, Principal, Digital Transformation Leader, KPMG in the U.S.

The road to growth: Disruptive business models (continued)

Which company do you worry the most about disrupting your business?



Partial list of visionaries shown. Respondents could enter one name. Source: KPMG Technology Innovation findings, March 2018

China's giant Alibaba tops the list of several companies named by tech industry leaders as companies they worry the most to disrupt their business.

Leading company disruptors

Alibaba outpaces U.S. brands as the leading global business disruptor.

Alibaba’s innovative and diversified line of businesses: cloud computing, entertainment, payment gateway, mobile data etc.; are why the company is the greatest business disruptor. The challenge to satisfy China’s over one billion population market requires visionary leadership.

Facebook, making strides with AI-powered posts and facial recognition takes second, with little difference regionally. Five percent of the global tech industry leaders are concerned about Apple disrupting their business. Ride-sharing services Uber and Lyft, around for several years now, pulled in 4 percent and 2 percent of the responses, respectively.

It is notable that in the United States, Alibaba was identified by tech industry leaders as the company they worry the most to disrupt their business. In addition to the companies listed in the chart, Tesla and FlipKart were selected by 8 percent each, in the U.S. poll.

Several international companies scored points. India’s dominant dotcom e-commerce player, FlipKart, excelled with a 6 percent global vote, and by 8 percent in the United States. Besides Alibaba, four other Chinese companies—smartphone maker Xiaomi, social messaging service Tencent, drone maker DJI, and ride-hailing provider Didi—made the cut of the top 15 companies selected.

China respondents favored U.S. companies as the top disruptors (Airbnb and Facebook at 12 percent each). Chinese homegrown contenders also ranked high in the China poll, Alibaba (11percent), Tencent, (8 percent), and Xiaomi and Didi (7 percent each).

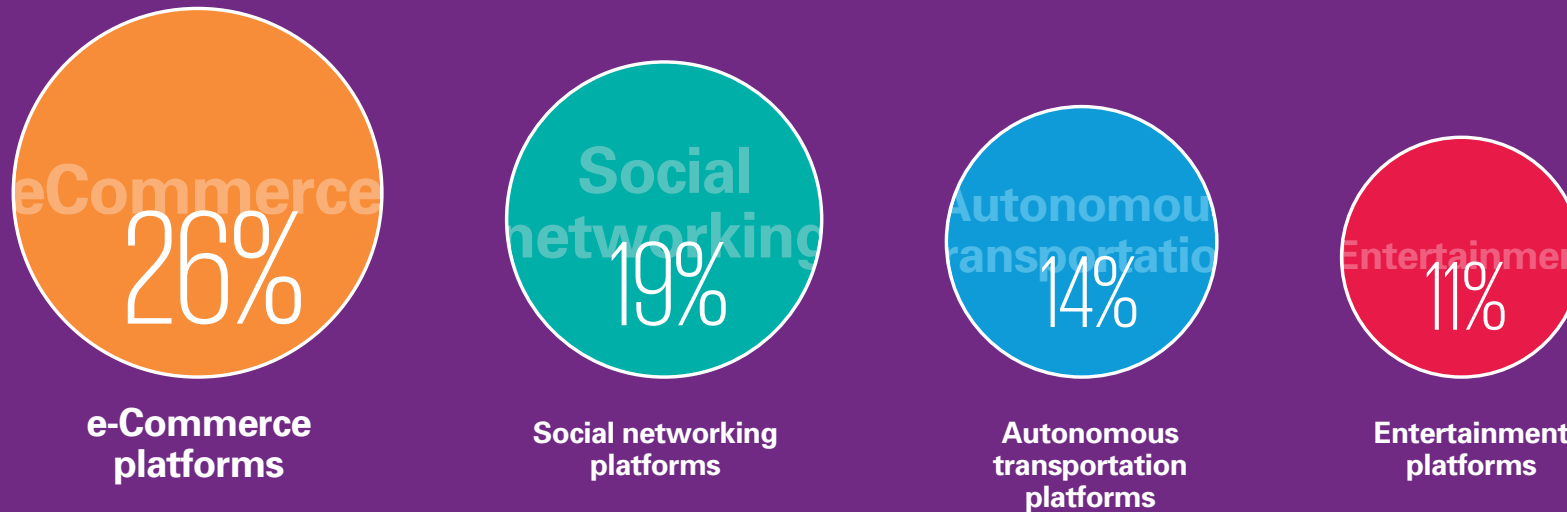
Top companies by country

	China	India	Japan	U.K.	U.S.
Airbnb	12%	2%	13%	6%	6%
Alibaba	11%	6%	13%	13%	19%
Amazon	9%	11%	17%	8%	7%
Facebook	12%	5%	13%	13%	13%
Google	11%	20%	10%	5%	9%
Netflix	1%	2%	3%	8%	10%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

The road to growth: Disruptive business models (continued)

Which new business model will be the biggest disruptor in your country in the next three years?



Source: KPMG Technology Innovation findings, March 2018

e-Commerce platforms are designed to be interconnected networks of business partners working together to seamlessly connect and satisfy consumer requirements providing an exceptional customer experience.

New business models drive growth

e-Commerce platforms are seen as the top disruptors in the next three years.

e-Commerce is transforming at light speed, from fast deliveries to highly efficient logistics and supply chain operations, to new mobile payment services and digital assistants. This top ranking is consistent with the tech industry leaders' responses in identifying Alibaba and Amazon as top companies to watch as disruptors of their own business.

Social networking platforms ranked second. These platforms are known to have a strong influence on people's life, behavior, and choices. Social network platforms also play an important role in the distribution of innovative technologies. Disruption resulting from transportation as a service and self-driving vehicles is reflected in the ranking of autonomous transportation platforms. Entertainment platforms ranked fourth as the shake-ups in traditional entertainment companies are expected to continue.

Slight regional geographic skew is found in these results. China did give relatively higher rankings to e-commerce, with Alibaba and JD.com as factors. China also favored autonomous driving platforms, empowered by AI, and one of China's growing tech strongholds. India reserved its highest grades (23 percent) to digital payment platforms such as home-grown Paytm mobile wallets, fast replacing cash.

Top business models by country

	China	India	Japan	U.K.	U.S.
Autonomous transportation platforms	18%	12%	20%	15%	15%
e-Commerce platforms	29%	17%	30%	26%	24%
Entertainment platforms	16%	9%	10%	19%	12%
Social networking platforms	12%	20%	17%	19%	23%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Industry transformation and monetization opportunities

Media and transportation on the tip of even greater shakeups

Fifty percent of tech industry leaders expect media, transportation, healthcare, and consumer markets to have the greatest transformation in the next three years.

In recognition of new business models and disruption successes such as Netflix and Amazon Prime, the U.S. sample underscores media as heading toward the greatest transformation (18 percent), a finding reinforced by the U.K. at the same percentage. China, at the forefront of AI-empowered news and messaging sites, rates media relatively high as well. China's embrace of mobility as a service, including ride sharing, can be seen in the strong (18 percent) rating by China for transportation.

Top industries that will have the greatest disruption/transformation in the next three years

	Global	U.S.	China	India	Japan	U.K.
Automotive/transportation	13%	13%	18%	14%	13%	16%
Consumer markets/retail	11%	13%	14%	9%	7%	8%
Education	8%	13%	8%	5%	13%	5%
Energy/Utilities	8%	5%	6%	14%	0%	10%
Healthcare	12%	11%	11%	6%	17%	11%
Industrial Manufacturing	10%	10%	4%	8%	13%	15%
Media	14%	18%	11%	6%	13%	18%
Telecommunications	10%	7%	16%	12%	23%	5%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Media

Media companies around the world continue to face a period of profound transformation, brought about by the prevalence of disruptive technologies. The growth and scale of Over-the-top (OTT) content providers are giving consumers more flexibility and choice than ever before for their TV viewing options.

OTT content delivery will bring about a redistribution of TV industry profits, and it may just be the beginning. Industry players have spent decades perfecting a highly profitable model that is now being significantly disrupted, and the onslaught of disruptions is happening at an increased speed. There is a strong sense of urgency to evolve and transform.

The TV and film ecosystem will evolve to adopt a platform business model, which will dramatically change the way viewers select, purchase, and watch TV programs. Companies looking to participate in the new TV ecosystem are facing uncharted territory and will need to grapple with significant change.

AI is making its way into news selection for social apps, print media, and Web sites based on what is the most popular content and personal profile information aggregated by AI. Smartphone apps are now pervasive in our society, impacting consumers' attention span and media consumption.

Automotive/transportation

Global auto executives agree: consolidation of the auto industry is likely to gain speed if the auto industry is to successfully compete against major technology companies racing to dominate the car ecosystem. Original equipment manufacturers will need to find the right balance of competition and integration

in order to compete with digital players rapidly entering the auto industry. Insights identified in the 2018 annual KPMG Global Automotive Executive Survey, include the following:

- The majority of executives believe almost 50 percent of brick-and-mortar retailers will close by 2025.
- Consumers will prioritize data security in purchase decisions and will expect security to become part of the vehicle standard operating equipment.

Across the world, a trillion-dollar market is swiftly developing around a new and disruptive transportation mode: driverless vehicles coupled with mobility services. To win in this marketplace of the future requires a new way of thinking.

“The financial strength of the biggest technology companies overshadows the major auto manufacturers. Together, the 25 major auto manufacturers make up only 20 percent of the market capitalization of the 15 biggest technology companies. In 2010 they made up 60 percent. This clearly shows digital companies are playing in a completely different financial league. Particularly for mass producers, partnership is key if they want to survive against the technology giants. Although premium suppliers are better positioned, they too have recognized the signs, resulting in integrations such as map services or charging stations for electric cars. ”

— Dieter Becker, Global Head of Automotive at KPMG

The road to growth: Disruptive business models (continued)

Healthcare/life sciences

Today's patients want choice and flexibility in how and where they access information and care. Urgent care centers, retail clinics, 24-hour hotlines, virtual care companies, and app developers are scrambling to give it to them. These channels are not core to most systems' business models today—but they are not fads either. The question is not whether or when to change, it is how.

This more patient-centered approach may look costly but makes sound economic sense when achieved through digital transformation. Gathering and mining data provided by digital interactions will prove increasingly important. By understanding the needs and behaviors of target groups, healthcare providers will find new ways to increase value by building trust and loyalty.

IoT, AI, and robotics technologies are transforming the way healthcare is provided, how diseases are treated, and how research is conducted. Japan heavily weights the healthcare sector for robotics applications. Robots are becoming part of the hospital's caregiving program. Some interact with kids to help them feel less afraid while other robots execute surgery procedures. In some markets, humanoid service robots are being used for in-home care.

“Tech industry leaders are digital first companies that continue to redefine the way business and consumers engage with the world. Many of today's business models and industry leaders will be displaced by tech industry players developing next-generation breakthroughs that can enhance economic value. The tech industry leaders of tomorrow are moving fast into other sectors and gaining market share.”

— Tim Zanni, Global and U.S. Technology Sector Leader
Chair of Global and U.S. TMT Line of Business,
KPMG in the U.S.

Consumer markets/retail

The availability of information has empowered consumers like never before, but this has created advantages for organizations too. The ability to take consumer data and transfer it into real customer insights is the path to growth, as it offers direct insights into consumer behavior and gives opportunities to promote brand and product loyalty. It also informs the creation of new products and related experiences that can differentiate a brand.

One key to success is having the right business and technology platform with a whole set of new organizational capabilities. Digital transformation offers the opportunity to link customer service to profitability, managing costs by capitalizing on spending trends, and streamlining supply chain and back-office processes.

Consumer markets and retail are being redefined by emerging technologies. IoT devices are enabling new product innovations such as smart shelves and smart mirrors. Some ways that IoT is working in retail include smart connected cameras installed at stores to improve security, temperature sensors for better energy efficiency, and fitness devices in athletic clothes to record performance.

In retail AI, robotics and IoT can provide significant value in personalizing products and services and in providing a new kind of customer service experience. Amazon Go store concepts are a great example. Connecting Amazon's Go stores with the e-Commerce platform will attract more customers and more supplies to their network resulting in greater economies of scale.

Which industries will have the greatest adoption of these technologies in the next three years?

Adoption of IoT

Global		China		India		Japan		U.K.		U.S.	
Consumer	11%	Automotive	14%	Consumer	18%	Media	20%	Education	13%	Consumer	13%
Education	10%	Aero & Defense	10%	Automotive	14%	Education	13%	Energy	13%	Media	13%
Services	9%	Consumer	10%	Education	11%	Industrial mfg.	13%	Telecom	13%	Telecom	13%
Industrial mfg.	9%	Media	10%	Services	11%	Healthcare	10%	Consumer	10%	Healthcare	11%
Telecom	9%							Industrial mfg.	10%		
								Services	10%		

Adoption of AI

Healthcare	11%	Healthcare	13%	Industrial mfg.	17%	Government	13%	Services	15%	Automotive	13%
Industrial mfg.	11%	Consumer	11%	Financial	12%	Healthcare	13%	Financial	11%	Services	13%
Consumer	10%	Industrial mfg.	11%	Aero & Defense	9%	Industrial mfg.	13%	Automotive	10%	Aero & Defense	12%
Financial	10%	Automotive	10%	Automotive	9%	Energy	10%	Healthcare	10%		
Services	10%	Services	10%	Consumer	9%	Financial	10%	Media	10%		
						Services	10%				
						Telecom	10%				

Adoption of Robotics

Industrial mfg.	15%	Industrial mfg.	17%	Industrial mfg.	32%	Healthcare	17%	Consumer	16%	Financial	16%
Healthcare	11%	Services	14%	Automotive	12%	Aero & Defense	13%	Industrial mfg.	15%	Consumer	14%
Consumer	10%	Government	13%	Healthcare	9%	Energy	13%	Financial	11%	Energy	11%
Financial	10%					Consumer	10%	Government	11%	Industrial mfg.	11%
Services	10%					Financial	10%			Services	11%
						Media	10%				

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018



Innovation and commercialization barriers

Innovation constraints

Barriers to commercializing technology innovations

Innovation constraints

Regulations weigh more heavily as top barrier

Government restrictions are foreseen as a leading concern across all geographic regions, and, in some countries, specific issues are becoming constraints such as increased scrutiny of foreign investment by the United States and China.

As technology companies seek to innovate, which of the following will limit/constrain innovation?

24% of the tech industry leaders surveyed point to restrictive regulatory policies as the leading issue limiting technology innovation (a jump from 19 percent in the prior poll). In the United States, key technology industry players have gained great economic and social power and are facing important issues. Regulators, businesses, and consumers want more transparency about how emerging technologies work and the impact of technology on society.



Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Access to talent and expertise ranked second as an innovation constraint. As tech companies seek to innovate, there is a fierce competition for talent. Emerging technologies are opening new fields and demand for different professional skills such as algorithmic audits and developing behavioral research on the use of these new technologies.

Other issues on the radar are nonexistent technology standards and legacy IT infrastructure. As next-generation technological developments become more complex and interconnected there is a need to develop new standards.

Despite the interest of key tech players in reducing technology complexity, the momentum to drive standards collaboration is limited. As the number of emerging technologies increase and existing technologies evolve to offer more value, there are integration and complexity challenges faced by both consumers and enterprises. How tech companies address integration paradigms to reduce complexity will be a competitive differentiator for the next wave of industry leaders.

The power and influence of the mega platform companies such as China's BAT (Baidu, Alibaba, Tencent) and the U.S. FAANG (Facebook, Amazon, Apple, Netflix, Google) is foreseen as an issue by 12 percent. There is increased concern that these tech titans will crowd out competitors and start-ups, ultimately restricting true innovation.

	China	India	Japan	U.K.	U.S.
Restrictive regulatory policy	22%	22%	40%	23%	30%
Access to expertise/talent	26%	17%	20%	16%	28%
Nonexistent tech standards	21%	11%	30%	23%	21%
Legacy IT infrastructure	18%	20%	17%	21%	23%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Innovation and commercialization barriers (continued)



Restrictive regulatory policies is the leading concern across many countries.

In the EU the General Data Protection Regulation (GDPR) enforcement date was May 25, 2018. The GDPR affects organizations that deal with consumers and businesses in EU member states, and will transform the way that personal information is collected, stored, used, disclosed, and disposed of. While meeting regulatory obligations is a must, there is a danger of seeing the GDPR as a one-off, “tick the box” activity, rather than a deliberate move towards a privacy-conscious culture, where transparency, citizens’ rights, and accountability become second nature to all employees.

“While meeting regulatory obligations is a must, there is a danger of seeing regulation, such as the GDPR, as a one-off, ‘tick the box’ activity, rather than a deliberate move towards a privacy-conscious culture, where transparency, citizens’ rights, and accountability become second nature to all employees. To make privacy an integral part of the way your organization does business, you must first get the basics right — starting with strong privacy governance.”

— Vijay Jajoo, Principal, Cybersecurity, KPMG in the U.S.

Barriers to commercializing technology innovations

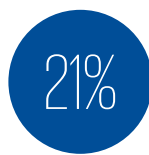
Customer, funding, and cyber top the list

Global tech industry leaders indicated a wide variety of challenges in commercializing emerging technologies. Customer adoption issues continue to be ranked as a leading inhibitor, marked at 22 percent of responses in the past two surveys. This concern is more pronounced in Japan, named by 30 percent compared to 18 percent the prior year. In contrast, this is less of an issue in China, showing 19 percent this year compared to 24 percent the previous year.

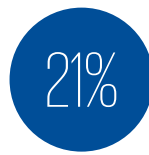
What are the top barriers to commercializing technology innovations?



Customer adoption



Funding/access to capital



Cyber security

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

There is still emphasis on funding and capital access concerns, with 21 percent pointing to this barrier compared with 36 percent in the prior survey. In an improving global economy, this is no longer the top issue. Tech industry leaders in the United Kingdom are more bullish about access to capital, showing 18 percent compared to 47 percent the prior year. This concern is also less evident in India and Japan compared to the prior year (40 percent and 39 percent, respectively).

Access to talent has emerged in this robust economic period as a bigger issue. A shortage of AI-trained specialists, data scientists, and engineers in quickly growing fields is a contributing factor.

Cybersecurity continues to be a challenge in commercializing emerging technologies. As data scientists seek to improve cybersecurity, artificial intelligence—and deep learning in particular—is emerging as a promising solution. From a cybersecurity perspective, deep learning can identify threats amid massive amounts of unstructured data and stop them before they happen. It can detect unusual network or user activity and can identify phishing e-mails before they unleash their damage. It has the ability to monitor all endpoints in a corporate network—including personal devices in addition to company-issued ones.

Measuring return on investment faces stronger headwinds in this highly competitive business cycle (regarded by 20 percent as a hindrance to innovation commercialization compared to 15 percent the prior year). The adoption of mission critical technologies has to be managed alongside a system of good governance. The creation of centers of excellence for investments in transformational technologies is likely to maximize ROI and minimize risk. For example, AI centers of excellence may ensure the continuous upgrade in skill levels to develop business and technology proficient employees and also focus on recruiting specialized AI talent.

	China	India	Japan	U.K.	U.S.
Customer adoption	19%	23%	30%	19%	23%
Funding/access to capital	22%	23%	13%	18%	27%
Cyber security	19%	14%	20%	21%	27%

Partial list. Percentages do not sum to 100%. Source: KPMG Technology Innovation Findings, March, 2018

Conclusion

The Fourth Industrial Revolution is well underway as cutting-edge technologies impact business, consumers, society, and the environment, creating massive upheavals across industries. This century's technology revolution is accelerating as the next wave of disruptors—the Internet of Things, artificial intelligence, and robotics—increasingly intertwine and new business models and companies emerge. Cloud computing and mobile technologies, which revolutionized business and consumers markets just a few years ago, are also evolving with innovations such as AI in the cloud enabling machine learning. The impact of these innovations is unforeseen as the speed of the next generation of technological advances continues to accelerate.

Blockchain is set to shake up financial markets and other businesses much like Uber, Didi, and Lyft did for transportation. Augmented reality is being increasingly applied in mobile games, in retail stores, and in classrooms for training and education. Self-driving vehicles and passenger drones are no longer science fiction. Biotech is working toward, and making progress on, a cure for cancer and other diseases and helping us live longer, healthier lives.

The race for leadership in the artificial intelligence arena is a key contributor among several others to quicker innovation advances overall. AI promises to increase our productivity and efficiency at work. Our home lives in developed countries are comfort zones more than ever thanks to gadgets that can monitor heat, noise, security, and light. In developing markets IoT and robotics are reaching underserved communities and making healthcare accessible with advances such as remote surgery.

Challenges remain. Lack of technology standards and complexity are barriers to progress in such an interconnected world. Restrictive regulatory policies are likely to impact technology industry players big and small as regulators, businesses, and consumers want more transparency about how emerging technologies work and the impact of technology on society. In addition, social media's bad actors and continued cybersecurity breaches are challenging the technology industry and most likely inspiring the next generation of entrepreneurs to solve these issues. Increasing consolidation of tech titan companies is emerging as a concern too, and is seen as stifling innovations by start-ups and less powerful contenders.

Managing proactively and strategically through this maze of disruptive technologies and new business models requires vision and courage. This is no time for fear of failure or status quo. Traditional companies that do not go down the path of transforming into digital-first enterprises will be obsolete.

The world is increasingly a magical mix of emerging technologies that are revolutionizing the way we live and work. Companies are entering new lines of business not in scope a few years ago. Maneuvering through this maze of advances and staying ahead will continue to challenge the next generation of global leaders.

“The future overall is positive as the convergence of IoT, AI, robotics, and other emerging technologies change the limitations of what humans can do and transform the business world. Visionary leaders understand the importance of innovation and transparency to be a market leader.”

— Tim Zanni, Global and U.S. Technology Sector Leader
Chair of Global and U.S. TMT Line of Business,
KPMG in the U.S.

Growing concerns about emerging technologies in our daily lives

What is the impact of these emerging technologies at work, at home, and to society as a whole?

Although IoT, AI, and robotics are helping solve complex social problems and transform business and the economy, there are ethical issues we must consider. As humans around the world interact with these technologies there are questions on how are individual rights protected.

Implications include a variety of outcomes that are beginning to be studied such as:

AI discrimination and bias. Algorithms are not always neutral or well intentioned. There are already precedents on AI discrimination and bias. Some companies are building inclusive teams in system design and developing more extensive testing for bias.

Trust. There are also challenges in trust related to data exchanges between humans, AI, robots, and IoT devices. In some cases the collaboration of humans and AI may help guide the solution to some of these challenges. Human algorithm audits combined with machine learning may provide transparency in AI algorithms and decision-making code to build trust.

Digital fragmentation and dependency. The rise of smartphones—and internet-connected devices generally—could not have been predicted. Research is showing the average human attention span is decreasing as we navigate from one app to another. At the same time, some digital business models have activated reward mechanisms to engage users creating, in some cases, addictive digital use patterns. Some tech companies are developing guidelines on how to set healthy limits on technology use.

The technology industry ecosystem has demonstrated its creativity to solve critical problems. The challenges resulting from the adoption of these emerging technologies are inspiring industry leaders, academia, and the next generation of entrepreneurs to assess and resolve these issues.

Survey demographics and methodology

Countries and regions



Source: KPMG Technology Innovation findings, March 2018

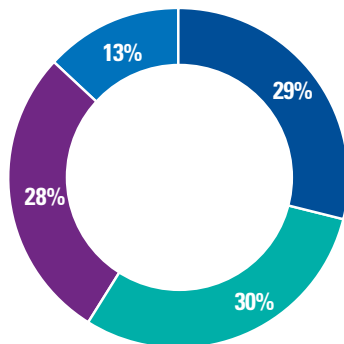
KPMG's technology innovation survey, now in its sixth year, includes 767 business executives in the technology industry. Most are C-level executives (85 percent).

Nearly one-third represent large enterprise technology companies, 29 percent are from mid-market tech firms, while 28 percent are from tech start-ups and the remainder from venture capital firms or angel investors. Ownership structure is split about evenly between privately owned and publicly traded companies.

Fifteen countries are represented. The Web survey was conducted from November through December 2017.

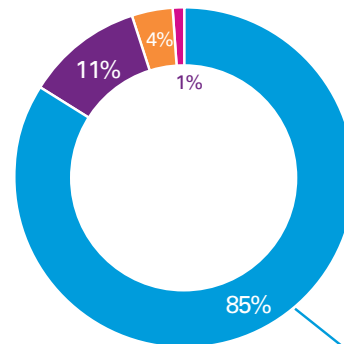
Q: Which of the following best describes your organization and your title?

Organization type



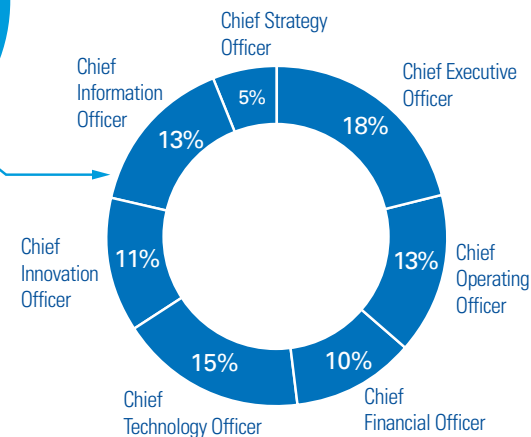
- Mid-market companies
- Large enterprise companies
- Start-up companies
- VC firm/angel investors

All titles



- C-level
- VPs, Directors
- Entrepreneurs, Venture Capitalists
- Other

C-level titles



Only C-level titles shown. Does not sum to 100%.

Source: KPMG Technology Innovation findings, March 2018

The strategy landscape

KPMG's Global Strategy Group

As sector convergence sets industries and organizations on a collision course, both opportunities and threats present themselves in the shape of new markets, propositions, channels, technologies and behaviors. When organizations from different industries meet each other in the market for the first time, and when disruptive new entrants and technologies are added to the mix, the environment becomes more competitive and less predictable, shortening the relevance and life span of many business models.

To survive and thrive, organizations need to be more forward-looking and agile, with greater control and visibility over strategic actions. They need to execute their strategy with an operational model that accelerates momentum, locks down value and de-risks decisions and actions—and can change course at a moment's notice.

KPMG's Global Strategy Group works with a wide range of organizations from the private, public, and not-for-profit sectors. KPMG knows the imperative of continually reviewing and updating strategy to reflect today's dynamic markets to create opportunities and respond to threats. KPMG professionals believe that agile strategies are more important than ever in this rapidly changing world. Whether it's steering a course through industry-disrupting changes such as the rise of the empowered consumer, digital enablement, intelligent automation and machine learning, responding to the pressures of intensified regulation or finding ways to operate more efficiently and at great clock speed. KPMG professionals bring insights, ideas, methods and experience and hands-on professionals to help clients craft winning strategies.

Our Approach – Getting from 'Innovation to Results'

KPMG's GSG strategy capabilities focus on: Growth strategy, Operating strategy & cost, M&A strategy, and Enterprise-wide transformation. KPMG's integrated "9 Levers of Value (9LoV)" strategic framework integrates KPMG's capabilities into one consistent discussion for the boardroom and ensures no stone is left un-turned to maximize the value delivered to clients. KPMG's approach is based on identifying and implementing a prioritized set of growth platforms that will enable clients to achieve their growth ambitions. KPMG's leading data analytics, machine learning and innovation capabilities are embedded in every engagement KPMG professionals do, providing unparalleled insights, ideas and speed to clients.

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KPMG Ignition brings together KPMG’s extensive knowledge of industries and business functions with the latest skills in signals-sensing, design thinking, data science, and solution development. Working with you and your team, KPMG Ignition helps you proactively plan for disruption, exploring fresh insights, new business models, and breakthrough solutions. With locations that span the United States and the KPMG International network of member firms, we invite you to experience KPMG Ignition in all of its dimensions:

Innovation Labs at KPMG Ignition

KPMG’s Innovation Labs sense and interpret signals of change from an outside-in perspective. With industry research, customer insights, and a wide range of analysis capabilities, they apply design thinking techniques for business model innovation, helping you translate signals into action.

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An experienced team, a global network

KPMG professionals combine industry knowledge with technical experience to provide insights that help technology industry leaders take advantage of emerging business opportunities and proactively manage business challenges. The KPMG network of professionals has extensive experience working with global technology companies ranging from the FORTUNE 500 to pre-IPO start-ups. They aim to anticipate the short and long-term opportunities of shifting business, technology, and financial strategies.

The KPMG network of firms is one of the world's leading professional services organizations, providing audit, tax, and advisory services to many of the world's largest and most prestigious organizations. KPMG International's independent member firms have 200,000 professionals working in 154 countries and territories. Learn more at www.kpmg.com.

KPMG Technology Innovation Center

KPMG firms recognize the importance of innovation. In 2012, KPMG in the U.S. launched a global Technology Innovation Center to identify and evaluate the impact of future disruptive technologies. The center connects leading technology industry thinkers including entrepreneurs, FORTUNE 500 technology executives and KPMG member firm professionals.

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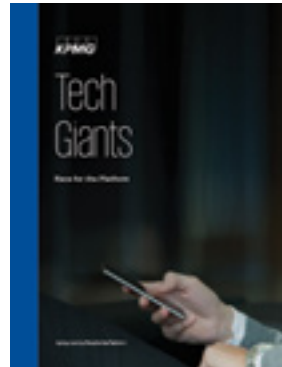
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