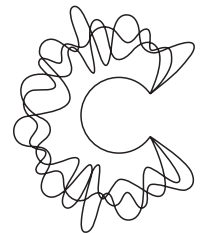


Cognitive Catalysts

Reinventing enterprises
and experiences with
artificial intelligence

Global C-suite Study
19th Edition

IBM Institute for
Business Value



How IBM can help

This report draws on input from 3,069 conversations with C-suite executives (CxOs) from April through June 2017. It is part of the 19th edition in our ongoing series of CxO studies from the IBM Institute for Business Value (IBV). We have had over 7,000 conversations with CxOs in 2017. Here, we explore their perspective on artificial intelligence (AI) technologies that enable the Digital Reinvention™ of enterprises. See ibm.com/globalcsuitestudy

IBM provides clients the consulting and systems integration capabilities to design and adopt advanced technologies to enable the cognitive enterprise. For more information about IBM Cognitive and Analytics offerings from IBM, visit ibm.com/gbs/cognitive. For more information about cognitive solutions and cloud platforms that support cognitive workloads, visit ibm.com/cognitive

Looming in sight

What will you do with artificial intelligence (AI) and cognitive computing? Automate an enterprise process, configure a chatbot, embed more sensors, empower employees, draw insights to serve up innovative customer experiences? Leading organizations are doing this and something more; they're redesigning their enterprises in the hunt for ever-more connections. They recognize that each interaction and each new node in their network is a fresh source of data – a new point in a pattern. In turn, each novel pattern illuminates ideas not yet conceived, paths not explored, opportunities not yet uncovered. As the art of the possible becomes the new science of discovery, innovations once unimaginable loom in sight.

Open to change?

There has been a reversal in the C-suite's response to disruptive business trends, compared to three years ago. On average today, C-suite executives are far less inclined to see competition coming from outside their industry and thus to search for innovation externally among partners. This raises intriguing questions. Is disruption abating? Are organizations more likely to “stay in their lanes”?

The answers, we found, could depend on an enterprise's approach to and use of advanced analytics and data as a foundation for Digital Reinvention™.

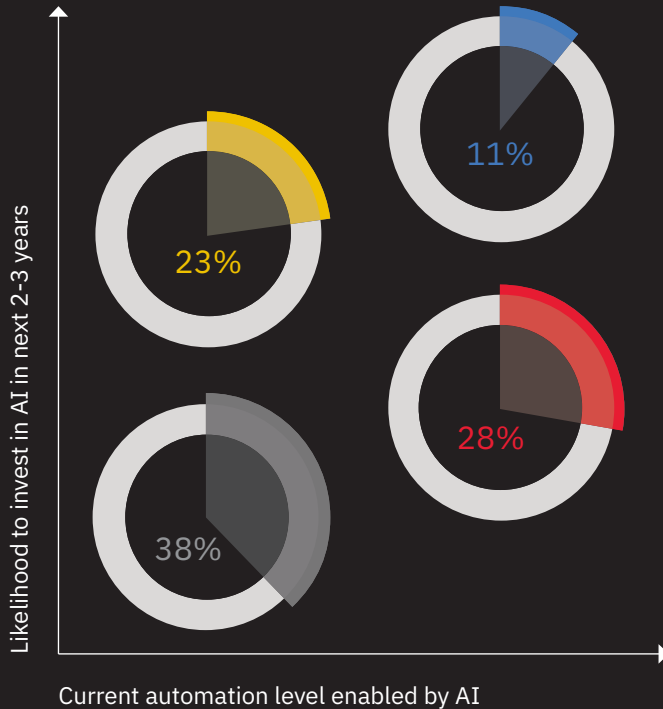
Cognitive computing refers to next-generation information systems that use artificially intelligent technologies, analytics and data to understand, reason, learn and interact. Cognitive systems continually build knowledge and learn, understand natural language, and reason and interact more naturally with human beings than traditional programmable systems. AI solutions have some, but not necessarily all, of the intelligent characteristics of cognitive systems. Automation, for example, has advanced from merely moving data to commanding complex systems, including performing judgment-based, AI-enabled interactions. In this report, we use the term “AI” to collectively reference such technologies and “cognitive” as a set of related capabilities.

What we mean by
artificial intelligence and
cognitive computing

Figure 1

State of play

34 percent of organizations plan to push ahead with AI technology



Reinventors

- AI-enabled with significant future investment

Tacticians

- AI-enabled yet minimal future investment

Aspirational

- Planning their first AI-enabled investments

Observers

- Not AI-enabled today and no planned investment

We segmented respondents by their current use of AI to automate or autonomize their business processes, as well as their planned future investment in this technology over the next two to three years (see Figure 1). Our analysis across their responses revealed significant differences in the organizations' capabilities, strategy and view of future advantage.

We have named these groups: Reinventors, Tacticians, Aspirational and Observers.

- The Reinventors (11% of surveyed CxOs) take a strategic approach to enabling their enterprise with AI technologies; they are solving complex problems, infusing intelligent capabilities into processes and investing to create a new and preferred future. Their enterprise design approach transforms both business and operating models to advance innovation as part of an ecosystem. Reinventors act in concert with an extended network of partners, including sharing their resources and assets, to continuously reinvent their businesses.
- The Tacticians (28% of surveyed CxOs) are updating select activities with AI point solutions; they're adept at remodeling parts of their business, but less focused on applying this technology to remake the enterprise. Tacticians are more insular than Reinventors, less likely to collaborate, share resources with partners or source innovation externally.
- The Aspirationalists (23% of surveyed CxOs) are still plotting their first forays into AI, and plan to use these technologies to overhaul their organization in the face of industry convergence, rising cyber risks and shifting consumer demographics. Aspirationalists expect AI to prompt cross-enterprise transformation and a consequent shift to ecosystems.
- The Observers (38% of surveyed CxOs) have not yet adopted AI; few have been impacted by recent disruptive forces and, for the most part, they intend to remain on the AI technology sidelines.

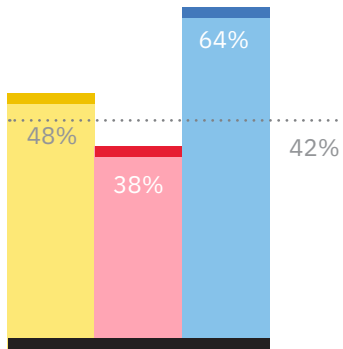
Consistent with their current pre-eminent position as leaders within their industries, many more Reinventors expect to make a move to new markets and expect disruption from new competitors entering their industry as well. They intend to collaborate more extensively with partners to innovate (see Figure 2). Reinventors, in short, have a far different view of the future than Tacticians.

Throughout this study, we focus primarily on those segments that have already adopted AI and cognitive capabilities: the Reinventors and the Tacticians. Aspirationals are included to understand their intent to use AI in the next few years. The Observer segment is not part of our analysis as they have signaled they're unlikely to adopt AI technology soon.

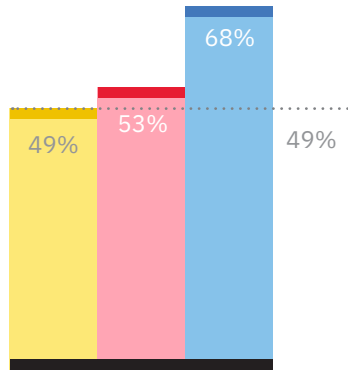
“You need to continuously reinvent yourself, adapt your business and be quick enough to implement before others do.”

Christian Hebich,
Global Head of Solution Integration & Services
Roche Diagnostics, Switzerland

Expect more external innovation



Expect to focus on new markets



Expect more competition from other industries

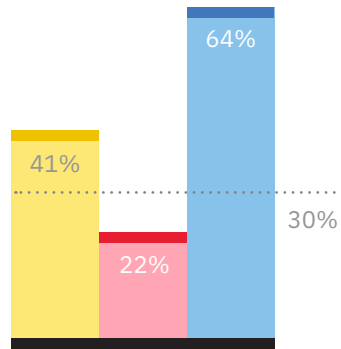


Figure 2

Get the picture

Reinventors anticipate what others don't

- Reinventors
- Tacticians
- Aspirationals
- Global average

A wide horizon

Reinventors are leading their organizations from a position of strength. Twice as many Reinventors as Tacticians in our study are high-performance, innovative organizations. Seven in ten Reinventors report that their revenue growth and profitability is better than their industry peers; nine in ten say they lead their industries in innovation.

Although more than twice as many Reinventors as Tacticians report a high degree of disruption in their industries, Reinventors are confident they have the wherewithal to manage the change they see coming. By contrast, Aspirationals, who are also experiencing significant disruption, said they are less prepared to manage this disruption (see Figure 3).

The Reinventors aren't retreating to traditional vertically integrated business designs. Instead, they're acting on a conviction that more open, expansive and digital business ecosystems will illuminate entirely new possibilities to create value and enter new markets. In this study, we explore their approach in three chapters:

Strategy:

Reframing the enterprise

Business models:

In pursuit of the personal

Operating models:

Becoming future proof.

Figure 3

All systems go

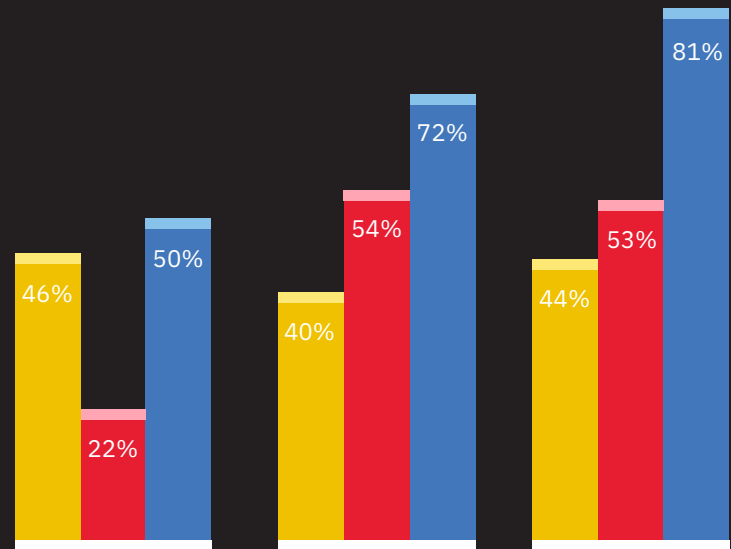
Reinventors prepare for disruption

Reinventors
Tacticians
Aspirationals

Experience a high level of disruption

Have a well-defined strategy to respond to disruption

Were very successful at managing change in the past



Strategy: Reframing the enterprise

A cognitive enterprise runs – and hums – on data. Always on the lookout for more of this most precious asset, Reinventors are reframing their enterprises to tap into the data they don't yet have – or don't have in sufficient supply.

This appetite for data manifests itself in two important ways. First, Reinventors favor a business design that features extended and collaborative partner networks. Second, they're more inclined to leverage a broader range of emerging technologies into their digital platform. Both get them to their desired state – awash in abundant data.

The executives leading these organizations are looking to reinvent their enterprises, starting with strategy. A full 70 percent of Reinventors rely on data to inform their business strategy, compared to 51 percent of Tacticians. More than twice as many Reinventors as Tacticians leverage emerging data sources to adapt to market changes. Reinventors gather data, question assumptions, look for new patterns and then reframe possibilities. Their strategy is to continuously seek out the next best opportunity.

In search of data

Ecosystem partners are a pipeline to the widest possible set of data – contextualized and heterogeneous data that reveals rich new patterns of possibility. Add emerging technologies such as the Internet of Things (IoT), intelligent automation and blockchain, and an abundance of data emerges. As digital enterprises ingest all this information, real breakthroughs and new ways of doing things become possible.

Partners, of course, aren't always inclined to share data. Those who overcome hesitancy or the objections of others can reap the benefits. Deeply collaborative relationships are more likely to yield an open exchange of data and these are the relationships Reinventors favor.

Seven in ten Reinventors collaborate intensively with partners to develop new products and services. Moreover, Reinventors are much more likely than Tacticians or Aspirationals to share – to a large extent – resources, people and even physical assets with their partners (see Figure 4).

“Artificial intelligence converts the unstructured work patterns of the past to the intelligent workflows of the future.”

Chief Human Resource Officer, Information Technology,
United States

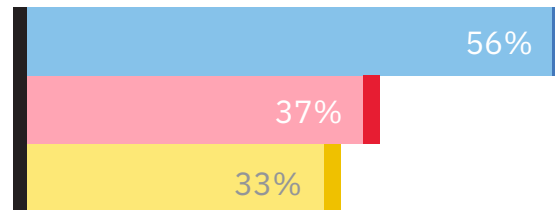
Figure 4

Find the flow

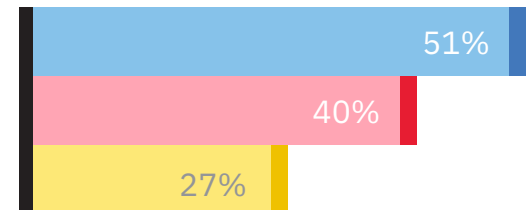
Reinventors are primed to share assets

Reinventors
Tacticians
Aspirational

We share people (resources and skills) with our partners to a large extent



We share physical assets with our partners to a large extent



AI is the “cornerstone”

For Reinventors and Aspirationalists, AI technologies become a cornerstone; once in place, they can see how to leverage the full array of emerging technologies. By contrast, the Tacticians’ uptake of new technologies is constrained as they instead prefer to only invest in those that are well-established (see Figure 5).

Very likely to invest in the following additional technologies

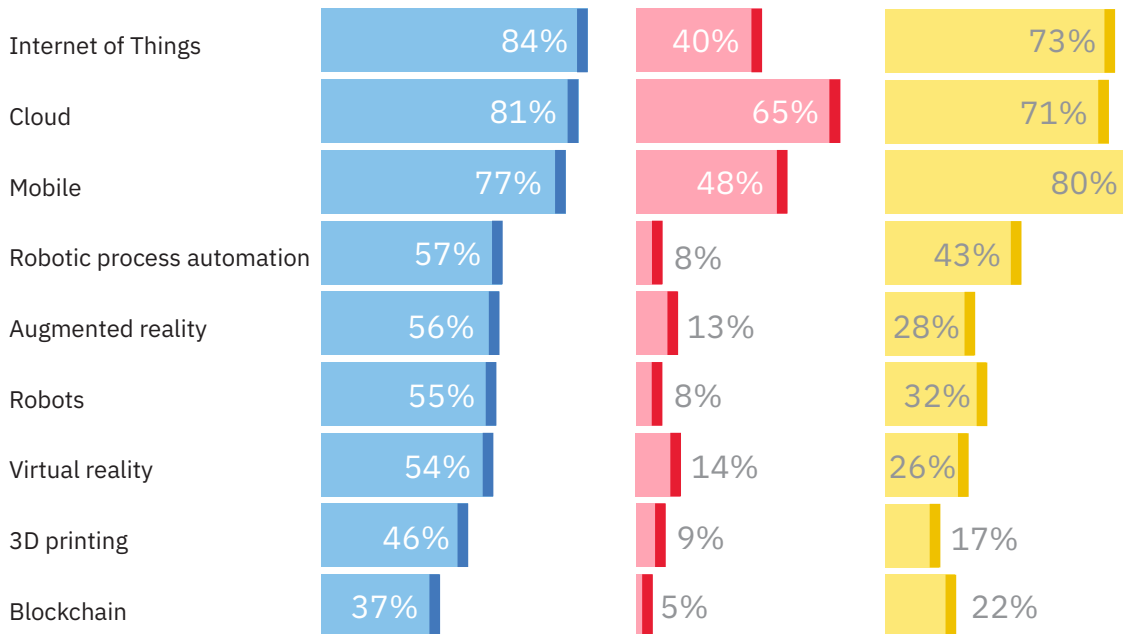


Figure 5

The full stack

AI underpins technological convergence

Reinventors
Tacticians
Aspirationalists

What makes Reinventors and Aspirationals so open to adopting emerging technologies? In part, those technologies enrich and expand the sources and types of data available for analysis, understanding and discovery.

Technological convergence, the combination of two or more technologies in a single device or process, has matured considerably across mobile, cloud and IoT. It's being applied in consumer devices such as smartphones, and business applications such as IoT-connected sensors on manufacturing equipment. The convergence of technologies leads to the integration of data, which in turn, can uncover new opportunities to reinvent a business model or achieve greater operational efficiency.

The Reinventors may be the first to fully exploit the transformative capacity of this technology and data convergence (see sidebar, "E. & J. Gallo Winery: Integrating technologies improves yield while saving water").

In the United States, E. & J. Gallo Winery wanted to find a way to water each vine according to its individual need. The breakthrough came from space. The winery used cognitive algorithms to compare remote-sensing data gathered in NASA satellite images – down to one square meter – with moisture sensors embedded in the soil. Using machine learning and visual analysis to crack the code in the satellite images, it developed an automated system that doles out only enough water for each vine. These irrigation practices increased the winery's yield by greater than 20 percent while improving its water-use efficiency by 16 percent.

E. & J. Gallo Winery:
Integrating technologies improves
yield while saving water

KONE, headquartered in Finland, is connecting elevators, escalators and automated building doors in customer service contracts to an IoT cloud platform. The company utilizes cognitive computing and advanced analytics to predict maintenance requirements and suggest resolutions to potential problems. By gathering detailed data from connected equipment and sharing this data with field operations and sales, it expects to be able to move from reactive to predictive customer service, and improve customer satisfaction.

KONE: Moving to predictive customer service

Connected buildings and farms are one future. Connected cars are another. Augmented reality is used in heads-up displays on windshields for drivers and for corrective maintenance on automated assembly lines. Blockchain can efficiently track parts across a complex web of tiered suppliers, and detect and forestall disruptions in a complex supply chain or on an assembly line. Data streaming from vehicles and the surrounding environment – global positioning satellites, sensors embedded in roads – is already the basis for new business models for auto insurers and city planners alike.

Scenarios like these create an abundance of data about situations, events and even human sentiment that was not available or fully understood before. That data fed to cognitive systems can transform both business and operating models (see sidebar, “KONE: Moving to predictive customer service”). It can also change how an organization cultivates talent.

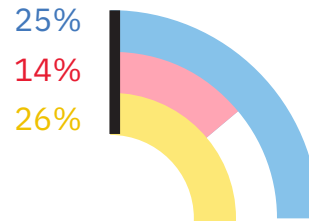
Everyone an expert

One of the most significant differences between Reinventors and Tacticians is their view on employees. More than twice as many Reinventors and Aspirationalists expect that using AI and cognitive technologies can free up their employees from routine tasks, letting them take on higher-value activities (see Figure 6). “As business-as-usual tasks are automated,” said Mohammed Abdulla Shael AlSaadi, Chief Executive Officer, Department of Economic Development-Dubai in the United Arab Emirates, “employees have time to think up new innovative ideas.”

Figure 6

Reinventors
Tacticians
Aspirationalists

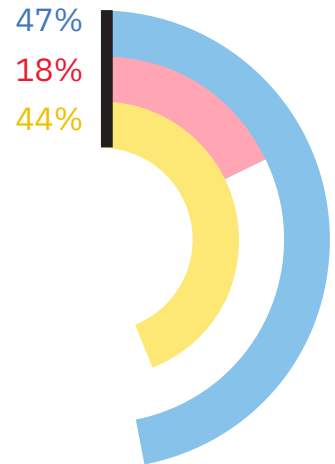
We are likely to deploy bots or robots to perform routine tasks within the next 2-3 years



Better than bots

Liberated employees create new value

We expect to redeploy employees to higher-value activities by using AI for routine tasks



At Woodside Energy in Perth, Australia, employees are using cognitive computing to access the company's 30 years of expertise and volumes of unstructured technical data. The time spent by the geoscience team members reading and searching for data for certain tasks has been reduced from 80 percent of their time to 20 percent, leaving more time for decision analysis. More immediate access to data enhances the collective knowledge transfer from one generation of employees to the next, and increases employee expertise and speed to execution. A more informed and engaged workforce, Woodside believes, is key to growth.

Woodside Energy: Using a cognitive approach to grow expertise

Reinventors recognize that a cognitive enterprise is ultimately more man than machine. Because AI doesn't just improve automation, but also the reasoning and evidence behind answers to complex questions, it gives every employee the capability to understand, reason and respond as well as the very best in that organization. AI can elevate everyone's expertise (see sidebar, "Woodside Energy: Using a cognitive approach to grow expertise").

One result? Today, 21 percent of Reinventors already report that AI and cognitive systems have improved talent management and retention. They further suggest this trend will grow, with twice as many (42 percent) expecting cognitive workforce systems to further these advantages over the next two to three years.

Comments from the C-suite executives in our study focused predominantly on the looming productivity advantage. Some leaders spoke of an opportunity to spark intelligence of a different kind. "Cognitive/AI," noted Claire Sharp, Customer Director of Northumbrian Water in the United Kingdom, "allows employees to become more skilled at dealing with complexity. It can even enhance their emotional intelligence." One way AI may sharpen emotional intelligence is by helping employees better understand their customers as individuals.

Develop a cognitive enterprise blueprint

Reinventors' broader AI vision and strategy suggest four actions that may propel other enterprises toward more strategic use of AI capabilities.

Opportunity

Expand data sharing among your partners to identify new markets, segments and product/service innovations.

Strategy

Publish an enterprise AI blueprint that aligns your business and IT strategies, identifies value realization opportunities and incorporates new ways of working.

Execution

Redesign your business model and processes to elevate expertise and redeploy employees to higher-value activities, keeping a keen focus on change management and communications.

Ecosystems

Rethink how you collaborate with partners, suppliers and distributors to expand capabilities, skills, resources and data.

Business models: In pursuit of the personal

For decades, organizations have yearned to achieve one-to-one marketing, seeking the capability to market uniquely to individuals on a personal level, instead of only to broader demographic groups. Almost 20 years ago, Harvard Business Review discussed its value and challenged companies to consider if they were ready.¹ Progress toward true personalization has unquestionably been slow, until recently. As vast quantities of data and AI technologies combine, executives indicate that market-of-one segmentation is less about individualizing products and more about the personalization of the customer experience. Because of the exponential speed and capacity for discovery, the modern AI-enabled information infrastructure can now make possible what once seemed unattainable.

“It is very helpful to have something that can make inferences. My job is to create intimacy at scale and AI helps me do that.”

Jason Alan Snyder, Chief Technology Officer,
Momentum Worldwide, United States

Know the crowd

Getting to some level of insight about individual customers requires sentiment and behavioral, demographic and psychographic data at scale to plumb the patterns (see sidebar, “Toshiba: Interpreting valuable patterns in data”). In other words, to understand an individual you need to know a crowd. Today, recommendation engines harness the knowledge from the crowd to help consumers discover books or music they weren’t aware they might want. Tomorrow, they could help organizations find the optimal real estate, delivery route or manufacturing equipment.

To gain a real-time understanding of patients with heart conditions, Toshiba Electronics Taiwan Corp, a subsidiary of Toshiba, Japan, turned to cognitive computing capabilities and the IoT. Biometric sensors from wearable devices collect a constant stream of data, such as heart rate and blood oxygen. Trained to read and interpret patterns in this data, the cognitive solution can distinguish with increasing accuracy between healthy and abnormal patterns. It accounts for individual health characteristics with a sophisticated algorithm that adjusts the expected normal range based on a patient’s initial readings. In the event of abnormal readings, the system raises an alert to help patients and caregivers take preventive action.

In Taiwan, where there is a shortage of doctors, caregivers can efficiently provide for at-risk patients by automating a function that is challenging and time-consuming for humans, and augment the work performed by the caregiver. In turn, Toshiba, which operates in an already saturated market, has expanded to a new industry – consumer health and wellness – with a subscription-based revenue stream.

Toshiba:
Interpreting valuable patterns in data

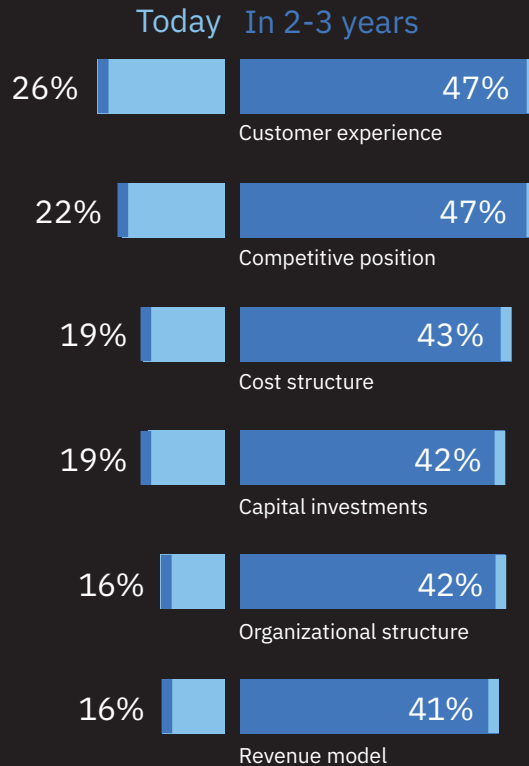
Figure 7

Reinventors

AI will have a significant impact on our business model

Opportunity knocks

New business models made possible



While most organizations are just transitioning from solution-specific uses of AI to these more complex systems, some Reinventors expect AI to drive significant impacts across their entire business model (see Figure 7).

Almost half expect their competitive position to improve by monetizing new customer experiences. They also expect to drive cost structure improvements and shift how the workforce operates.

Reinventors, Tacticians and Aspirational hold different market outlooks, but they have a common goal: each is convinced that AI's greatest competitive advantage will come from its ability to personalize the customer experience. Asked to choose among six areas where this emerging technology should help their organization compete, each ranked personalized experiences first.

Not just personalized, but personal

What also differentiates Reinventors from both Tacticians and Aspirationalists is their approach. Reinventors are much more effective at working with partners to understand and enhance customer experiences and deploying technology to transform their interactions with customers. Already, 77 percent of Reinventors say they're very effective at creating personalized customer experiences (see Figure 8).

The best experiences are contextualized not just to the individual, but also to the moment. As one Consumer Products CMO in Japan said, "Artificial intelligence helps you understand customers as individuals, and then focus on that understanding in real time."

The personalization equation

Partners and technology-enabled interactions transform the experience

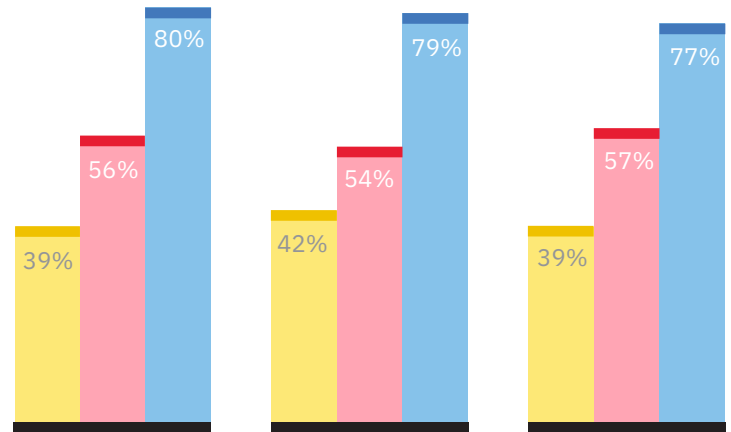
Figure 8

Reinventors
Tacticians
Aspirationalists

Leveraging partners to understand and enhance customer experiences

Deploying digital technologies to transform interactions and transactions

Creating personalized customer experiences



What AI technology makes possible is the capability to deeply understand human sentiment and prescribe to individuals from that perspective. This can take the form of individualized products and services, but to be personalized, it must most of all be personal. This includes not just understanding customers, but having the capacity to surprise and delight them. Here too, a convergence of emerging technologies does the trick.

If chatbots that process natural language are beginning to seem nearly ubiquitous, intelligent robots are still quite rare. But that's just what one Reinventor CFO in Financial Services told us his firm in Japan has introduced: a humanoid robot that interacts with customers, and is capable of understanding emotions and speaking multiple languages. "AI," he said, "will completely reshape our business."

The financial services leaders in our study are strong advocates of AI-enabled interaction. Leaders across other industries are also looking to immersive experiences – virtual reality and augmented reality technology that infuse the physical world with digital interactions of countless kinds.

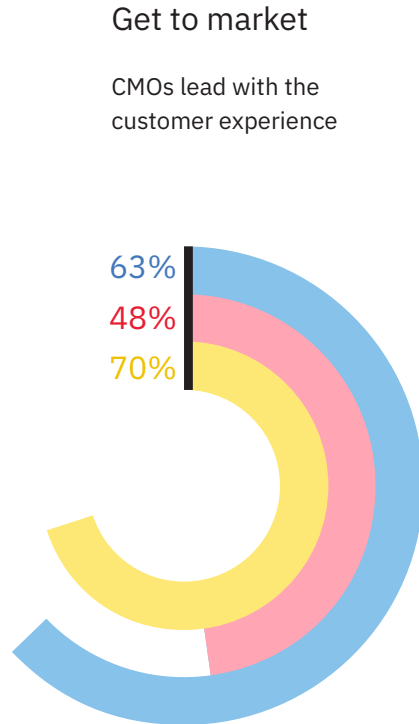
“Robo-advisors will aid in balancing human and machine advice, and as a result of this combination extract the perfect piece of advice.”

Chief Financial Officer, Financial Services,
United Kingdom

Figure 9

CMO Reinventors
CMO Tacticians
CMO Aspirational

Chief Marketing Officers:
We will deploy AI within the
next two years to reinvent
our customer experience



Consider a virtual reality showroom where customers can interact with 3D models of ovens, for example. They can open doors, rearrange shelves, bake a virtual pie and configure their own design. That's a personalized experience. It's also an opportunity to capture each interaction customer-by-customer and contextualize the data, which renders a far richer view of what customers care about. In turn, that data can be fed back to product design, research and manufacturing.

Similarly, augmented reality mobile apps are replacing catalogs and could be used by sales representatives in face-to-face settings to sell carpeting for an office park or pharmaceuticals to a medical practice. 3D printing, which is revolutionizing rapid prototyping in manufacturing and becoming more cognitive, enabled by AI, brings catalogs to life.

We asked Chief Marketing Officers about their AI and cognitive technology deployment plans (see Figure 9). In the next two years, 63 percent of Reinventor CMOs and 70 percent of Aspirational CMOs expect to deploy these technologies to reinvent their customer experience; 48 percent of Tactician CMOs do.

New technologies don't just create engaging experiences for customers; they create rich new sources of data – data that reveals what is distinctly human within each interaction. In turn, the intricate patterns and correlations reveal the whole human being and expose new ways to create value. Creating that value suggests a need to reinvent related aspects of the enterprise's operating model as well.

Innovate for a market of one

Reinventors expect AI to enable business model innovation by personalizing the customer experience.

Opportunity

Contextualize experiences to each individual “moment” by infusing touchpoints and interactions with data and technology.

Strategy

Articulate the vision of a seamless, end-to-end personalized experience, whether B2C or B2B, with a macro view that extends across ecosystem partners.

Execution

Combine data and emerging technologies to create immersive, individualized interactions throughout the experience.

Ecosystems

Seek out and leverage data from partnerships to create new business model and personalized insights.

Operating models: Becoming future proof

To compete, organizations are “rewiring” their operating models for speed and responsiveness. The personalized experiences promised at the point of engagement require operations that can consistently and reliably deliver on that expectation. The cognitive enterprise can do something more – become situationally aware with the potential to respond autonomously.

“Through artificial intelligence, we could establish a smart network factory in which data from the supply chain, design teams, production lines and quality control combine to create a highly integrated and intelligent creation engine.”

Chief Marketing Officer, Industrial Products,
China

Aiming to field the growing volume of inquiries related to a new mortgage offering without driving up costs, a commercial bank in South America began looking for a new approach to customer service – one capable of delivering personalized attention without requiring extensive human contact.

The bank introduced a cognitive chatbot solution, using natural language processing to “converse” with customers, interpret the intent behind their words and ask clarifying follow-up questions. The solution taps into a repository of structured and unstructured data to identify the most appropriate response to each inquiry. It now handles routine inquiries at half of its traditional contact center costs and automates more than 75 percent of the traffic related to the new product.

Banking operations profit from AI

The capacity to do situational analysis – learn and adapt as it goes – is an important difference between simply being digital and being a cognitive enterprise. The shift? Organizations used to rely on an extended supply chain requiring millions of decisions built on last year’s data. Cognitive capabilities enable a supply chain to evaluate the immediate situation with real-time streaming data that can tell related processes what to do.

The C-suite executives we interviewed were keenly focused on the automation of operational processes using software robots that mimic human activities through programmed commands, algorithms and AI (see sidebar, “Banking operations profit from AI”). They spoke about the productivity advantages of doing things like automating claims management, underwriting and over-the-counter derivatives; finding anomalies in x-rays, handling customer service inquiries, and automating logistics and industrial production. About six in ten Reinventors told us they had already stepped up from automating complex processes with AI to autonomous processes, ones that can reason and make decisions on behalf of humans. By contrast, just two in ten Tacticians have such autonomous processes in place.

A new view on risk

Reinventors expect AI and cognitive computing's impact on the operating model to rapidly accelerate in the next few years (see Figure 10). Reinventors, Tacticians and Aspirationalists in our study all consistently agree that AI's most significant impact on the operating model will be in risk management. They are particularly focused on the benefits of early intervention, but also the possibility of far better prevention. They described risk-sharing innovations, evaluating the risks of different business models and coping with complex regulatory issues.

C-suite executives weren't focused just on financial forensics, but rather on identifying, remediating and forestalling operational risk. AI systems, they recognized, can make an enterprise-wide approach to risk feasible with a resulting boost in risk management effectiveness and financial performance.

Figure 10

Reinventors

AI has a significant impact on our operating model

Planning horizon

Reinventors expect AI to have the greatest impact on risk management

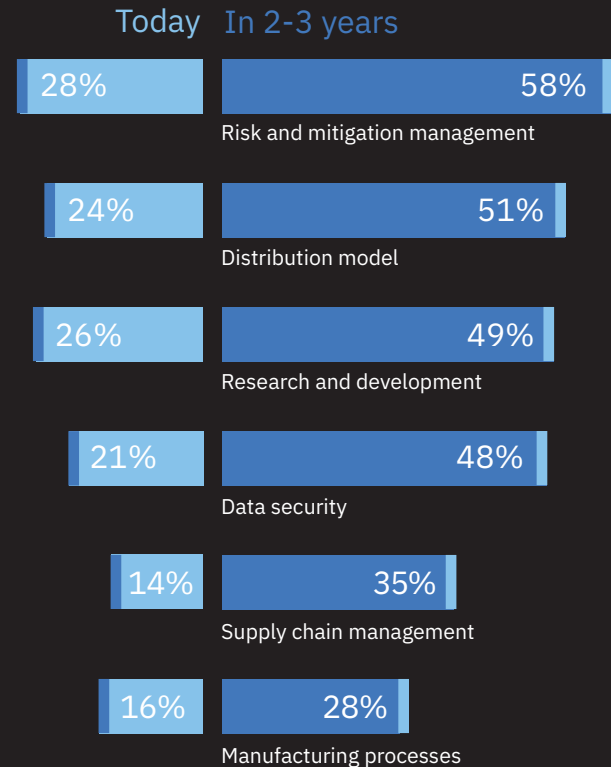


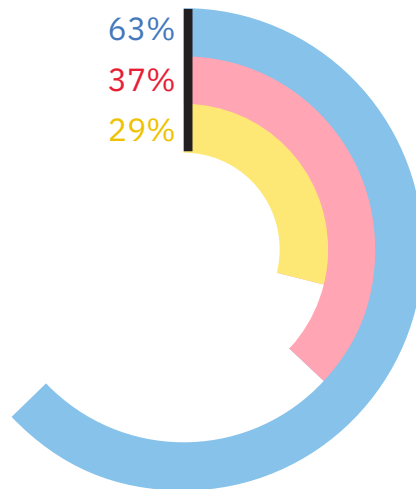
Figure 11

COO Reinventors
COO Tacticians
COO Aspirational

Chief Operating Officers:
 We apply real-time information
 to optimize processes and
 networks for immediate
 actions and outcomes

In the moment

COO Reinventors pursue
 superior response times



Optimized for uncertainty

Reinventors expect the competitive advantage created by AI technologies to enhance two related operating model areas: process optimization and forecasting.

One European multinational bank has already used complex automation to streamline its forecasting processes from a monthly work effort of 12 hours to just two, while cycle times of 90 minutes have fallen to 15 minutes. Overall, the bank increased efficiency within these processes by almost 90 percent.

The COO Reinventors we surveyed are leading the way in predictive optimization. Six in ten of them are applying real-time information to optimize their processes and networks for immediate actions and outcomes (see Figure 11).

A revolution in real time

The convergence of technologies like the IoT and Blockchain in the cloud enable vast improvements in supply and demand forecast accuracy, and speed across the supply chain.

In tandem with robotic process automation, organizations could optimize processes for immediacy. First-movers can begin to conceive entirely new ways of working – from reducing waste, errors or fraud, to the autonomization of everything from self-driving delivery trucks to factory floors that select their own suppliers.

Reinventors' and Aspirational's visions for the cognitive enterprise are remarkably alike: 72 percent of Reinventor COOs and 64 percent of Aspirational COOs see the convergence of these digital technologies as having a significant impact on their operating models. Just 32 percent of Tactician COOs do.

COOs are moving fast to establish operations that are tuned to pull IoT and other data into AI systems and bring “cognition” to processes. In just a few years, the number of organizations running such autonomous processes could triple or more (see Figure 12). Ultimately, because these autonomous processes need and use real-time awareness of workflows and the environment they operate in, they can become capable of intelligent improvisation. This could include switching supply chain partners or product design mid-stream, opportunistically drop-shipping a product based on current demand and inventory levels, or rerouting batches to different equipment to eliminate idle time. As automation shifts to autonomy, something close to the seamless self-orchestration of ecosystems becomes possible.

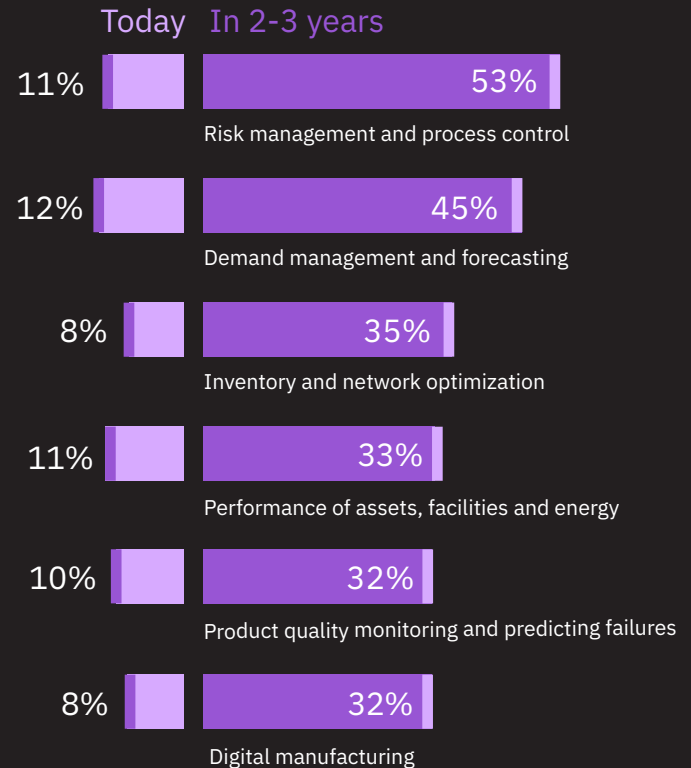
Figure 12

Chief Operating Officers

Primary insight capabilities used today and in the next 2-3 years for AI

An economy of autonomy

COOs recalibrate for AI operations



Many advances will be contingent on capturing and using data from IoT-enabled devices. Reinventor COOs are looking to IoT devices as a required source for needed data: six in ten view it as a means to exchange data across industries, versus two in ten Tacticians.

Reinventing customer experiences through AI capabilities also requires significant changes to the operating model. Chief Operating Officer Reinventors are already on the job. Six in ten confirm they're leading their organizations to individualize the customer experience, applying flexibility in operations to support new capabilities and experiences that attract and retain customers.

“Artificial intelligence will help us search out hidden opportunities.”

Chief Information Officer,
Financial Services, Taiwan

Build AI capabilities to enable future-ready operations

Reinventors understand that business model transformation requires commensurate changes to their operating model.

Opportunity

Use AI technologies to create an enterprise that is situationally aware.

Strategy

Design optimal processes using machine learning, then identify automatable tasks focusing on efficiency, efficacy and speed.

Execution

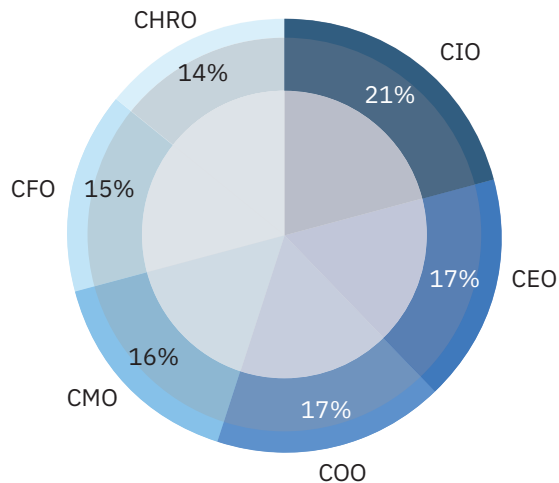
Enhance decision making, risk management and forecasting with AI technologies to create value, while automating routine or mundane tasks to create efficiency.

Ecosystems

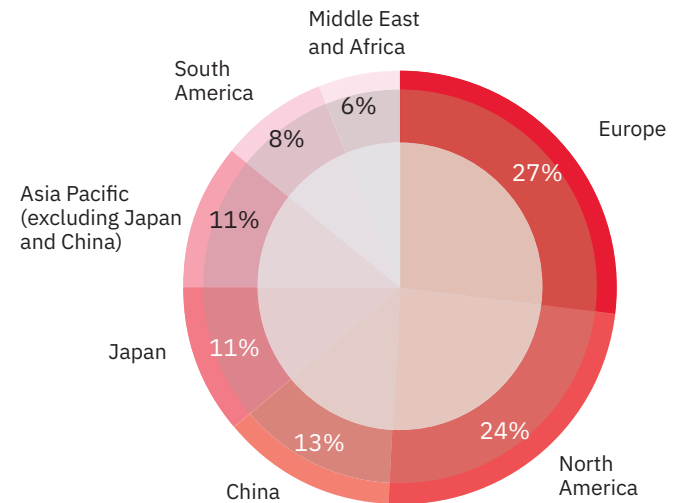
Explore ways to use diverse technologies to connect components across the ecosystem to create end-to-end awareness.

Our research methodology

The IBM Institute for Business Value, in cooperation with Oxford Economics, interviewed 3,069 C-suite executives from 91 countries and 20 industries worldwide. Information was collected through a combination of 2,491 live phone interviews and 578 face-to-face meetings conducted from April 1 to June 30, 2017. Respondents in our study were a balanced mix of six C-suite roles: CEOs, CMOs, CFOs, COOs, CIOs and CHROs.



We analyzed responses to questions about their current levels of automation, leveraging structured and unstructured data, coupled with their plans to invest in AI and cognitive technology in the next two to three years. This analysis yielded four unique archetypes, against which we analyzed a broader set of macro, general business, role-specific and industry-specific questions. In addition, we analyzed participants' contextual responses using the IBM Watson Natural Language Classifier, to obtain overarching themes and priorities.



Related IBV executive reports

Abercrombie, Cortnie, Rafi Ezry, Brian Goehring, Anthony Marshall and Hiroyuki Nakayama. “Accelerating enterprise reinvention: How to build a cognitive organization.” IBM Institute for Business Value. June 2017. www.ibm.com/business/value/accelentreinvent/

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Ezry, Raphael, Dr. Michael Haydock, Bruce Tyler and Rebecca Shockley. “Analytics: Dawn of the cognitive era – How early adopters have raised the bar for data-driven insights.” IBM Institute for Business Value. October 2016. www.ibm.com/business/value/2016analytics/

Notes and sources

- 1 Peppers, Martha Rogers and Bob Dorf. “Is Your Company Ready for One-to-One Marketing?” *Harvard Business Review*. January-February 1999. Accessed August 31, 2017. <https://hbr.org/1999/01/is-your-company-ready-for-one-to-one-marketing>

For more information

To learn more about this IBM Institute for Business Value study, please contact us at iibv@us.ibm.com. Follow @IBMIBV on Twitter, and for a full catalog of our research or to subscribe to our monthly newsletter, visit: ibm.com/iibv.

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