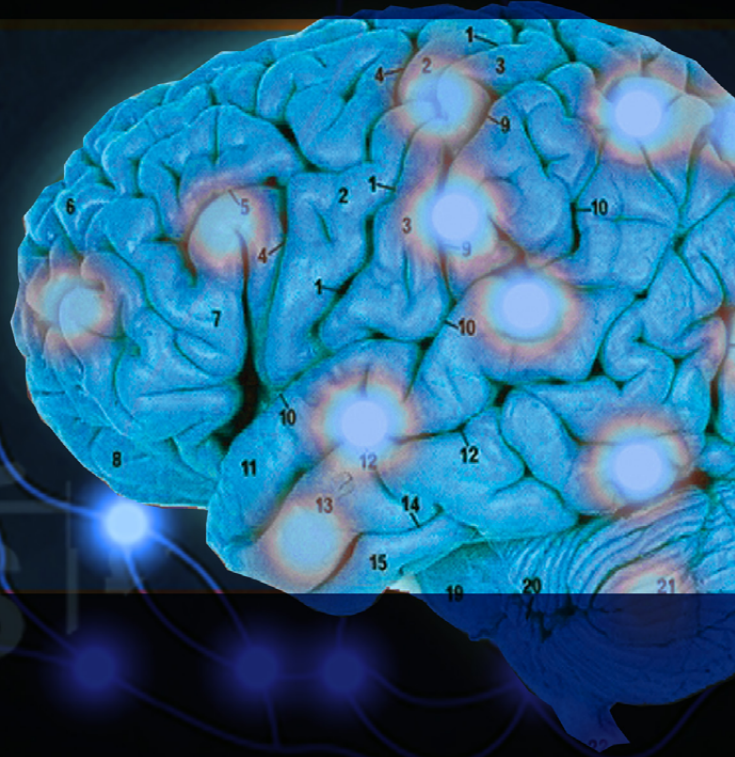


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# Breakthrough banking

*Your cognitive future in banking and financial markets*

## **Executive Report**

Banking and Watson

### **IBM Banking and Financial Markets**

To succeed in today's environment, businesses need to lead through increased complexity and volatility, drive operational excellence and enable collaboration across enterprise functions, develop higher quality leadership and talent, manage amid constant change and unlock new possibilities grounded in data. For more information about IBM Banking solutions, visit [ibm.com/banking](http://ibm.com/banking). For more about Financial Markets solutions, see [ibm.com/financialmarkets](http://ibm.com/financialmarkets).

### **IBM Watson**

Watson is a cognitive system that enables a new partnership between people and computers that enhances and scales human expertise. For more information about IBM's Watson, visit [ibm.com/Watson](http://ibm.com/Watson).

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## *Transforming financial services*

*For banking and financial markets, cognitive computing has arrived, and its potential to revolutionize the industry is enormous. With the power to unleash a new era of innovation and growth, cognitive systems are already helping institutions evolve beyond digital banking to further enhance the customer experience, uncover new insights and improve the quality of timely decisions. Our research indicates banking leaders are poised to embrace this groundbreaking technology and invest in cognitive capabilities to transform financial services.*

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## **Executive summary**

Facing upheaval triggered by economic, societal and industry influences, the financial services industry is primed for a landmark shift. As numerous banks struggle with compressed margins, they are simultaneously pressed to reevaluate their operating models amid complex regulatory requirements.<sup>1</sup> In addition, the industry finds itself catering to an increasingly demanding and empowered consumer, while contending with relentless and increasingly sophisticated security threats, as well as growing competition from non-traditional players.

At the same time, financial institutions have to manage massively increasing volumes of data, from a wider range of sources, brimming with latent insights that could potentially redress some of these issues. Unfortunately, they are unable to unlock the full value of the data at their disposal. As the potential for insight increases with additional data, so, too, does the challenge in managing this data.

Advances in cognitive computing can help financial institutions manage this increasing volume of data while exploiting it for greater insights. Cognitive-based systems can build knowledge, understand natural language and provide confidence-weighted responses. And they can quickly locate the proverbial needle in a haystack, identifying new patterns and insights – something particularly relevant for activities in the banking and financial markets sector. Indeed, cognitive capabilities could help financial institutions optimize value from data already within their reach, giving them a leg up on new market entrants that don't have access to the same data.

# 79%

of banking executives familiar with **cognitive computing** believe it will play a critical role in the **future of their business**.

# 89%

of banking executives familiar with **cognitive computing** believe it will play a **disruptive role** in the industry.

# 88%

of banking executives familiar with **cognitive computing** intend to **invest in cognitive capabilities**.

Our research reveals that cognitive solutions are already enabling financial institutions to blaze new territory. As a follow up to the “Your cognitive future” reports, we launched a new series of industry-specific studies based on research conducted in early 2015. (For more information on the research, which included a survey of close to 100 banking executives, see the “Study approach and methodology” section). In this report, we examine current and future applications for financial institutions and provide recommendations for those embarking on the cognitive journey.

We also offer insights from banking executives who understand how cognitive capabilities can help push the current boundaries of innovation and growth. These leaders recognize the potential to transform banking and financial markets – and are set to exploit cognitive capabilities to do so.

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## Conquering industry forces

Traditional financial institutions are particularly sensitive to the challenges of today's rapidly changing world and are facing unprecedented levels of ongoing disruption. A 2013 study identified banking as the industry most vulnerable to disruption by Millennials, one third of whom predict they won't even need a bank in five years.<sup>2</sup>

From operational and regulatory challenges to rising competition, a number of powerful forces are shaping – and shifting – the financial services marketplace:

*Pressure to perform:* For a number of banks, profits are stagnating. As many financial organizations experience a challenging business environment, they are under pressure to reduce costs on the one hand and improve returns on capital on the other.<sup>3</sup>

*Complex regulation:* Financial institutions have to navigate an increasingly complex regulatory environment and incur the associated compliance costs. Reflecting this, well over half of U.S. and more than a third of European executives consider regulatory compliance a top investment priority.<sup>4</sup>

*Heightened security threats:* A 2014 study revealed that the rate at which banks experience fraud is rising, with a sharp increase in card fraud in particular.<sup>5</sup> As financial fraud and cyber attacks become more sophisticated and varied in nature, organizations require innovative solutions to better manage security, detect fraud and mitigate risk.

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### What is cognitive computing?

Cognitive computing solutions offer various capabilities, including...

- Learning and building knowledge from various structured and unstructured sources of information
- Understanding natural language and interacting more naturally with humans
- Capturing the expertise of top performers and accelerating the development of expertise in others
- Enhancing the cognitive processes of professionals to help improve decision making
- Elevating the quality and consistency of decision making across an organization.

*Emboldened customers:* Today's customers want individualized banking services they can employ anytime and anywhere. To deliver a seamless customer experience, banks are seeking far more penetrating consumer insights. According to a recent IBM Institute for Business Value banking innovation report, a majority of banking leaders recognize the importance of customer insight in creating higher-value offerings.<sup>6</sup>

*Disruptive competition:* According to another recent IBM Institute for Business Value study, a majority of banking executives expect more competition from outside the industry.<sup>7</sup> New market entrants, such as startups in the financial technology space (fintechs), intensify competition but also present partnering opportunities. For example, some companies that offer mobile banking services – like Simple, for example – partner with larger FDIC-insured banks that handle the banking functions and house customer deposits.<sup>8</sup>

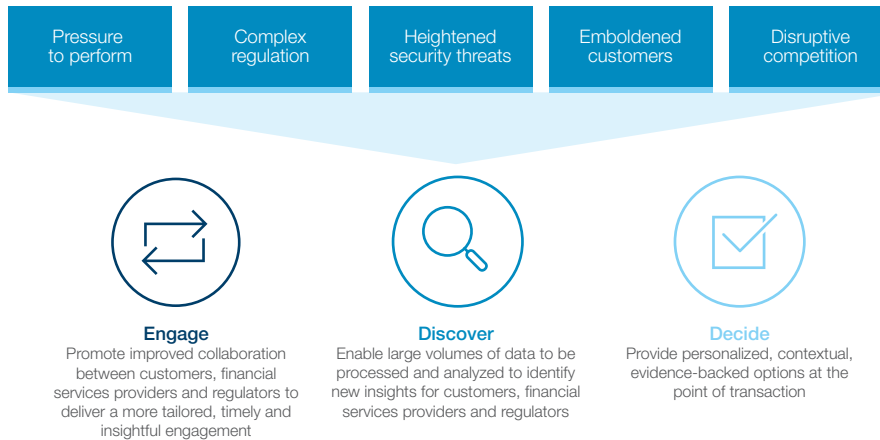
### **From disruption to focus**

It is clear that financial institutions are operating in an environment of great turmoil. Although the forces challenging the industry are various in nature, we identified key themes among them relating to customer communication and engagement, innovation and discovery, and decision making and trust.

To thrive in the presence of ongoing change, banking and financial services leaders must be smarter in how they approach data. We suggest they start by improving their capabilities to *engage*, *discover* and *decide* (see Figure 1). Increased engagement helps improve communication and collaboration, which in turn enables more tailored and effective services. And new discovery tools and capabilities that unearth insights buried in data facilitate the development of innovative products and services. Finally, more accurate and timely decision capabilities can lead to more personalized recommendations for customers, as well as improved decisions relating to risk, security and fraud detection.

**Figure 1**

*To combat forces challenging the industry, financial institutions need to improve their capabilities to engage, discover and decide*



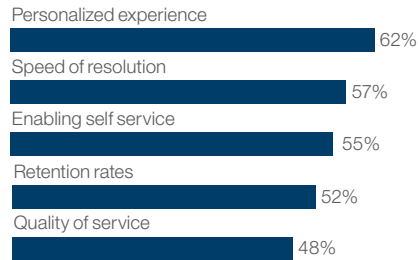
*Source: IBM Institute for Business Value.*

**Engage:** Today's consumers seek highly personalized, convenient and consistent service across multiple channels. Although a clear majority of banking executives in our survey – almost 70 percent – understand these demands, many struggle to deliver. In fact, 62 percent believe their institutions are not effectively delivering a personalized experience, while 55 percent are not providing successful self-service options. In addition, 57 percent are dissatisfied with their organization's ability to address customer concerns efficiently and comprehensively, and 52 percent are dissatisfied with their customer retention rates.



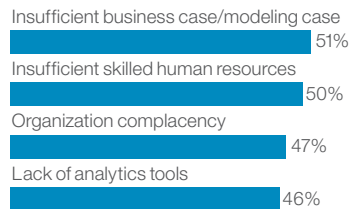
### Engage

Percentage of banking executives who believe their organizations are not competitively delivering customer service (by area of service)



### Discover

Percentage of banking executives citing key challenges when pursuing disruptive innovation



### Decide

More than half of banking executives are not confident about decisions relating to cost reduction and day-to-day operations



*Discover:* Our survey data revealed that a majority of banks are actively pursuing product and service innovation. However, banking executives cite insufficient business case or modeling skills, inadequate human resources, organizational complacency and lack of analytical tools among their greatest challenges in pursuing disruptive innovation. To compete with smaller, more agile players, banks need to greatly accelerate their ability to turn data into insights – and use those insights to develop offerings more clearly aligned to customer desires, needs and expectations.

*Decide:* An U.S. Federal Reserve report on failed banks cited poor strategic decisions as a common theme.<sup>9</sup> Our survey revealed that more than half of banking executives are not confident about their organization's decisions relating to cost-reduction and day-to-day operations. A potential reason could be that many organizations are forced to make decisions based on incomplete information because they lack the tools necessary to optimize the vast data at their disposal.



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## Cognitive opportunity in banking and financial markets

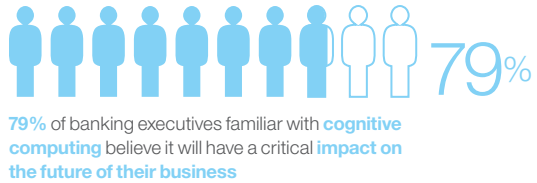
There are hundreds of billions transactions in the world each year.<sup>10</sup> In the United States alone, there were 73 billion debit and credit card transactions in 2012.<sup>11</sup> Yet, despite an explosive growth of information across all industries, less than 1 percent of the world's data is currently analyzed.<sup>12</sup>

While effective for a number of applications, traditional analytics solutions cannot fully exploit the value of big data: They are unable to adapt to new problem domains or handle ambiguity and are only suitable for structured and unstructured data with known, defined semantics (the relation of words and phrases and what they mean). Without new capabilities, the data paradox of having too much data and too little insight will continue.

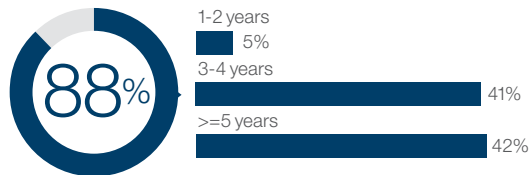
How can financial institutions bridge the gap between untapped opportunities and current capabilities? What solution can overcome human and current machine limitations to fully harness the hidden insights that reside in data – internal and external and structured and unstructured? The answer is cognitive computing.

Cognitive computing takes analytics to the next level by applying machine learning algorithms and natural language processing to make sense of vast quantities of data, much of which is unstructured, to improve data-driven discovery and decision making. While financial institutions can still derive value from analytics solutions, the addition of cognitive capabilities could help them reach new levels of value.

A powerful evolution in digital banking, cognitive computing opens the door for these organizations to leverage their wealth of data in ways that new market entrants like fintechs simply can't replicate. Cognitive capabilities can help banks extract meaningful patterns from data about markets, customers, partners and employees – and use that information to better anticipate change and even shape the future.



88% of banking executives familiar with **cognitive computing** are likely to **invest in cognitive capabilities** in the future



Banking executives from our survey agree that cognitive computing has the potential to radically change the industry. Among those bankers familiar with the technology, 79 percent believe it will play a critical role in the future of their business, 89 percent believe it will play a disruptive role in the industry, and 88 percent intend to invest in cognitive capabilities.

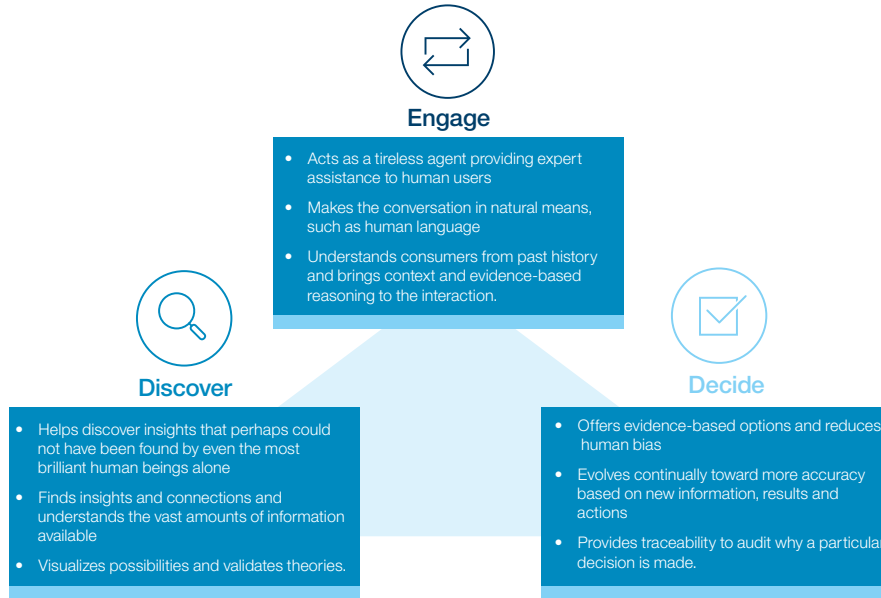
So, how specifically can financial institutions leverage cognitive computing to address issues preoccupying the industry? This new computing paradigm has three capability areas that specifically address the industry's need to improve engagement, discovery and decision making (see Figure 2).<sup>13</sup>

In this age of empowered consumers, expanding channels, changing product mixes and shifting value propositions, financial institutions are looking for ways to better leverage the power of their data for competitive advantage. As they do, a new type of bank is emerging: the cognitive bank. This new bank can use cognitive computing capabilities to discover insights previously beyond the abilities of programmed computers – and use these insights to create new business models. A cognitive bank embraces the power of cognitive computing to help scale and augment human expertise, leverage complex data for new insights, and make more timely and informed decisions.

### Engagement capabilities

Cognitive systems can fundamentally change the way humans and systems interact and significantly extend the capabilities of humans by leveraging their ability to provide expert assistance. These systems provide advice by developing deep domain insights and bringing this information to people in a timely, natural and usable way. Here, cognitive systems play the role of an assistant – albeit one who does not require sleep, can consume vast amounts of structured and unstructured information, can reconcile ambiguous and even self-contradictory data, and can learn.

**Figure 2**  
*There are three emerging capability areas for cognitive computing*



Source: IBM Institute for Business Value.



### Engage

#### Financial services group embraces cognitive computing for more personalized financial advice

A financial services organization in Asia wanted to deliver a next-generation client experience as part of its ongoing journey to shape the future of banking. The bank intends to apply cognitive capabilities to its wealth management business to help improve the advice and experience delivered to affluent customers.

Cognitive capabilities can help the bank’s relationship managers analyze large volumes of complex unstructured and structured data, including research reports, product information and customer profiles; identify connections between customers’ needs and the growing corpus of investment knowledge; and weigh various financial options available to customers. Armed with data-driven insights, the bank’s relationship managers will be better equipped to personalize the client experience and offer solutions that correspond with clients’ needs – all in a more timely manner.



## Discover

### European bank invests in cognitive capabilities to facilitate trade processes

Seeking to increase its competitive advantage through cognitive capabilities, a large European bank decided to focus first on the area of trading. For complex transactions involving institutional clients, the bank's sales teams follow detailed approval processes to fully vet potential trades.

These processes require a number of approvals related to credit and market risk constraints, compliance issues and regulatory policies. As a result, they are time consuming – so much so that the market sometimes shifts before the sales team reaches a decision. The cognitive system, however, can rapidly digest trading and compliance policies, regulatory documents, and appropriate risk calculations and limits. It can then offer recommendations relating to the trade, all before market changes make those recommendations obsolete.

Employing cognitive capabilities will enable the teams to offer more opportune trade recommendations based on the latest information and market conditions. In the future, the bank plans to expand its use of cognitive capabilities to sales and risk management.

By broadening capabilities for both customers and employees, these types of cognitive systems can help financial institutions offer a customer experience more focused on interaction than transaction. They enable customized and self-service options for customers and can assist employees in offering tailored recommendations that align with customer need and risk tolerance (see sidebar, *Financial services group embraces cognitive computing for more personalized financial advice*).

Because they are able to engage in dialogue with humans, these systems can understand customers based on their history and bring context- and evidence-based reasoning to the interaction. Future systems will likely have free-form dialogue capabilities, which could open the door to transformative self-service initiatives.<sup>14</sup> For example, retail customers could engage in dialogue with an “automatic advisor” or “virtual relationship manager.” The cognitive system, enabled by input from the bank, could answer questions in natural language, offering a seamless personalized experience.

### Discovery capabilities

Cognitive systems can help users discover insights that might otherwise not be found by even the most brilliant human beings. Discovery involves finding insights and connections and understanding the vast amounts of information available around the world.

Discovery capabilities can dramatically reduce research time, providing financial services providers with the speed and agility required in an industry facing ongoing transition. Cognitive systems can reveal detailed information relating to customer preferences and behaviors that can help improve products and services. They can also rapidly uncover insights, patterns and relationships from disparate and vast sources of information, facilitating more timely analysis of complex data used in detecting fraud, predicting client behavior and managing risk (see sidebar, *European bank invests in cognitive capabilities to facilitate trade processes*).

In the future, cognitive solutions could enable even more effective and timely matching of customers to offerings by rapidly analyzing historical customer data across all relevant investment areas. In addition, future systems could allow more precise market risk calculations and early fraud detection through, for example, improved discovery, modeling and predictive capabilities.

### **Decision capabilities**

Cognitive systems aid in decision making and reduce human bias by offering evidence-based options. They continually evolve, based on new information, results and actions. Current cognitive systems perform more as advisors by suggesting a set of options to human users, who ultimately make the final decisions.

Banks and other financial institutions are investigating how cognitive capabilities can facilitate improved decisions for employees and customers alike through timely, customized recommendations based on input from a variety of sources (see sidebar, *Bank explores cognitive to help customers select higher-value investments*). Cognitive solutions can quickly process customer data, product and offering information, current economic conditions, the experience of financial experts and other relevant information – and then identify the most appropriate recommendations.

In the future, cognitive capabilities could enhance more individualized risk assessments, as well as improved risk calculations for complex, data-intensive transactions. And, as future cognitive systems have access to growing amounts of historical data and analysis, recommendations on financial matters could grow in both effectiveness and scale.



### **Decide**

#### **Bank explores cognitive to help customers select higher-value investments**

One of the world's largest banks is investigating how cognitive capabilities can help customers select higher-value investments. In particular, the bank is focusing on mass market customers who contact its call center.

The bank discovered that many of these customers make cash deposits because they are not aware of or do not understand alternative investment options. The bank plans to employ cognitive capabilities to search massive amounts of data to find the exact answers users need and rapidly deliver evidence-based recommendations.

By providing answers to specific questions and facilitating dialogue about investment options through cognitive computing, the bank can help customers make better investment decisions based on their individual situations.

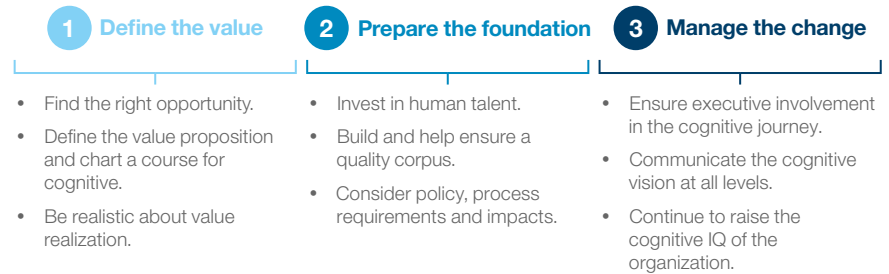
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## The way forward

Despite the enthusiasm for cognitive, organizations need to realize there is often a steep learning curve. In terms of system implementation and user interaction, cognitive systems are fundamentally different than traditional programmatic systems.<sup>15</sup> Banking and financial services organizations can learn from pioneering organizations that have already implemented cognitive by following three key sets of recommendations (see Figure 3).

**Figure 3**

*Organizations with cognitive computing experience have identified three critical action areas for success*



*Source: IBM Institute for Business Value.*

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## 1. Define the value

Early planning helps ensure the greatest return on investment of resources. Defining the value of cognitive to your organization is critical and includes several steps:

*Find the right opportunity* – Cognitive solutions are well suited to a defined set of challenges.

Banking and financial services organizations need to analyze the specific problem to determine if cognitive capabilities are appropriate:

- Does the challenge involve a process or function that today takes humans an inordinate amount of time to seek timely answers and insights from various information sources using potentially various techniques in making a decision or thinking through a problem? For example, many roles in operations or risk management and compliance involve vast amounts of data and can be manually intensive and highly contextual.
- Is there a need for users to interact with the system in natural language (such as customer inquiries relating to personal investment advice)?
- Does it involve a process or function that requires providing transparency and supporting evidence for ranked responses to questions and queries (such as loan application processes)?

*Define the value proposition and chart a course for cognitive* – Identify both the differentiated value provided by cognitive computing and the business value up front. In addition, establish a cognitive computing vision and roadmap with executive-level support. Continuously communicate roadmap progress with appropriate executives and stakeholders.

*Be realistic about value realization* – The benefits of cognitive computing systems are not realized in a single “big bang” at the time of initial deployment. Rather, these systems are evolutionary and improve and can lead to increasing value over time. Communicate this reality to key stakeholders, such as customers, providers of financial services and regulators. Also, consider using a phased rollout or deploying the solution to a subset of trusted users who understand the technology’s evolutionary nature.

## **2. Prepare the foundation**

Prepare the foundation for a successful cognitive computing solution implementation by focusing on the following:

*Invest in human talent* – Cognitive solutions are “trained,” not programmed, as they “learn” with interactions, results and new pieces of information and help organizations scale expertise. Often referred to as supervised learning, this labor-intensive training process requires the commitment of human subject matter experts.

In addition to domain expertise, a cognitive implementation also requires expertise in natural language processing, machine learning, database administration, systems implementation and integration, interface design and change management. Banking executives in our survey identified “lack of skilled resources and technical expertise” as the number one barrier to implementing a cognitive solution, so acquiring technical talent will be crucial. Finally, there is an additional intangible “skill” required for team members: intellectual curiosity. The learning process never ends – for the system, the users and the organization.



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*Build and help ensure a quality corpus* – Cognitive systems are only as good as their data. Invest adequate time in selecting data to be included in the corpus, which might include structured (e.g., account information) and unstructured data (e.g., client presentations, blogs, videos) from multiple databases and other data sources and even real-time data feeds and social media. Data will likely emanate from new and untapped sources as well (e.g., call center recordings, audio files, corporate web pages). In addition, invest in records digitization to secure the future of your organization's corpus, focusing on both historical and new documentation.

*Consider policy, process requirements and impacts* – Assess any potential impact on processes and how people work. Because users interact with cognitive systems in entirely different ways than traditional input/output systems, processes and job roles could be impacted. In addition, consider if any data policy changes are necessary. Obtaining necessary data could test the boundaries of existing data-sharing policies and might require new or modifications to existing policies, regulations and agreements, particularly in banking, where security, privacy and other regulations are stringent.

### **3. Manage the change**

Compared to traditional programmable systems, cognitive systems are a whole new ball game. As such, change management is more critical than ever.

*Ensure executive involvement in the cognitive journey* – Executive involvement should begin with active participation in defining the cognitive vision and roadmap and continue throughout the journey. This includes executive participation in regular reviews of incremental progress and value realization.

*Communicate the cognitive vision at all levels* – Because cognitive computing is new and not completely understood by most, regular communication at all levels (business managers, regulators, government, customers) is critical. Address any fears, uncertainties and doubts head on, and leverage executive sponsors to reinforce the value of cognitive to your institution's mission.

*Continue to raise the cognitive IQ of the organization* – Education is critical in assuring cognitive is understood and adopted. Of particular importance is managing expectations related to system-generated recommendations. Cognitive systems are probabilistic and not deterministic. While accuracy rates will improve as a system learns over time, the rate will never reach 100 percent. Educate stakeholders early on about accuracy rates, and conduct regular reviews on incremental improvements.

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## Ready or not? Ask yourself these questions

- How do you plan to create more engaging and personalized experiences for your customers?
- How do you assess the extent to which you use your structured and unstructured data effectively across all business lines and functions?
- What is the cognitive computing IQ level of your organization? How much do employees know about cognitive computing and its benefits for banking and financial markets?
- What capabilities do you require to support and manage cognitive computing services in your organization?
- How would you implement cognitive computing in your organization? Have you envisioned your business and operating models? How would you measure the success of cognitive computing in achieving your strategic goals?
- How do you plan to secure senior management commitment for a cognitive computing business case?

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**For more information**

To learn more about this IBM Institute for Business Value study, please contact us at [iibv@us.ibm.com](mailto: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](http://ibm.com/iibv)

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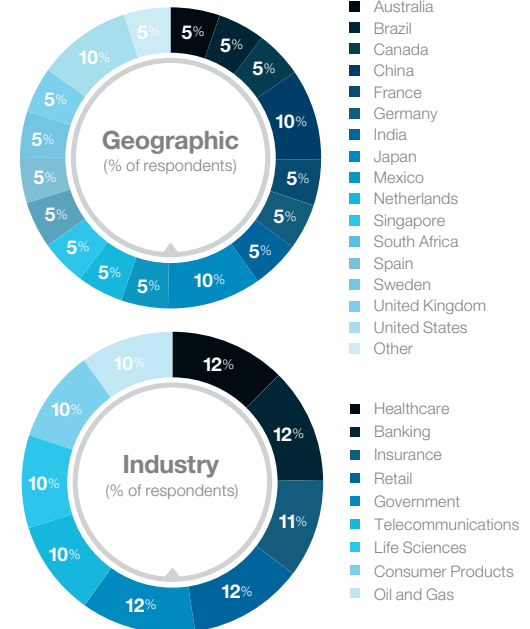
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### Study approach and methodology

As a follow up to the initial IBM *Your cognitive future* study, we conducted additional research in early 2015 to dive deeper into select industries and explore opportunities for cognitive computing. Through a survey conducted by the Economist Intelligence Unit, IBM gained insights from more than 800 executives from around the world representing a variety of industries, including healthcare, banking, insurance, retail, government, telecommunications, life sciences, consumer products, and oil and gas. The study also included interviews with subject matter experts across IBM divisions, as well as supplemental desk research.



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