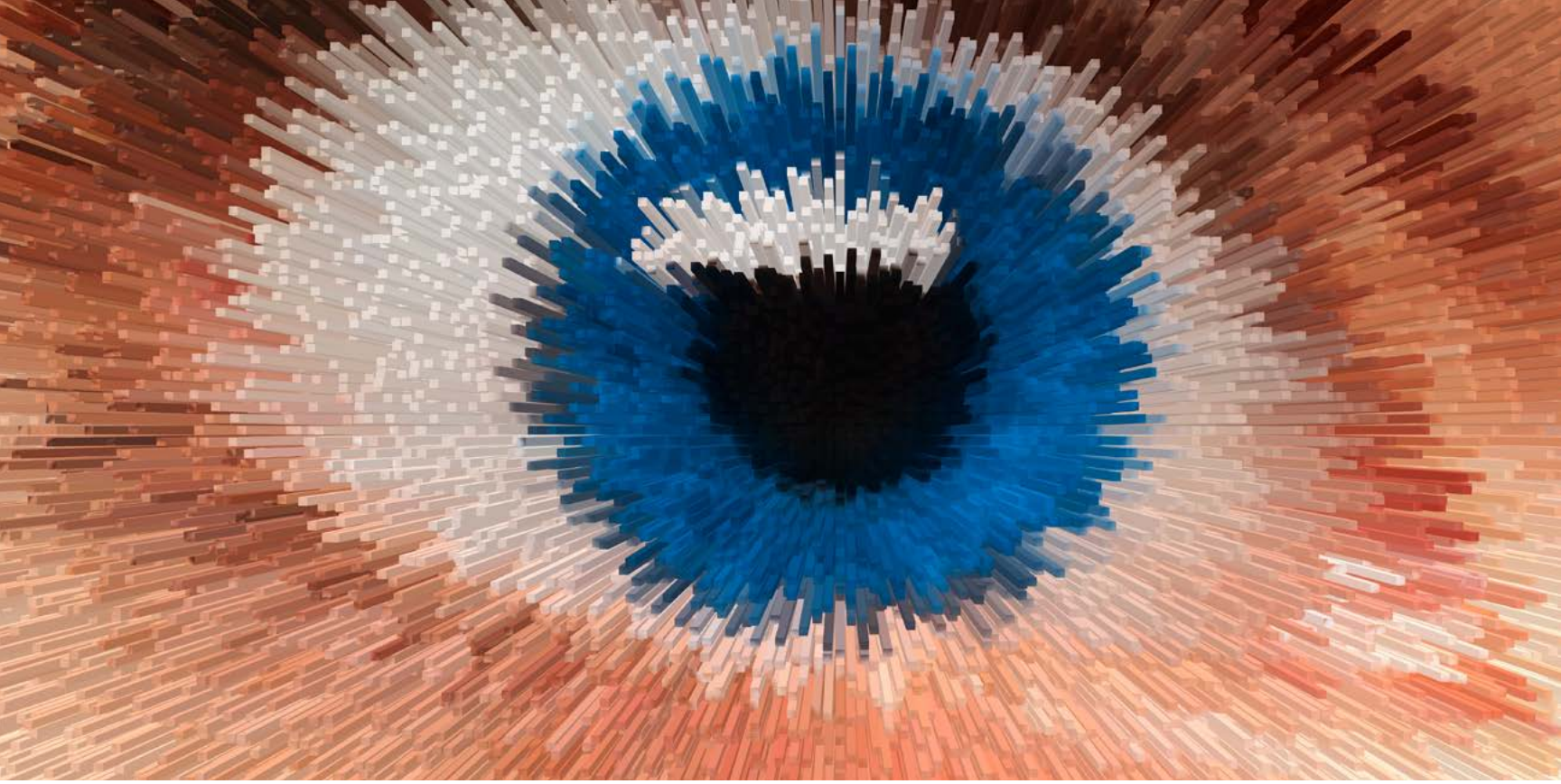


The cognitive bank

Decoding data to bolster growth and transform the enterprise

IBM Institute for Business Value

How IBM can help

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 amidst constant change and unlock new possibilities grounded in data. For more information, visit **ibm.com**/banking

Enlightenment from data within

Today the banking industry faces a rebirth by necessity. As the digital age morphs into the cognitive era, success depends on radical transformation that enables the integration of advanced analytics, artificial intelligence, machine learning, robotics, blockchains and more. For 64 percent of those surveyed in 2016, their organization's efficiency remained the same or declined over the last three years. Tapping huge quantities of dormant, bank-owned data, much of it unstructured, is essential to offering the individualized engagement that customers demand, transforming operations and benefitting from fintech innovation. How can you take advantage of these technologies to build a cognitive bank?

Executive summary

Traditional financial services business models are under the microscope. For most financial organizations, sustained profitability is a challenge in today's lower-interest rate environment. Competition from new market entrants is also generating new layers of disruption, while customer experience and engagement are not keeping pace with much greater expectations of the rapidly evolving digital world.

But despite some regional exceptions, many financial organizations have responded to date with headcount reductions and tactical cost-cutting. Nevertheless, sustainable performance requires something radically different and especially enhanced by new technologies. Our 2015 report, "Breakthrough banking" explored the potential of cognitive computing to transform financial services, and 88 percent of executives familiar with cognitive capabilities said they intend to invest in them.[1]

For success in the digital age, banks must tap the hidden treasure they already own in massive quantities: data. Cognitive systems offer ways to transform beyond traditional banking functions, among other things, using machine learning and applying analytics to data to understand more about the enterprise, customers and competitors. They continually build knowledge and learning, understand natural language, and reason and interact more naturally with human beings than traditional programmable systems.



80% more outperformers than underperformers have **adjusted their strategies to deal with challenges from fintechs**



Only **28% of 2,009 banking executives are familiar with cognitive computing**. Just 17% say their organizations are ready to use it



58% more outperformers than underperformers **expect cognitive computing to impact** their business lines and functions

To better understand the potential for the industry to profit from cognitive technologies, we engaged more than 2,000 executives worldwide for the 2016 Cognitive Bank Survey. Analysis of these findings confirms that commoditization, discerning customers and disruptive competitors are major industry challenges requiring urgent responses. This research categorizes financial institutions based on revenue growth and operating efficiency over the past three years to allow a comparison of outperformers with others in the industry. While many organizations still have far to go, outperformers are already taking strides to become fully-fledged cognitive banks.

But, in 2016, just 11 percent of study respondents said they have adopted cognitive technology. Fifty-eight percent named improving operational efficiency as their most important strategic priority, and operational efficiency was the top answer (49 percent) when asked to name the expected benefits of cognitive computing. In this report, we explore how bankers can start now to decipher data and use analytic insights to start achieving more against their strategic goals.

Threats remain, but opportunities are brewing

Global industry trends include commoditization of products and services in the marketplace, unenthusiastic customers seeking more personalized and deeper experiences, and new breeds of competitors attacking banks on all sides. For many financial institutions, attempts at paring costs have been unsuccessful and financial performance has plateaued. For 64 percent of those surveyed, their bank's operational efficiency remained the same or declined over the last three years. The top three strategic objectives were all cited by more than half of executives surveyed: improve operational efficiency (58 percent), improve customer engagement and experience (51 percent), and grow revenues (50 percent).

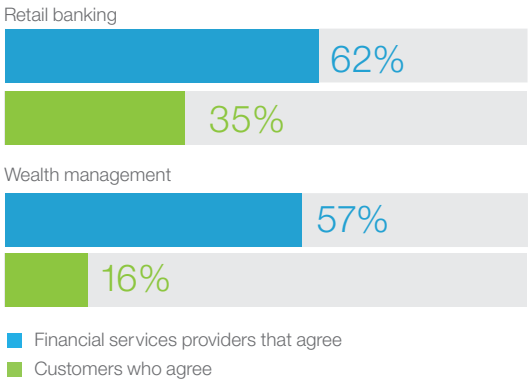
Commoditization continues

In this study, 43 percent of executives surveyed said traditional banking functions are becoming increasingly commoditized – with only 15 percent reporting that banks can avoid it. Banking products and services are largely indistinguishable and key business processes are being standardized to increase efficiencies.

Commoditization is forcing banks to seek value in different ways, not through products and services alone, but rather through radical innovation in business processes and new technologies. While emerging competitors may be able to perform banking functions better and at lower cost, they will find it much more difficult to build and manage the breadth and depth of customer relationships that traditional banks have carefully built over decades.[2]

Figure 1

Conflicting views: The majority of industry executives failed to see widespread customer dissatisfaction with their experiences



Source: "Banking redefined." IBM Institute for Business Value. 2015.

Customers are unheard and unimpressed

As excellent relationship management becomes essential, customer requirements are rapidly changing and become increasingly valued. Customers want more personalized experiences than banks can currently provide. In other parts of their everyday lives, customers are enjoying new levels of interaction with other organizations. In financial services, as elsewhere, they seek individualized engagement which aligns and caters to their own specific context – likes, lifestyle, place of residence, background and much more.

Fifty-four percent of executives surveyed said consumer buying behavior is moving from products and services to experiences, yet they are struggling to live up to expectations.[3] In sharp contrast to customers' perceptions of shortcomings in the banking experience, more than half of financial firms involved in 2015 IBM research, rate themselves highly in that regard (see Figure 1). Only 35 percent of customers said retail banks provide an excellent customer experience, compared to 62 percent of bankers. Wealth managers revealed an even worse gap between their own perceptions and how customers rated the experience.

Disruptive competition can't be ignored

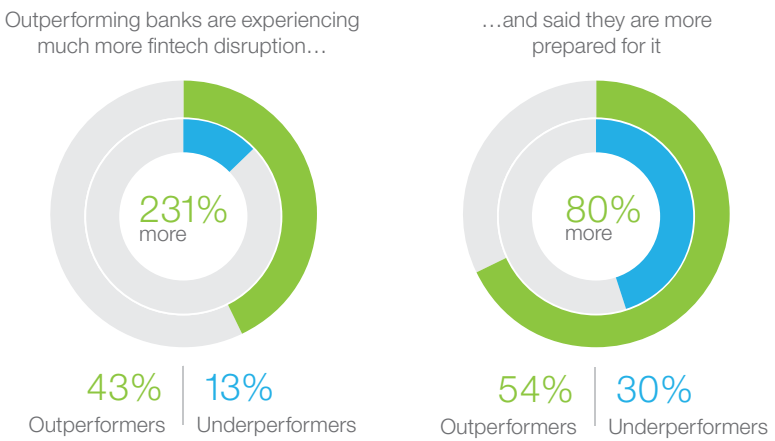
Seemingly ubiquitous attacks from new competitors – which include digital-only, non-bank entrants – offer bank customers lower costs and new value. Why, for example, wait two days to learn by phone or email whether a bank has approved your car loan if you can get an online decision within minutes from a non-traditional loan source?

Outperforming banks are much more aware of disruption by fintechs – and responding proactively. In great contrast to their underperforming counterparts, 3.3 times more outperforming banks have experienced disruption by fintechs to at least a moderate degree (see Figure 2). And industry leaders are learning that partnering with fintechs may be a better approach than treating them strictly as competitors. Eighty percent more of outperformers than underperformers have adjusted their strategies to deal with challenges from fintechs.

Creating an ecosystem of services – one that includes fintechs and others – is enabling banks to serve as the principal gatekeeper to customers, while gaining efficiencies and other advantages from partnering with others. Partner ecosystems enable banks to create new customer value as the universe of stakeholders expands to address a host of other needs in customers' everyday lives, less directly tied to traditional banking functions.

Figure 2

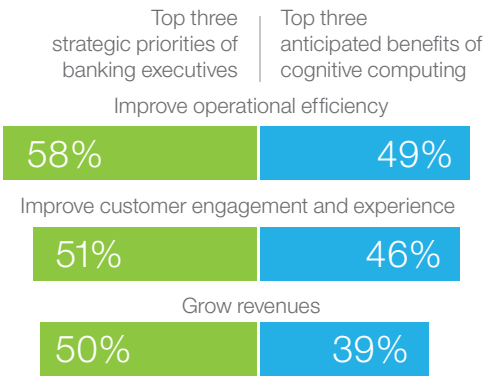
Disruptive competitors: Outperformers have a higher awareness and more proactive response



Source: 2016 IBM Institute for Business Value Cognitive Bank Survey, (sample size n = 2009, left; sample size n = 1427, right).

Figure 3

Needs and outcomes: The expected benefits from cognitive computing align strongly with banks' strategic priorities



Source: 2016 IBM Institute for Business Value Cognitive Bank Survey, (sample size n = 2009).

Gaining competitive advantage through cognitive technologies

Incremental change is no longer enough. The industry needs new ways to achieve a desired level of performance that relies not just on producing expected quarterly results, but tackles the effects of industry disruption.

Cognitive computing technologies such as artificial intelligence, natural language processing (NLP) and machine learning are still largely nascent, but starting to appear on the radar of many financial services organizations today. Of executives surveyed, just 28 percent are familiar with cognitive computing and only 17 percent consider their organizations ready to embrace it. However, outperforming banks are significantly more ready than our full sample of executives: 52 percent of outperformers are aware of cognitive computing and 32 percent of them describe their organizations as prepared to adopt cognitive computing.

Fifty-eight percent more outperformers than underperformers said they expect cognitive computing to significantly impact their business lines and functions. Improving operational efficiency was named by 58 percent of surveyed executives as their most important strategic priority; and it was the most-named benefit (cited by 49 percent) they expect from cognitive computing (see Figure 3).

Seizing the power to transform

Cognitive computing solutions offer valuable capabilities by enabling systems to process and act on data in a human-like manner. They can transform how organizations think, act and operate.[4] Their combination of NLP, hypothesis generation and evaluation, and dynamic learning enable powerful, fast and accurate solutions. Four principles form the foundation of cognitive computing: learn and improve, build speed and scale, collate human intelligence, and interact in a natural way (see Figure 4).

Learn and improve. Because cognitive computing leverages systems that can learn, improvements are possible with each outcome, action and iteration. Every new piece of information can add to the body of knowledge with more than a simple additive result.

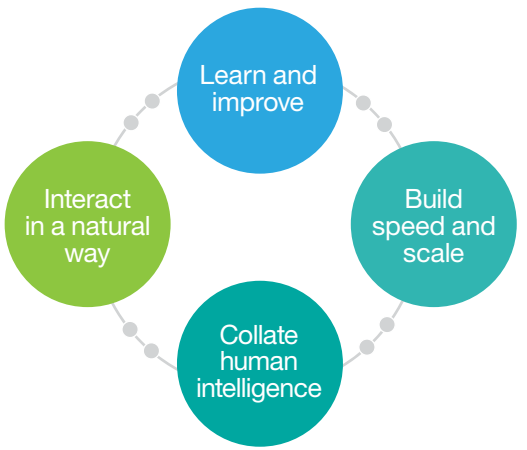
Build speed and scale. Processing speed supports scaling that enhances machine learning to carry out complex tasks repeatedly and much more efficiently.

Collate human intelligence. Cognitive solutions are trained by subject matter experts and make collective knowledge accessible for rapid reuse and decision support. These technologies help us understand the complexities of unstructured data and apply advanced analytics to weigh and evaluate responses.

Interact in a natural way. Cognitive solutions adapt to human approaches and interfaces while understanding context and reason. Deep NLP assesses and evaluates language over virtually unlimited topics and enables informed judgments.

Figure 4

Four principles: What cognitive computing provides to users



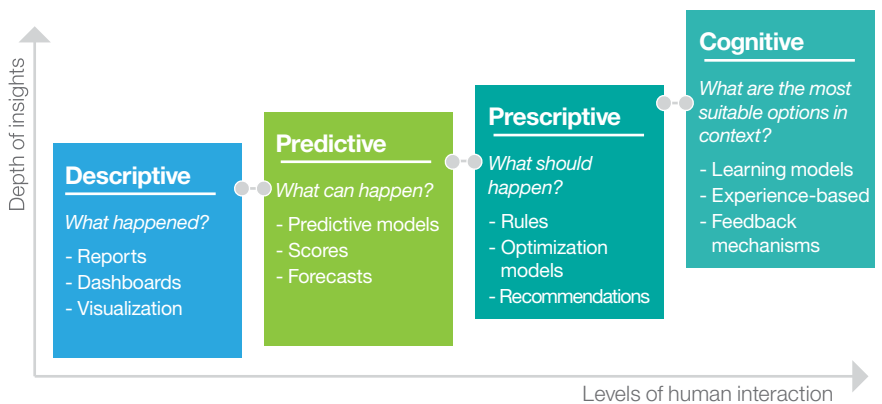
Source: IBM Institute for Business Value analysis.

Decision making supported by cognitive capabilities offers a high level of quality insights with high levels of human interaction (see Figure 5). Ultimately, cognitive computing enables banks to exploit the benefits of available data by:

- Providing deeper and more personalized customer insights
- Supporting more-informed decisions across the whole bank
- Accelerating operational and organizational efficiencies.

Figure 5

Greater insights, deeper interactions: Cognitive technologies enable decision making to be forward-looking and continuous



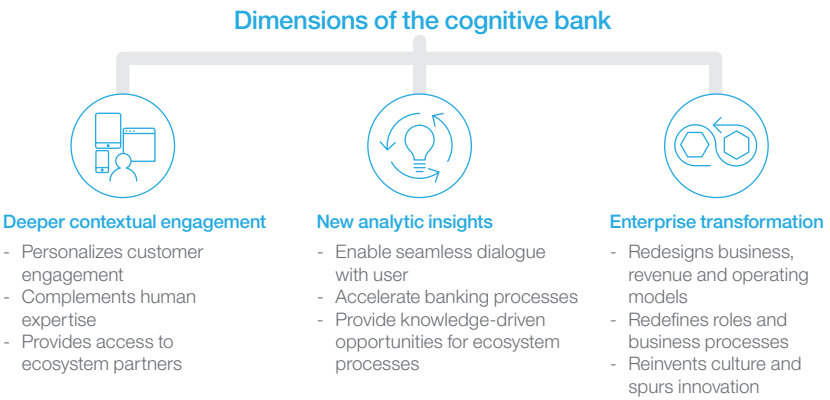
Source: IBM Institute for Business Value analysis.

The cognitive bank: Three dimensions of change

Cognitive computing is enabling banks to achieve their strategic priorities in ways they could not previously imagine. It benefits the entire bank across three dimensions: improved engagement, new analytic insights and enterprise transformation (see Figure 6).

Figure 6

The cognitive bank: Reshaping the enterprise across three key dimensions



Source: IBM Institute for Business Value analysis.

Asian bank: Improving branch service with robots

A bank in Asia serves more than 26 million households with products that include everyday banking, trusts and securities. It has more than 500 branches and 10,000 ATMs nationwide. The bank sought to distinguish itself from online competitors and take advantage of its physical locations. It developed a cloud-based, cognitive robot software platform that gathers customer service information from every interaction and responds with the latest assistance from online resources and other bank systems.

This new cognitive solution will power customer service robots that understand speech, gestures and even customer expressions. It interprets questions and learns preferences while scanning the bank's information to provide personalized service that becomes richer and more targeted over time.

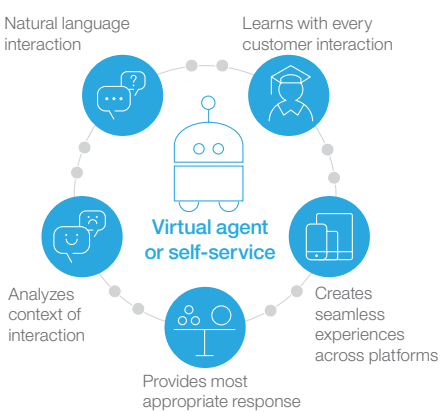
Deeper contextual engagement

In support of more meaningful engagement with customers, the cognitive bank enables personalization through continually deeper insight, context and learning. Self-service engagement allows delivery of one-on-one experiences at scale, as when a cognitive virtual agent has highly personalized conversations in interactions with clients (see example, "Asian bank"). Such direct-to-consumer cognitive virtual agents can serve, guide and advise customers via web and mobile.

For example, during a customer interaction, a virtual agent or self-service capabilities – such as NLP and context analysis – enhance the seamless, cross-platform experience to enable the most appropriate response. Afterward, the ability to learn from customer interactions offers the chance to create superior experiences in the future (see Figure 7).

Figure 7

Virtual agents: A cognitive way to offer highly personalized interactions to each client



Benefits for customers and banks can include:

- Reduced waiting time
- More real-time dialogue
- Improved cross-selling and up-selling
- Less customer attrition and higher customer satisfaction
- Lower operating costs and more efficient interactions

Source: IBM Institute for Business Value analysis.

New analytic insights

Adding cognitive capabilities to employee-facing applications enhances service across the customer lifecycle and supports better decision making. Using deeper knowledge of customers, a cognitive smart advisor can enable relationship managers to advise clients more accurately than imagined in the past, scale sales and accelerate service expertise on demand.

Insights are also critical to support exploration of information in functions such as customer service support (see example, "European bank"). Cognitive computing offers instantaneous customer service support for more efficient response times and higher call conversion rates.

By tapping a deeper knowledge base, even highly-customized business processes can be accelerated. Optimal credit solutions can be designed for a client, as can other products suited to individual needs. Proactive data capture and processing help provide compressed cycle times, reduced errors, better compliance enforcement and higher productivity (see Figure 8).

With its access to new analytic insights, the cognitive bank filters and digests dynamic internal and external data from the banking ecosystem and beyond. It can capture the "market DNA," including, for example, information about industry trends, financial performance, strategic intent, merger and acquisition activity, market risks and benchmarking analytics. Cognitive computing unifies a view of corporate intelligence based on data from diverse sources, peer connections and real-time comparisons, all of which can contribute to an optimal response strategy and help identify new value creation opportunities.

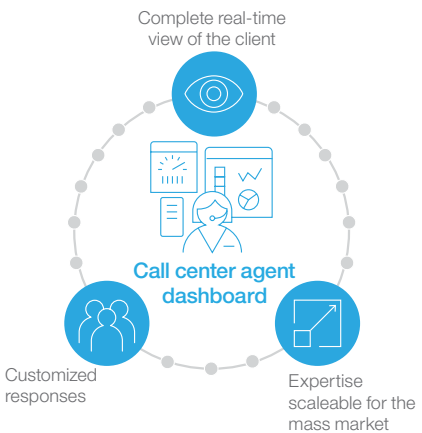
European bank: Expanding foreign trade business with NLP

A European bank provides financial services including banking, insurance, pension and investment fund activities, and has approximately 5,000 branch offices, 30,000 employees and over 10 million customers. To expand its foreign trade business, it saw an immediate need to improve the speed and accuracy of its responses with a system that provides agents information to answer customers directly, rather than relying on experts. The bank developed a solution in two phases.

In Phase I, agents accessed a cognitive system that uses NLP to offer possible answers. In Phase II, the bank moved to a cloud-based system and added the ability to rank answers. Its cognitive learning capability improves the view of customer needs over time and constantly refines recommendations for customers. Now, within seconds, agents receive answers to foreign trade questions culled from information contained in masses of unstructured regulations.

Figure 8

Call center agent dashboard: A comprehensive client view enables greatly improved customer service



Benefits for customers and banks can include:

- Highly responsive and consistent customer service
- Faster and accurate query resolution
- More scalable on-demand expertise
- Lower training costs
- Better resource utilization

Source: IBM Institute for Business Value analysis.

Enterprise transformation

The cognitive bank can make improvements that offer greater visibility into specific business challenges and support proactive decisions across the whole organization. One example is to align policies, procedures, controls and standards enterprise-wide to meet regulatory requirements, such as for employee-facing applications that enhance wealth management operations (see example, “Global financial services firm”).

Monitoring risk and compliance with cognitive capabilities enables assurance across business processes (see Figure 9). Imagine a system that understands your entire global client base individually, with comprehensive knowledge of both existing and proposed banking regulations across continents, countries, states and provinces.

Figure 9

Enterprise transformation: Identifying upcoming regulations to help ensure proactive compliance



Benefits for customers and banks can include:

- Simplified compliance management and tracking
- Dynamic view into the changing regulatory environment
- Transparency across the organization
- Efficient documentation and data management

Source: IBM Institute for Business Value analysis.

Global financial services firm: Managing compliance proactively

Operating in nearly 100 regulatory jurisdictions worldwide, a financial services holding company faces ever-changing regulatory requirements. It needs to identify specific obligations, such as password policies, data backups or traceability. Manual examination of regulatory content eats up thousands of hours yearly and costs millions of dollars. The firm wanted a better way to stay compliant with changing regulations, challenging the idea that only humans can do this work.

It supported a proof-of-concept project to train a cognitive computing platform designed to ingest thousands of regulatory documents and online content in various unstructured formats. Using NLP and self-learning capabilities, it can identify regulatory obligations with increasing accuracy, building a case for decisions by citing precedents and weighing risk involved. Early results showed a 72 percent accuracy versus a 75 to 80 percent target. The solution is also expected to reduce the costs of churn and associated loss of institutional knowledge that takes years to develop.

On the verge of revolution

We asked study respondents to name the barriers restricting them from implementing cognitive IT and related skills. Cost was named most often and cited by 45 percent of executives. Close behind was lack of IT and other skills (named by 43 percent). Lack of organizational buy-in was a distant third (25 percent).

Just 11 percent of our 2,009 respondent organizations said they have adopted cognitive technology. But outperforming banks are already convinced of its importance and impact. Strikingly, 3.3 times more executives from outperforming banks than underperforming banks said cognitive computing has strategic relevance to their organizations.

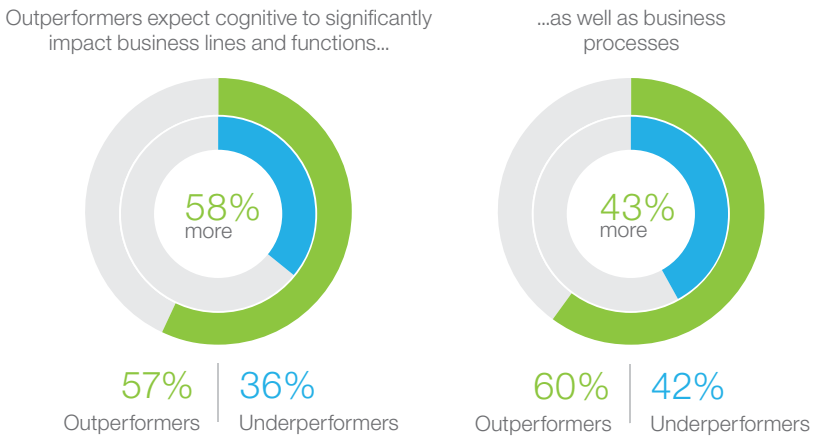
Outperformers again outnumbered underperformers in how strongly they expect cognitive computing to affect different aspects of the business (see Figure 10). Outperformers expect the greatest impact on IT systems architecture (67 percent), followed by a tie between operating and revenue models (60 percent), and business processes (60 percent).

What does a cognitive bank look like?

The cognitive bank will look radically different from traditional models and entails a transformation of how banking organizations think, act and operate. By leveraging the value in previously-untapped data, traditional banks can position their organizations at the center of rapidly evolving banking ecosystems. Fintechs are able to leverage new technologies to compete against banks in specific functional activities. However, fintechs lack banks' key advantage of owning the valuable data that underpins customer relationships.

Figure 10

The outperformer viewpoint: Understanding the cognitive impact is a first step to reaping associated benefits



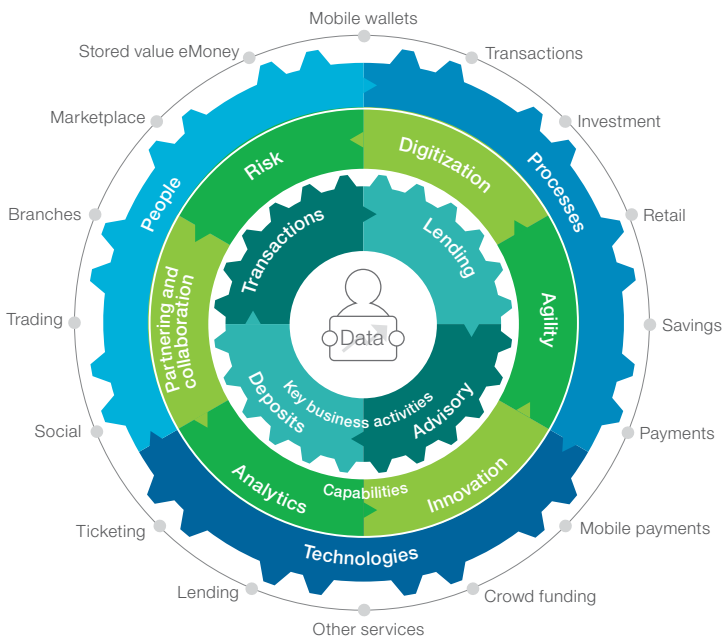
Source: 2016 IBM Institute for Business Value Cognitive Bank Survey (sample size n = 2009).

Using cognitive capabilities to attain analytic insights, financial institutions gain the opportunity to build powerful ecosystems in which customers entrust them to manage their relationships with other service providers, increasingly from outside the industry. Banks can transform from being mere service providers to playing integral roles in customers' everyday lives by optimizing how they use data and orchestrating multiple ecosystems of providers.

An intelligent "thinking" bank is preoccupied with fine-tuning its key capabilities across the constant interplay of people, processes and technologies to enact continual performance improvement across the organization, as well as the ecosystem in which it is an active and dynamic player (see Figure 11).

Figure 11

New view: Envisioning the cognitive bank and its growing ecosystem



Source: IBM Institute for Business Value analysis.

Recommendations: Become a cognitive bank

Plan

Design a holistic cognitive strategy and business case. Establish an appropriate enterprise-wide governance framework. Identify prioritized opportunities to adopt cognitive computing. Define the scope and obtain senior management commitment to start leveraging cognitive capabilities. Appoint "cognitive champions" throughout the organization, whether in your call center, back-office processing, compliance function or elsewhere.

Formulate your cognitive intentions using design thinking. Explore relevant cognitive computing solutions and use data to create superb customer experiences. Strive to offer the ideal experience for obtaining a mortgage loan, reallocating portfolio assets, or evaluating geopolitical and economic factors to make optimal investment decisions.

Prototype and conduct pilots, refining continually. Test and validate prioritized user profiles with business users; encourage all-level involvement. Refine these with user inputs to improve stakeholder buy-in over time. Involve compliance officers in testing a cognitive system with thorough knowledge of current and future banking regulations across geographies.

Promote ongoing executive alignment and commitment. Communicate business value to executive sponsors and stakeholders at all levels. Enlist cognitive champions to drive communication and coordinate cognitive adoption enterprise-wide.

Prepare

Invest in new kinds of human talent, not just banking experts. Understand the talent gap for cognitive deployment. Experts on data, NLP, cognitive and other machine learning skills will be invaluable to financial institutions.

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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Adjust processes and policies. Assess the likely impact of cognitive insights from once-dormant ("dark") data on both business processes and the broader organization. Make necessary changes to support cognitive implementations. Using cognitive computing to conduct corporate research can shave days from the amount of time needed for an industry analyst to do it manually.

Build and help ensure a quality corpus of data. Conduct a structured data strategy assessment. Invest in digitizing systems of records. Collect, ingest and curate enterprise-wide data to build a quality corpus.

Establish a cognitive-ready infrastructure. Develop infrastructure to support cognitive data sets, volumes and workloads in a secure manner. Address the related skills and technology needs to support the use of context-driven, unstructured text from various sources versus the usual financial transaction processing. Determine whether this means growing internal skills or finding external partners.

Progress continually

Communicate the cognitive vision at all levels. Use change management principles to control, measure and communicate the ongoing impact of enterprise and ecosystem transformation.

Apply cognitive technologies. Execute a staged roll-out (using "agile sprints," for example). Establish a framework of metrics and key performance indicators.

Measure and achieve outcomes. Assess progress toward your outcomes. Measure and communicate value realized at different phases. Set up a periodic review process.

Enhance, expand and share collective knowledge. Periodically update functionality and training with new content based on learnings. Look for reusable knowledge and create ways to share it for enterprise-wide, perhaps even ecosystem-wide, scalability.

Are you ready to transform using deeper insights?

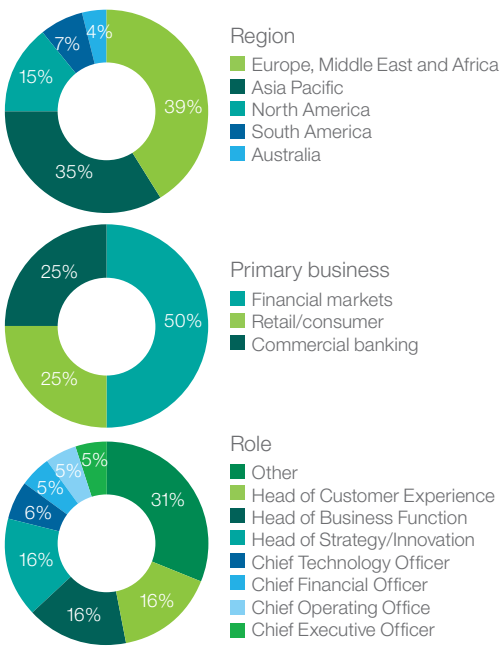
- What is your plan to identify and start analyzing previously untapped data, especially unstructured data? Can you assess its potential value in improving revenues, operations and customer engagement?
- How will you communicate the potential business benefits of cognitive systems to stakeholders across your enterprise and ecosystem?
- What are your plans to address the expected skills gaps as you plan for and implement cognitive solutions?
- In what ways will you communicate the cognitive vision enterprise-wide? How will you systematically measure and learn from outcomes?

How we conducted our research

In second quarter 2016, IBM surveyed 2,009 global C-suite executives in a range of executive roles in the banking and financial markets industries (see Figure 12). Respondents' answers to two questions determined whether they fell into the outperformer or underperformer category, or whether they ended up somewhere in between. *Outperformers* (27 percent of total) are those organizations with growth in both revenue *and* operating efficiency over the last 3 years. *Underperformers* (also 27 percent of full sample) had both revenue *and* operating efficiency that decreased, or was relatively unchanged during that same timeframe.

Figure 12

Methodology



Related IBM executive reports

Drury, Nicholas, Anthony Marshall, Jim Brill and Likhit Wagle. "Banking redefined: Disruption, transformation and the next-generation bank." IBM Institute for Business Value. October 2015. http://www.ibm.com/services/us/gbs/thoughtleadership/bankingredefined/

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Acknowledgments

The authors would also like to thank the following colleagues: Stephen Ballou, Kristin Biron, Amanda Drouin, Vijayanand Ganeishan, Brian Goehring, Jayashree Lanjekar, Eric Lesser, Anthony E. Marshall, Kathleen Martin, Joni McDonald, Hebatallah Nashaat, Carrie Ritchie, Rajrohit Teer and Anne-Marie Weber.

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Produced in the United States of America
September 2016

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