

# THE FUTURE OF RISK MANAGEMENT IN THE DIGITAL ERA

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# Preface

Digital is the new normal. It has already transformed industries such as media, transportation, and retail and is now sweeping through financial institutions. But when it comes to a financial institution's risk function, unique challenges and opportunities accompany digitization. Global CEOs and CROs tend to be cautious when considering the very idea of a digital risk transformation, wondering just how far they can automate crucial processes and rely on automated decisions. From our conversations, numerous questions have arisen around the impact of digitization on the risk function's mandate, role, and organization (including the lines of defense); the capabilities, talent, culture, and ways of working required to deliver a digitized risk function; how to embark on a transformation program that digitizes the risk function; and what impact such a transformation would have.

To answer these questions, the Institute of International Finance (IIF) and McKinsey & Company have conducted a global, comprehensive survey of more than 30 banks to develop an industry perspective. We hosted ten sessions with the working group, in which participants discussed a defined topic for two hours. These topics included important digital themes such as automation, analytics, and banks' transformation approach, and were moderated by a McKinsey expert on the topic. We also conducted more than 20 in-depth interviews with banks, regulators, supervisors, and financial and regtech start-ups to learn more about how digital risk trends and technologies affected their role and the measures they had undertaken in response.

As a result of our joint work, we have prepared this report, *The Future of Risk Management in the Digital Era*, to help organizations navigate a digital risk transformation, now and in the long term. The report aims to answer the critical questions posed by CEOs and CROs and provides insights and recommendations for banks, supervisors, and fintechs on the best course to take in transforming the risk function.

The report first describes the key drivers that make change necessary and then lays out a longer-term vision, as well as shorter-term, more practical initiatives we observe at numerous institutions that are already having an impact by digitizing risk. It lays out the key elements a bank must develop for a digital risk transformation. Finally, it provides a transformation road map with concrete steps for shepherding a financial institution through a digital risk transformation program given the control specificities of risk and the function's safeguarding mandate.

Keeping pace with change is always a challenge at first. We hope that this report helps to get banks fully prepared for the digital future that lies ahead. With the right risk strategies and an innovative mind-set, we are confident that banks can turn the challenges into opportunities.

# Participating institutions

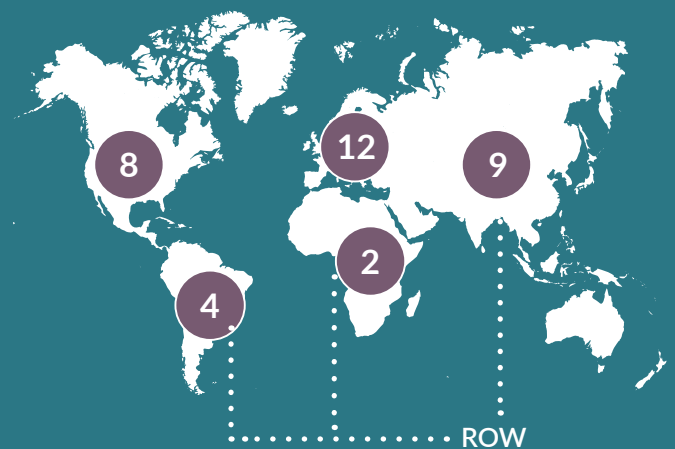
The following banks, companies, and other institutions participated in the survey, working-group discussions, and interviews. Those that took part in the survey are marked <sup>1</sup>. Those that took part in the working groups are marked <sup>2</sup>.

Aliya	Citigroup <sup>1</sup>	Gulf Bank Algeria <sup>1</sup>	Office of the Comptroller of the Currency
Alyne	Commerzbank <sup>1 2</sup>	Gulf Bank of Kuwait <sup>1</sup>	Rockall Technologies
Banco Galicia <sup>1</sup>	Crédit Agricole <sup>2</sup>	HSBC <sup>1 2</sup>	Royal Bank of Canada <sup>1 2</sup>
Banco Hipotecario <sup>1</sup>	Credit Suisse <sup>2</sup>	Industrial and Commercial Bank of China <sup>2</sup>	Royal Bank of Scotland <sup>2</sup>
Bancolombia <sup>1</sup>	Danske Bank <sup>1 2</sup>	International Bank of Qatar <sup>1</sup>	Société Générale <sup>1 2</sup>
Banco Santander <sup>2</sup>	Deutsche Bank <sup>1 2</sup>	Intesa Sanpaolo <sup>1</sup>	Scotiabank <sup>1 2</sup>
Bank Alfalah <sup>1</sup>	DNB ASA <sup>1</sup>	ING <sup>1 2</sup>	Sumitomo Mitsui Banking Corporation <sup>1</sup>
Banque de Commerce et des Placements <sup>1</sup>	Emirates NBD <sup>1</sup>	Lloyds <sup>1 2</sup>	Swedbank <sup>1 2</sup>
BBVA <sup>1 2</sup>	European Central Bank	M&T Bank <sup>1</sup>	UBS <sup>2</sup>
Beacon Platform	Federal Reserve	Maybank <sup>1 2</sup>	Unicredit Group <sup>1</sup>
BNP Paribas <sup>2</sup>	Feedzai	Mizuho Financial Group <sup>1 2</sup>	Union National Bank <sup>1</sup>
Billie	Financial Conduct Authority	Morgan Stanley <sup>1 2</sup>	United Arab Bank <sup>1</sup>
CIBC <sup>1</sup>	Financial Services Authority	Nedbank <sup>1</sup>	US Bank <sup>1 2</sup>
	Goldman Sachs <sup>1</sup>		

## 2017 IIF/McKinsey digital risk survey: a balanced sample of banks across all regions

Number of participants = 35

### Principal market<sup>1</sup>

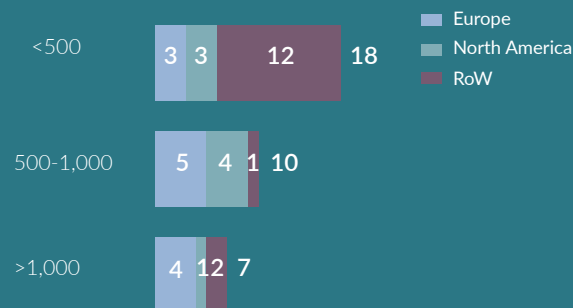


### Geographical footprint



### Size by assets

\$ billion, number of participants



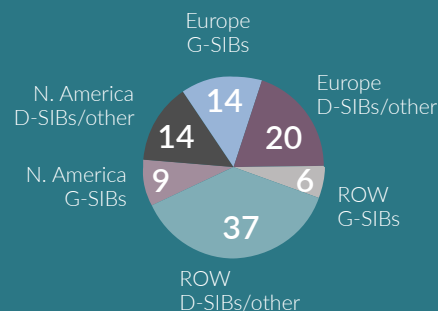
### Lines of business

Percent of respondents with presence in the activity



### Supervisory class and geography

Share of participants, %







# Summary

The facts about the digital era are becoming familiar but remain astonishing. Computing power has doubled annually since the 1970s,<sup>1</sup> and costs have fallen at about the same rate. With every human activity now digitally recorded (even sleep, in Apple's new health app), more data have been generated over the past two years than in all of previous recorded history. The number of interactive devices is also increasing fast. Four billion smartphones were active in 2016,<sup>2</sup> with two billion more to come. And all those smartphones (and laptops, tablets, sensors, cameras, and so on) are busily creating torrents of yet more data—2.5 exabytes every day.

Data, analytics, and the digital tools to harness them are transforming all aspects of life, including business and industry.<sup>3</sup> Banking is undergoing its own digital revolution (see “What is digital?” on page 8), with significant implications for risk management. In the 2017 IIF/McKinsey digital risk survey,<sup>4</sup> we find that 70 percent of banks have digital risk prominently on the radar, with a middling level of management attention, and 10 percent have it on the high-priority list. Correspondingly, respondents indicate that 22 percent of banks—nearly 30 percent in Europe and the rest of world—have invested more than 25 percent of the annual risk budget to digitize risk management. Six main trends are behind this transformation, either directly or because they build a case for change.

Front and center are customers and their ever-rising expectations. Today's consumers and businesses are accustomed to personalization through social media and to rapid fulfillment through e-commerce. They expect the same kind of near-instantaneous service and customized products from their banks.

A second force is greater competitive pressure: aggressive fintechs, some prominent nonbank lenders, and early-adopting incumbents have enhanced their customer offerings, largely automated their processes, and made their risk models more precise. As a result, they can undercut traditional banks on price (our research has shown that digital attackers' cost/income ratio is 33 percent, compared with 55 percent at incumbent banks).

Third, cost pressures come from another direction too: regulatory constraints and low interest rates have, in many cases, brought the average return on equity below or close to the cost of capital. While these cycles may turn, the pressure is likely to remain, especially as banks have added substantial staff to manage risk and enforce compliance.

The fourth trend is related to emerging and evolving risk types that arise from new business models. For instance, digital channels present new kinds of risk (including the greater exposure of digital assets). The rise of analytics requires risk managers to pay close attention to model risk, and the greater level of interconnectedness among businesses requires vigilance on contagion risk.

A fifth trend, regulation, may surprise some people who think that banking has reached “peak regulation.” Thirty percent of the respondents in our survey say regulatory cost for risk increased by more than 50 percent over the last five years. Moreover, 46 percent predict costs will continue to increase somewhat over the next five years. Though some aspects may begin to be deregulated slightly, banks can expect an overall increase in regulatory constraints on topics including supervision (for instance, TRIM and SREP), systemic risk (such as stress tests and Basel III), data protection (like GDPR), and customer protection (for instance, PSD II). While many participants in the working groups (and many of the chief risk officers in a forum that McKinsey recently convened) said that regulation “has become a stable element of our new business as usual” this means that regulation is driving parts of the digitization agenda. Digitization can also strongly help to cope with the repercussions—nearly 100 percent of the respondents, irrespective of geography or category (G-SIB vs. D-SIB), state that digitization is an important lever to cope with the regulatory burden. On the other hand, regulation is not a key impediment to digitizing risk. The most important impediments, according to the respondents, are legacy IT (85 percent), data challenges (70 percent), culture (45 percent), a shortage of talent (40 percent), and complex organizational structures (40 percent). These all score higher than regulation (35 percent).

1 “After Moore's law,” *The Economist*, March 12, 2016, [economist.com](http://economist.com).

2 Ian Fogg, “Smartphone market worth \$355 billion, with six billion devices in circulation by 2020: Report,” IHS Markit, January 17, 2017, [technology.ihs.com](http://technology.ihs.com).

3 For more information, see “Harnessing automation for a future that works,” McKinsey Global Institute, January 2017, on [McKinsey.com](http://McKinsey.com).

4 “Respondents” henceforth refers to bank risk managers participating in the 2017 IIF/McKinsey survey titled “The future of risk management in the digital era.”

Finally, a sixth trend concerns a banking-services ecosystem that is now springing up, offering new ways to undertake vital functions. For example, banks have used fintechs in credit risk underwriting partnerships, fraud detection, and (through industry utilities) regulatory compliance or supervisory reporting. Overall, 70 percent of survey respondents believe that fintechs will help to digitize the risk function. The most important topics here are mitigating losses from operational risk, managing ALM liquidity, risk stress-testing, identifying emerging risks, and monitoring and managing risk portfolios. Also, 30 percent of the respondents (60 percent in North America) plan to use utilities and partnerships to cope with regulation.

## The digitization of risk

Digitization in banks has so far concentrated mostly on customer-facing “journeys” (such as online marketing) and the operations that support those journeys (customer onboarding, customer servicing). Only recently have banks expanded their transformations into other parts of the organization, including the risk function. Banks note the importance of digitizing risk. Seventy percent of respondents reported that senior managers are paying moderate attention to risk-digitization efforts; 10 percent say that senior managers have made these efforts a top priority. Risk digitization is clearly an established topic in the executive suite.

# What is digital?

In this report, we use a generally adopted cross-industry definition of the digitization of a business or industry, which features seven building blocks.

- 1. Data management.** Overall data governance, data quality, consistency processes, and operating models enable the capture and use of vast amounts of data—both structured (such as transactions) and unstructured (emails and text messages, social-media posts, photographs, and so on).
- 2. Process and workflow automation.** Computers streamline, standardize, and efficiently execute routine tasks (such as data collection and entry).
- 3. Advanced analytics and decision automation.** Advanced statistical techniques and algorithms, together with artificial intelligence (including machine learning, cognitive agents, and robots) help managers extract insights, make better predictions, and choose more helpful interventions.
- 4. Cohesive, timely, and flexible infrastructure.** A modernized data environment, including the data architecture and underlying systems, becomes flexible through the use of techniques such as data lakes, virtualization, and the hybrid cloud. The infrastructure produces a seamless and consistent user experience—for both customers and employees—on PCs, mobile phones, and tablets.
- 5. Smart visualization and interfaces.** Tools and applications present users with data, such as self-service reports, interactive dashboards, and even augmented reality.
- 6. External ecosystem.** Partnerships provide market-leading digital capabilities developed with established peers, utilities, start-ups, and others.
- 7. Talent and culture.** People combine traditional business and technology knowledge and experience with modern data, analytics, and digital expertise. The culture encourages rapid, iterative delivery; a knack for “failing fast”; and deep collaboration.



This is not yet reflected in banks' investment, however. Only about 10 percent of risk groups have allocated more than half of their budget to digitization; another 15 percent have allocated between a quarter and a half of their budget. Risk teams in Europe are investing more in Europe than in North America.

Lagging investment is likely to catch up soon. Digital risk transformations are already a reality at the largest banks: 70 percent of G-SIBs stated that a digital risk transformation is now in place. Moreover, many respondents have high ambitions to digitize 80 percent or more of risk process in the next five years. Furthermore, senior management's mandate is now to drive such transformations; only 9 percent of respondents view a lack of senior management attention as a key challenge to digitizing risk.

Given the trends we have laid out, it is imperative for the risk function to accelerate its digitization efforts, since it will be increasingly hard to stay analog while customer-facing activities and operations race ahead into digital. As one risk executive noted, "the risk function should not be the bottleneck to a highly digital [bank]." Another said that "there is no way channels can be truly digital without working with risk." However, only 39 percent of respondents considered their risk function to be a significant contributor to the bank's overall transformation.

A digital transformation for risk would mean a number of changes. Chief among them, risk would capture and manage information from a broader and richer set of data, looking into nontraditional sources like business-review ratings online. It would automate processes it controls, and work with others to do the same for decision-heavy processes. It would use advanced analytics to further improve the accuracy and consistency of its models, in part by greatly reducing the biases. Risk would embed its solutions in a bank's website, its mobile trading app, and its corporate-banking platform, while deploying a flexible risk data architecture. Inside the bank, leaders would consult self-serve dashboards informed by risk analyses—and thus act on risk-driven strategic advice. Risk would review and reshape its mandate and role to capitalize on its ability to provide faster, more forward-looking, and deeper insights and advice. It would alter its organizational setup, as well as its culture, talent, and ways of working.

But to get there, risk must overcome a set of challenges. First, risk systems have significant IT and data constraints. IT systems are often patchworks, which means that data quality is often poor. Eighty-six percent and 63 percent of risk managers viewed legacy IT systems and a lack of easily accessible high-quality data, respectively, as the main challenges to digitizing risk. The working group noted the contradiction involved in encouraging people to seek additional and creative data sources while not mining fully trusted internal data as a result of the challenges of legacy IT systems.

Second, risk leaders are inherently and appropriately conservative, given their mandate. They will need to adopt and adapt concepts like iterative design, "fail fast," and multivendor teams. Forty-six percent of risk managers viewed culture as a main challenge in digitizing. Risk staff often lack the most up-to-date knowledge of analytics and next-generation technologies that will be needed in a more digital state. Forty-three percent of risk managers saw talent as a key challenge in digitizing. The working group actively debated how to attract and retain talent both proficient in risk and comfortable with digital technologies.

Third, risk has bankwide interdependencies. The risk function is highly involved in thousands of daily decisions across the entire bank. It requires considerable collaboration from others to deliver a digital risk solution. Thirty-seven percent of risk managers viewed a complex organizational structure as a main challenge in digitizing. As one risk manager stated, "strategic alignment is needed between different groups ahead of time [to drive the risk] digitization."

Regulation is another challenge. As 34 percent of the respondents noted, regulatory requirements for transparency, auditability, and completeness could limit the depth and speed of the technology's adoption. The working group consequently observed that "black box" machine-learning techniques have had a slow rate of adoption in regulatory-reviewed models. Finally, digital transformation in risk is a special case. Not unlike open-heart surgery, everyone must know the playbook to the last detail, and a range of safety measures and fallback options must be in place to safeguard the bank and its customers and keep operations running at the highest possible levels.

Nevertheless, it can be done. Many capabilities are in place, others can be amassed, and several banks have laid promising foundations. Further, there is a strong economic case for taking on these challenges and digitizing risk; 40 percent of respondents believe that credit risk costs will fall by more than 25 percent (we explore the economic case in detail, below). Leading banks and fintechs have proved that a number of oft-cited transformation barriers, such as a lack of digital talent and heavy regulatory requirements, can be overcome. In essence, the research that underpins this report makes a clear case for digitizing risk. Now the question is how far and how fast digitization can go.

### A vision for digital risk

A fully digital risk group could be game-changing for key stakeholders given the observed trends and impact at stake. Consider how their experiences would improve:

- **Risk executives** will focus on more strategic and high-value decisions as routine work is automated away and fewer exceptions require manual handling. They will use advanced-analytics capabilities to generate insights that are hard to produce today (such as complex correlation and trend analyses) to help the front line optimize its decisions and offerings. Risk executives will deploy a centralized “nerve center” where newly powerful self-learning models will harness improved connectivity to set limits dynamically and to detect emergent risks (credit, market, and operational)—evaluating those risks immediately, setting cross-risk mitigation strategies in motion, and dynamically adjusting limits. This nerve center will thus improve forward-looking risk identification and management across different risk types. To access these nerve centers, risk leaders will consult self-service, highly customized dashboards that gave them the ability to drill down into the headline figures and run self-defined analyses, mostly in real time. Risk executives will lead a smarter, nimbler, and smaller organization (60 to 70 percent of the current size in full-time equivalents, or FTEs) with a very different distribution of skills, including many more people with analytics and digital skills. Risk’s responsibilities will grow, however, in the view of more than 80 percent of respondents. Nearly two-thirds also think that more activities
- will move from the first line of defense into the risk group.
- **CEOs and heads of business** will receive automatically generated strategic advice on risk-oriented business decisions, such as identifying origination opportunities, shrinking unwanted exposures, managing investment portfolios, and allocating capital. Here too, executives will rely on an intuitive visual tool to provide advice on demand at an appropriate level of detail (such as specific markets, portfolios, or products). This advice will be grounded in live analytical views of the bank’s projected performance. CEOs will come to rely on a tool that readily illustrates, say, the implications for risk appetite of taking on credit and market risk in a given country under various macroeconomic scenarios.
- **Retail and corporate customers** will have individualized banking experiences that meet their high expectations. Banks will be present at key moments in people’s lives, helping them make more informed decisions, adroitly anticipating their needs, and offering customized solutions. No longer will customers need to communicate over multiple channels or shuffle through reams of paper. Banks’ advice might range from simple nudges to avoid overdrafts or late-payment fees to more sophisticated help managing account balances to optimize interest income. The advice will come in real time and will be fully embedded in the customer journey. For corporate customers, the bank will also be able to integrate into the supply chain, assessing risks and providing timely financing; here too, advice and decisions would be fully embedded in the customer journey. CFOs could expect comprehensive financial advice (subject to regulatory constraints), including views on risk from, say, adverse market trends and benchmarks that might compare the company’s customers with industry metrics. Customers could, moreover, confidently expect the bank to keep their data safe.
- **Regulators** will move from consuming reports to receiving near-live data. While our respondents were divided on whether regulators will have direct access, most think that the provision of data will be timely and painless. Regulators could swiftly perform ad hoc analyses (for instance,

impromptu stress tests) and provide banks with enhanced guidance on systemic risks. They could flag potentially noncompliant actions, allowing banks to deal with and mitigate any related risks to prevent them from ballooning into material systemic issues. Regulators could also oversee nonbanks, including fintechs and corporates with financing arms, in the same digitally enabled ways.

## The value at stake

Risk managers agree that considerable value is already at stake for banks in achieving this digital state in the near term (two to three years). This value would be derived mainly from efficiencies, reduced losses, and even indirectly through an enhanced customer experience and increased revenues. Twenty-eight percent of respondents expect automation to reduce costs by at least 30 percent. Nearly two-thirds think that a reduction of at least 15 percent is likely and that the time to make credit decisions will fall by at least 25 percent across portfolios. About 80 percent think that more timely decisions will be another benefit. Seventy percent expect higher productivity.

We estimate that the annual steady-state value from digitizing risk management (including revenue effects) will be approximately the same as the total investment over the first three years. This equates to a return on investment of about 450 percent for a first-mover bank with a well-executed program. For a G-SIB, this would translate to about \$600 million to \$1.1 billion of annual, steady-state impact. A typical G-SIB with a \$1 trillion balance sheet would have to make a \$200 million investment annually for three years. Since digital transformations are much more modular than classic large-scale IT replatforming programs, higher-impact areas can be targeted first in a precise way. As a result, the ROI would be even greater in the short term, with early impact potentially funding later investments in an agile deployment of initiatives. These estimates are contingent on risk and the bank's successful execution of a large change-management program of many initiatives; it is possible or even probable that banks will not meet their expectations on all initiatives.

Our analysis considered several levers. Recent efforts with risk automation and robotics suggest that FTE productivity could rise by 10 to 20 percent. With machine learning and other technologies, risk

models can become more predictive, which suggests that credit losses may fall by up to 10 percent. As automation and analytical tools reduce the number of human errors, and as new multichannel surveillance techniques detect inappropriate employee behavior more capably, the frequency and magnitude of operational and compliance losses and fines could decline by 10 percent. However, evolving risks (such as cyberrisk) might increase the potential for high operational losses, offsetting the gains to some extent.

IT costs for risk could decrease by 10 to 20 percent as the function optimizes its application-development and -maintenance capabilities and simplifies its data and application environments. Finally, there is also the potential for a capital reduction of up to 8 percent—depending, of course, on regulatory restrictions. As data quality and processes improve, and as analytics supplies greater precision, banks will be able to deploy capital more efficiently, lowering their risk-weighted assets.

We also see the potential for a revenue uplift of up to 4 percent for a first-mover bank that overlays risk models onto marketing models to develop a view of risk-adjusted returns from prospecting for new revenue sources, and from providing excellent risk-based decision tools to customers, in or near real time.

Over time, we estimate that most of these benefits would expand, as more advanced technologies, better algorithms, and more automated processes come online.

## Real-world progress

Parts of this future vision are already taking shape as various banks show strong progress in key applications of digital risk. Of numerous examples we encountered, two stand out. A midsize European bank implemented a digital-risk “engine” in its mortgage business to combat imminent competitive pressures. The bank retooled the process, removing a number of breaks. It kept most of its previous risk models, but upgraded its pricing model and optimized its credit policies and decision-making criteria, replacing a complex and overlapping set of rules. In six months, the bank transitioned from nearly 95 percent manual decision making (two weeks of approval time) to 60 percent straight-through processing (less than one minute of

approval time) with a completely paperless process. It reduced the customers' burden of data provision by 75 percent thanks to reusing information it already had or could easily find. The decision process integrates seamlessly into the advisory process, allowing for instant credit approval by the RM.

The second example comes from a US universal bank that is currently digitizing its CCAR process. Production time is slated to decrease by 30 to 50 percent, freeing up experts to focus on review and challenge before submission. The bank also anticipates FTE productivity gains of approximately 20 percent. Risk is collaborating with finance and business units to reengineer the process; critically, several steps that used to be done sequentially now take place in parallel. The bank is automating workflows, including the production and review of documentation, and applying advanced analytics and automation to enhance controls, thereby making the output more reliable and reducing the need for rework.

These are just two specific examples of high-impact use cases that could serve as parts of a broader digital risk transformation, which could include initiatives, such as rapid limit setting across the portfolio, automated early-warning and collection systems, and automated compliance controls. Many participants and interviewees spoke of similar experiences, demonstrating that the capabilities to digitize risk safely are already in place, and that techniques like the agile organization allow risk to focus closely on high-impact areas in a modular way, building a transformation quickly.

## The seven building blocks of digital risk

Banks can harness the seven building blocks of a digital transformation to construct a successful digital risk program. It is not necessary to excel in each category; rather, risk should prioritize those that enable the strategy of the bank and capture its unique opportunities.

**1. Data management.** Enhanced data governance and operating models will improve the quality of the data, make risk and business decisions more consistent, and ensure responsiveness to risk's data needs. One important enhancement is the need to consider

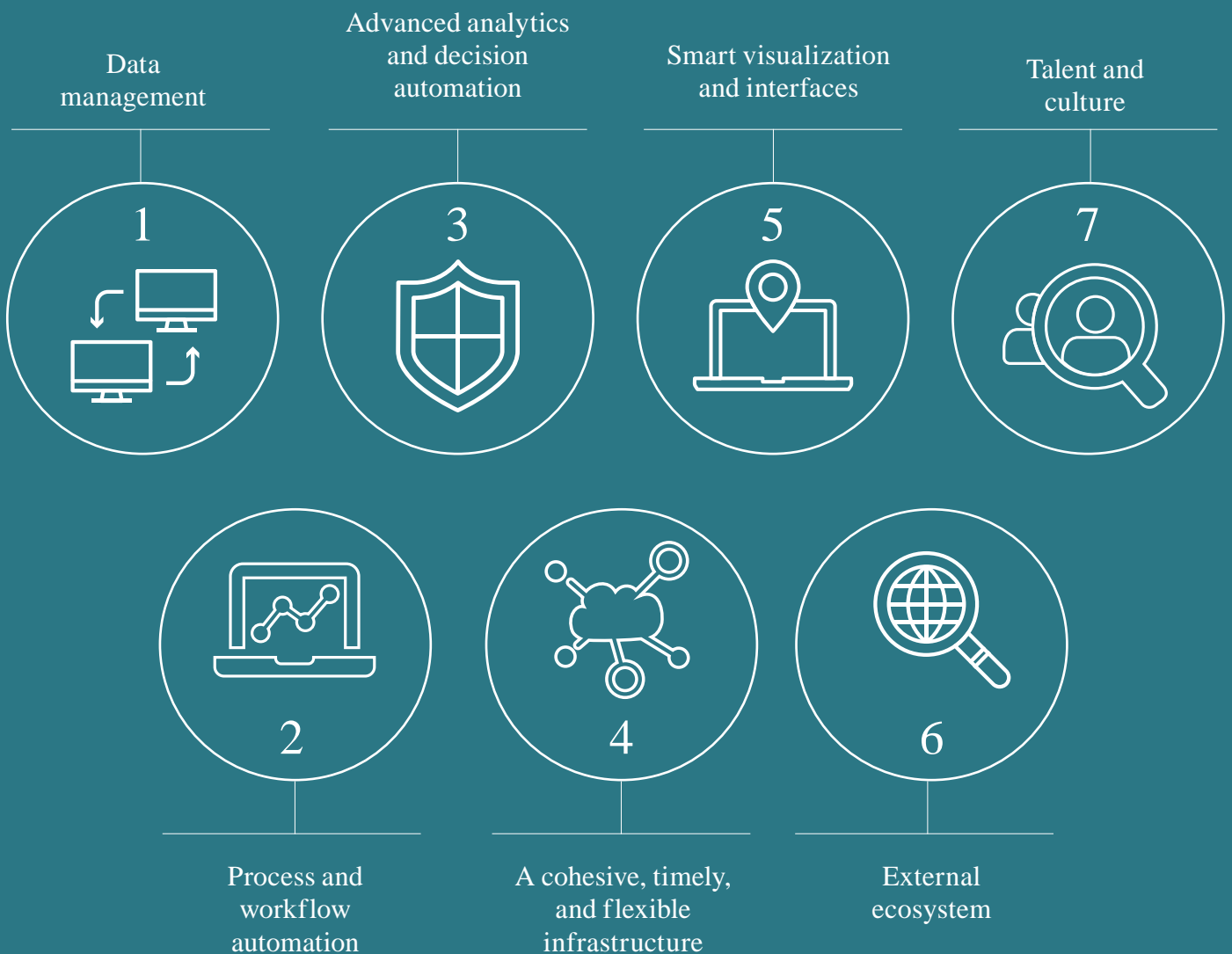
data risk as a key element of the risk taxonomy, linked to a specific risk-appetite statement and data-control framework. Another is to accommodate far more varieties of data. Approximately 30 percent of the respondents say that new data sources will probably have a high impact on their work. And of course, risk must prepare for a lot more data.

**2. Process and workflow automation.** As risk automates tasks such as collateral data entry, often through robotic process automation (RPA), it can combine several of them into smart workflows: an integrated sequence performed by groups of humans and machines across an entire journey (for instance, credit extension fulfillment). In addition to greater efficiency, smart workflows create a more seamless and timely experience for customers. About a quarter of respondents believe that more than 15 percent of costs can be cut across different risk disciplines, except in credit, where the number is a bit above 60 percent. Around 30 to 45 percent of respondents see 5 to 15 percent cost-reduction potential from automation, depending on risk type. Ninety percent see benefits from increased precision and 55 percent believe automation will improve compliance with regulation. As a knock-on effect, risk people will focus more on the value-adding activities they have been trained for. And 84 percent of respondents expect an increase in customer and employee satisfaction.

**3. Advanced analytics and decision automation.** Sophisticated risk models (for instance, those built on machine-learning algorithms) can find complex patterns (such as sets of transactions indicative of invoice fraud) and make more accurate predictions of default and other risk events. Nearly three-quarters of risk managers surveyed expect advanced analytics to have a significant impact on their work. Fifty percent say credit decision times will fall by 25 to 50 percent. A few respondents even believe that times could fall by 75 to 100 percent.

**4. A cohesive, timely, and flexible infrastructure.** The risk infrastructure will evolve to support several other building blocks: innovative data-storage solutions, new interfaces, easier access to the vendor ecosystem, and so on. It will use

# The seven building blocks of digital risk



techniques like application as a service, obtained from application service providers (even on open banking platforms). Approximately 45 percent of the respondents see innovative technologies as a high-impact building block. “No code” and “low code” solutions will put control further in the hands of risk executives and reduce the number of end-user computing tools. Nearly 60 percent of the respondents expect innovative data-storage structures to have a significant impact on risk management.

5. **Smart visualization and interfaces.** Risk will deliver its insights in more intuitive, interactive, and personalized ways through risk dashboards, augmented-reality platforms for customers, and other interfaces. Nearly 20 percent of risk managers expect nascent technologies, such as augmented reality, to have a high impact.
6. **External ecosystem.** Risk will partner with external providers to vastly improve customer onboarding, credit underwriting, fraud detection, regulatory reporting, and many other activities. Two-thirds of respondents see fintechs more as enablers than disruptors, while 63 percent of North American respondents plan to use industry utilities to deal with regulatory burdens.
7. **Talent and culture.** Risk will have a far greater share of digital-savvy personnel with fluency in the language of both risk and the business, operating within an agile culture that values innovation and experimentation. The new profiles

seen as most critical in a digitized risk function include data scientists and modeling experts. Many risk leaders think that their teams will need to develop these skills rather than hire nonrisk professionals and expect them to learn risk.

## A road map for success

A digital risk transformation is complex and potentially confusing. It includes all the tasks of digitization efforts elsewhere in the bank, such as getting alignment among top executives, prioritizing specific high-ROI and time-bound initiatives, and changing the culture. But the digitization of risk must be handled with even greater care than the bank uses elsewhere. “Move fast and break things” is not the right motto for digital risk. Risk is the bank’s watchdog, and no digital improvement is worthwhile if it keeps risk from its appointed rounds.

While difficult, digital risk transformations are not impossible, and more banks are taking them on. As noted, 43 percent of the interviewed respondents (and 70 percent of those at G-SIBs) currently have a digital risk transformation in place. The survey, working groups, and interviews revealed the secrets of making digital risk a reality in each of the three main thrusts of a transformation:

- Defining a vision for digital risk, including a view on the key activities risk will perform in the future, and in what way; the corresponding mandate and role of risk; and the metrics that will be used to determine success. Critical insights here include





understanding the ways that risk's role will evolve, to include activities such as providing strategic counsel to the top of the house.

- Determining the opportunities for digitization, through a bottom-up assessment of risk processes, a plan for applying digital tools to the most promising activities, and a business case that estimates the total impact. One key insight: banks should not wait for perfect starting conditions before getting started; often, they can take significant steps even while they are building vital assets and skills, which can be added later.
- Running a swarm of initiatives that meets the strategic goals and captures the defined opportunities, through a considered approach to governance and the operating model, and new techniques such as agile sprints and digital factories. One important finding from the research: even as it moves to agile development, risk must put in place hard measures to ensure safety, such as running old and new processes in parallel for a while, and conducting more back-testing on new analytical approaches.

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*Given the high value at stake and the dangers of procrastination, banks should embark on the digital risk transformation journey as soon as possible. Most risk functions have at least some of the building blocks they'll need to get started. They can harness these for short, agile initiatives that build momentum toward the necessary digital risk vision and address any lingering internal doubts. As one risk executive told us, "By delivering proofs of concept, we can convince those remaining skeptics that the new technology and innovations at our disposal can and should be used in [achieving the critical digital risk transformation]."*



# 1. The digital imperative

In this chapter, we examine the forces pushing risk groups to digitize and the current state of banks' efforts to meet the requirements.

## SIX TRENDS

A confluence of six trends makes it important for banking, and risk in particular, to undertake a deep, systematic digital transformation. The first four affect the entire bank: more demanding and ever-rising customer expectations, greater competitive pressure, growing cost discipline, and an emerging ecosystem of delivery models. The others particularly affect the risk function: emerging and evolving risk types; and the expanding breadth, depth, and reach of regulations.

### More demanding and ever-rising customer expectations

Customers no longer compare one bank with another. They compare it with the best-in-class customer experiences they get from an array of customer-centric tech companies—experiences that have raised their expectations across the entire “journey” (what happens for the customer, across all channels, before, during, and after the experience of a product or service). One CRO explained this in an anecdote. The bank had just completed building a digital mortgage journey for retail customers. For the first transaction, the bank invited a real customer to run through it in front of the bank's senior leaders. It all went well and in less than 5 minutes the customer had the loan approved. With this success, the bank was now the leader in its market, and was feeling pretty happy. They asked the customer how it was, and his response was “OK.” After all that work, culminating in an on-time, in-budget delivery, this was deflating. They asked why it was just OK, and the customer's reply was, “Look, this is nice, but it was so much more complicated than buying on Amazon, and I don't even have the money yet.”

The intuitive interfaces of many mobile devices give customers the ability to navigate them easily and to visualize data to meet their needs. A range of users benefit from this simple navigation; consider the fact that online spending on Apple products by people over the age of 65 was approximately 20 percent more,

last year than the spending of those aged 25 to 34.<sup>5</sup> Meanwhile, customers are receiving increasingly personalized offers, which are becoming more and more accurate in predicting their needs. Customers consider this important: nearly 60 percent of consumers who have experienced personalization stated, in one study, that it has a noticeable impact on purchasing.<sup>6</sup> And needs fulfillment is becoming more and more instantaneous; at one fashion-tech company, Rent the Runway, 30 percent of store orders are for same-day fulfillment.<sup>7</sup>

As the digital experience improves, customers increasingly want a seamless journey. Fewer of them now set out to find a financial product; rather, they're looking for help with a need. That's true of both retail and corporate customers. And these expectations are ratcheting up all the time, as the “five-minute mortgage” bank learned to its cost.

Risk will need to be a critical part of delivering robust journeys for banking customers, by ensuring that the underlying processes move seamlessly, do not create delays for customers, or require them to deal with large volumes of paperwork. Risk can help make sure that journeys help customers take preemptive decisions; it can also identify needs that are risk assessed before the customer is even aware of them.

### Greater competitive pressure

Banks are facing higher competitive pressure from a variety of institutions that now offer sophisticated digital experiences and enhanced customer offerings. These players include digitizing incumbent banks, smaller niche banks that are broadening their scope using digital strategies, aggressive fintechs, and nonbank lenders—in particular, digital companies.

Leading banks are investing over 10 percent of their earnings to support large-scale digital transformations, our survey and research indicate. This kind of investment allows banks to reshape their most significant customer journeys radically and to build an arsenal of data and analytical capabilities while modernizing their technology infrastructure and operating models. One large bank, HSBC, has rolled out a process to provide credit decisions

5 Jaimee Minney, “Apple's biggest spenders have seniority,” Slice Intelligence, October 28, 2015, [intelligence.slice.com](http://intelligence.slice.com).

6 “Rethinking retail,” Infosys, 2013, [infosys.com](http://infosys.com).

7 Hilary Milnes, “How Rent the Runway is pulling off deliveries at the speed of Amazon,” Digiday, July 31, 2017, [digiday.com](http://digiday.com).

on loans of less than £30,000 to small and midsize enterprises (SMEs) in as little as two minutes.<sup>8</sup>

Many of the “born digital” fintechs are grabbing bank customers. Unencumbered by legacy architectures and the banks’ regulatory burden, they use agile development to hone their offerings quickly to meet the needs of traditional bank customers.<sup>9</sup> And they generally do so at a significant cost advantage; our research has shown that the digital attackers’ cost-to-income ratio is about 33 percent, while the ratio of incumbent banks is about 55 percent.

Nonbanks are also starting to compete by setting up online lending platforms, which increasingly distance banks from their customers. Alibaba, which began as an e-commerce platform, created the digital MYBank in 2014, extending SME loans with a typical size of about \$3,000. Its loan book is now more than \$12 billion. And niche banks, such as Volkswagen Bank, are expanding online and extending their range of products.

For banks, the competitive pressures mean a loss of market share and eroding margins. Risk can help shore up these losses by developing greater precision in selecting customers. Just as important, risk can enable the superior customer experience discussed earlier, as well as the speed to make the instantaneous decision that gives the bank the edge needed to keep or acquire a customer. Thirty percent of G-SIB survey respondents believe credit processing times will be cut by 50 to 75 percent over the next 3 to 5 years. In many cases, some of which we show some later, processing times have gone down by much more than this, yielding on-the-spot decisions and loan payouts.

### Slow-growth environment and continued cost discipline

Cost discipline has become more critical for banks in the postcrisis, slow-growth, low-interest-rate environment, especially given regulatory constraints. The pressure on balance sheets is global. The ROE of European banks has dropped to 3 percent, from 6.5 percent, since 2010. And in 2016, global banking’s ROE was just below 10 percent<sup>10</sup>—at or near the cost of capital—driven not only by the prolonged period

of low growth and low interest rates in developed economies, but also by the downward credit cycle in emerging economies. This difficult macroeconomic environment is expected to keep pressure on bank profits in the years ahead.

Cost pressures will be manifested in a drive to reduce FTEs, including those in risk. Exhibit 1 shows that nearly 40 percent of survey respondents expect the number of risk FTEs to fall over the next three to five years, while less than 20 percent expect an increase.

### Emerging ecosystem of delivery models

Fintechs (for instance, Kabbage in Europe) and industry utilities (such as GCD) increasingly provide banks with ways to accelerate their digital risk transformation. In fact, 62 percent of the total funding (about €3.8 billion) of fintechs has been raised by fintechs willing to partner with banks. Meanwhile, 63 percent of North America-based survey respondents are looking to utilities in dealing with increases in regulation.

Some examples of new cutting-edge fintech technological solutions include trading and risk-analytics solutions backed up on the cloud, artificial intelligence and machine learning for antifraud solutions, and the smart collection of bad loans through matching algorithms that use behavior to pair collectors and debt holders. Seventy percent of respondents believe that fintechs will be a help to banks as they digitize the risk function. The areas where such help is most likely are operational risk loss mitigation, ALM liquidity management, risk stress testing, emerging risk identification, and risk portfolio monitoring and management.

Meanwhile, industry utilities can develop shared solutions for regulatory compliance (for instance, cybersecurity, model validation, and third-party vendor management) to free up resources for higher-priority initiatives. Thirty percent of respondents are planning to use utilities and partnerships to cope with regulation; 60 percent of those in North America plan to do so.

8 Emma Dunkley, “HSBC sets up £10bn SME loan chest,” Financial Times, April 17, 2016, ft.com.

9 “The Fight for the Customer: McKinsey Global Banking annual review 2015,” September 15, McKinsey.com.

10 Denis Bugrov, Miklos Dietz, and Thomas Poppensieker, “A brave new world for global banking,” McKinsey & Company, January 2017, McKinsey.com.

## Emerging and evolving risk types

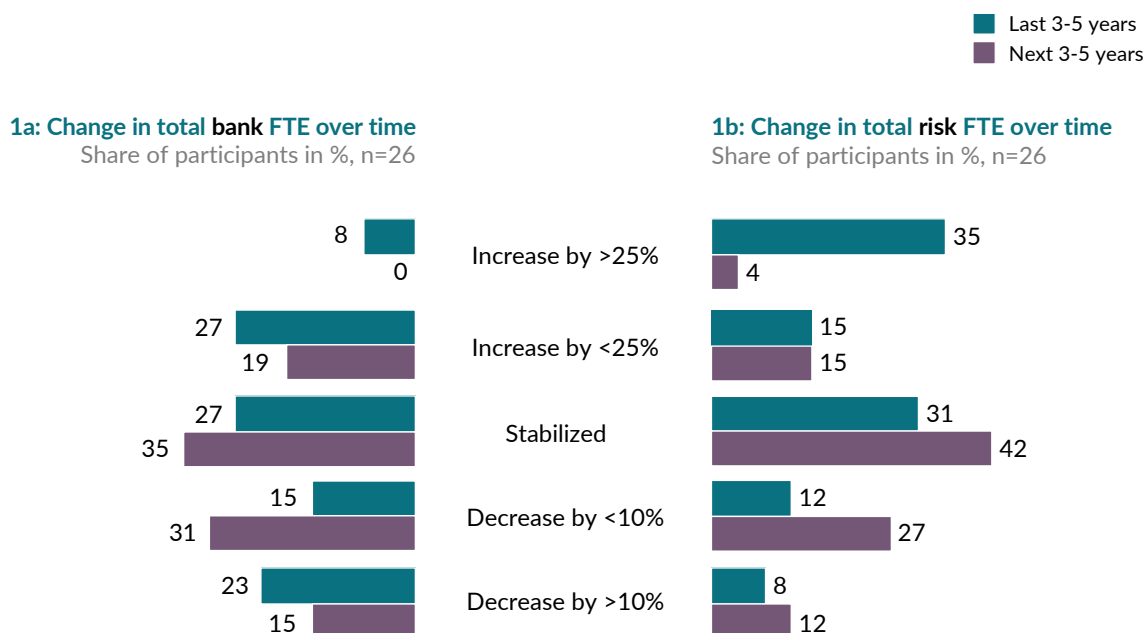
Risk is now devoting more effort to identifying and mitigating evolving risks arising from the more pervasive use of digital channels, the greater exposure of digital assets, the rise of analytics, and increasingly interconnected businesses. The working-group participants noted that many of the evolving risks are “not truly new.” Rather, they have increased as a result of structural changes introduced by digital. Some of the risks discussed included cyberrisk, model risk, and contagion risk.

Cyberrisk refers to exposure to losses and damages resulting from the misuse and theft of intellectual property or from the disruption of business. It is the main emerging risk on the minds of risk leaders, given the large volume of data held by banks and the extraordinary costs of a breach (according to one study, \$1.9 million for incidents with less than 10,000 compromised records and up to \$6.3 million for

those with more than 50,000 compromised records).<sup>11</sup> Clearly, as recent breaches involving hundreds of millions of customers have shown, these figures are only going up. Meanwhile, data breaches often involve millions of records. This risk is unlikely to subside. Risk will need to guard its own perimeter against cyberrisk, and role-model genuine digital resilience.

*Model risk* refers to losses arising from the incorrect use of models, defective models, incorrect or outdated assumptions, or underlying data issues. With models increasingly integrated into business processes, the number of models rising by 10 to 25 percent a year at large institutions,<sup>12</sup> and models becoming increasingly complex, the appropriate management of model risk will be critical. One global bank had losses of over \$5 billion, partly as a result of inaccuracies in risk measurement resulting from a flawed value-at-risk model, a lack of modeling experience by the operator, a lack of backtesting, and operational problems.

## Exhibit 1 – Risk FTEs are expected to decrease over the next 3-5 years due to completion and scale down of large regulatory programs



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

<sup>11</sup> Cost of Data Breach Study 2017: Global Overview, Ponemon Institute, June 2017, available at [ibm.com](http://ibm.com).

<sup>12</sup> Ignacio Crespo, Pankaj Kumar, Peter Noteboom, and Marc Taymans, “The evolution of model risk management,” McKinsey & Company, February 2017, [McKinsey.com](http://McKinsey.com).



Further, as banks build more models, they sometimes automate decisions that actually require some human judgment. Given the growing risk posed by models, model-risk management (MRM) has become a key part of risk activities; MRM groups have grown considerably in recent years and are expected to keep growing.<sup>13</sup>

*Contagion risk* refers to the risk that negative developments in one entity will spread to others and result in financial losses across the financial system. The interconnectedness of business is increasing because of the ease of doing business with automated and digital processes. This poses a material risk, since failure in one corner of the value chain can easily ripple through an entire industry. Contagion risk in the financial system has been a critical focus of regulators.

While not all of these risks are new, their emergent speed, growing importance, and the amplitude of their repercussions has fundamentally changed. Very early identification of these risks and intelligent insights on mitigation measures will not be possible without thorough use of technology.

### Expanding breadth and depth of regulations

The global regulatory oversight that began to skyrocket after the 2008 financial crisis is not likely to abate, though some isolated instances of deregulation might occur. From the onset of the crisis through 2015, the cumulative number of finalized publications by the Basel Committee on Banking Supervision increased by roughly 30-fold.<sup>14</sup> Society now expects government to ensure that we never again face a “too big to fail” situation. Regulators also more frequently use banks to help police illegal and unethical financing, both domestically and internationally.

This increasing level of regulation covers a number of areas, including supervisory considerations, such as the Targeted Review of Internal Models (TRIM) and the Supervisory Review and Evaluation Process (SREP);<sup>15</sup> systemic risk and the stress tests

that measure it; Basel III; data protection, such as the General Data Protection Regulation (GDPR); and customer protection (PSD2). The scope of regulation is widening, with additional scrutiny placed on nonfinancial risks and areas such as risk culture. Indeed, nearly every bank that took part in this effort has been asked by regulators to fix problems and close gaps in its approach to nonfinancial risks.

The scope and implications of certain regulations, such as GDPR and PSD2, are directly driving the need to digitize. For instance, in preparing for GDPR, banks can start taking the necessary steps to further build their digital capabilities, such as adopting sophisticated techniques for customer master data management.<sup>16</sup> Meanwhile, banks will need to respond digitally to operate successfully within the scope of PSD2 and Open Banking, and to compete with highly digital nonfinancial companies that could now capture material front-end interactions with customers as a result of these regulations.

Thirty percent of the respondents in our survey say regulatory costs for risk have increased by more than 50 percent over the last five years. Further, 46 percent predict costs will continue to increase, though by less than 50 percent of current levels, over the next five years (Exhibit 2).

If we consider the expansion of regulation in relation to the rising cost pressures, it seems that risk has some circles to square. Making sure processes are built in a compliant way is much easier, and indeed may only be possible, through digitization. Similarly, the cost of setting up a pervasive control framework that monitors the bank’s actions in a timely and effective way and prevents supervisory fines can only be made acceptable with thorough digitization. Indeed, as Exhibit 3 suggests, digitization and analytics are the best tools to cope with the expanding regulatory burden.

<sup>13</sup> Ibid

<sup>14</sup> Stefan Ingves, “Finalising Basel III: Coherence, calibration and complexity,” keynote speech at the 2nd Conference on Banking Development, Stability and Sustainability, December 2, 2016, Santiago, Chile, available at Bank for International Settlements, bis.org.

<sup>15</sup> Giorgio Bonomo, Sebastian Schneider, Paolo Turchetti, and Marco Vettori, “SREP: How Europe’s banks can adapt to the new risk-based supervisory playbook,” McKinsey & Company, July 2016, McKinsey.com.

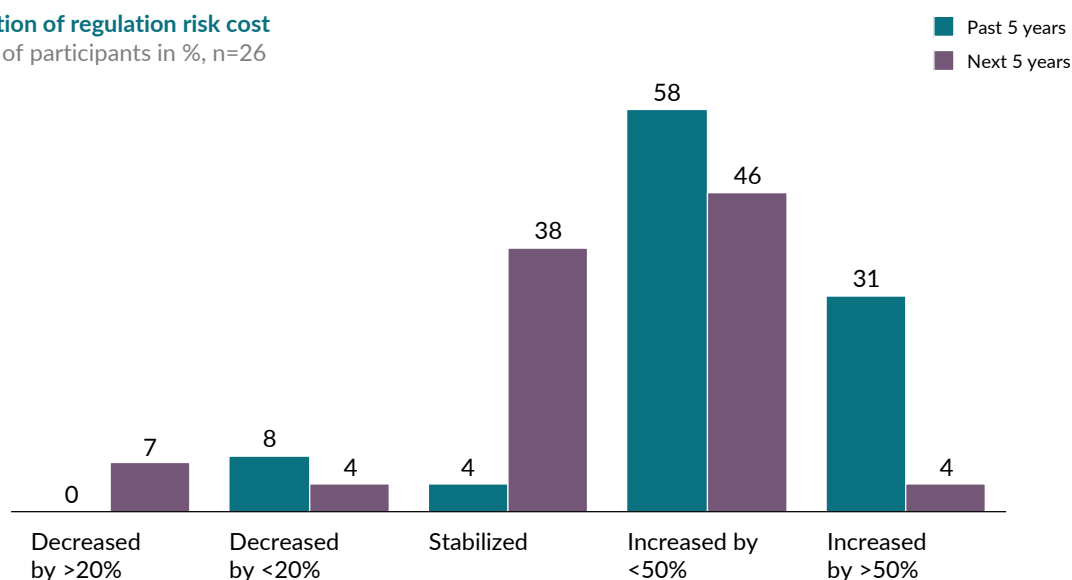
<sup>16</sup> “Daniel Mikkelsen, Henning Soller, and Malin Strandell-Jansson, “The EU data-protection regulation—compliance burden or foundation for digitization?,” McKinsey & Company, January 2017, McKinsey.com.



## Exhibit 2 – Regulation risk costs have risen in the past 5 years and are expected to grow

### Evolution of regulation risk cost

Share of participants in %, n=26

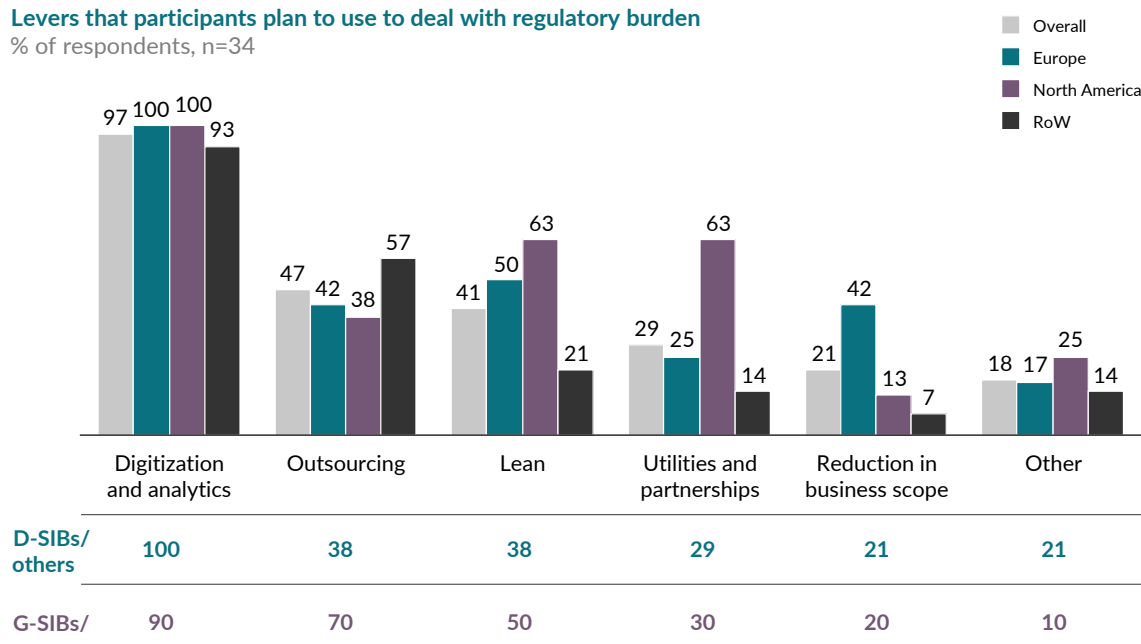


SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Exhibit 3 – Digitization, advanced analytics, and outsourcing are critical tools for an increasing regulatory burden

### Levers that participants plan to use to deal with regulatory burden

% of respondents, n=34



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## DIGITIZATION OF RISK: CURRENT STATE AND CHALLENGES

Even with these trends, digitization in banks has so far been concentrated on customer-facing journeys (such as online marketing) and the operations that support those journeys (for instance, customer onboarding and customer servicing). Only recently have banks expanded their transformation into other parts of their organization, including the risk function. Banks readily recognize the importance of digitizing risk. As Exhibit 4 shows, 69 percent of our survey respondents report that senior management has paid a moderate level of attention to risk digitization efforts, and 11 percent see it as a high priority.

On the other hand, many banks have been underinvesting: respondents at just 22 percent of banks state that investments in digitization accounted for more than 25 percent of the annual risk budget (Exhibit 5). As is often true, the largest banks are leading the way: 70 percent of respondents at G-SIBs state that they have a digital risk transformation in place. Moreover, as we discuss in Chapters 3 and 4, these banks are finding that, with the digital tools available today and a laser-sharp focus, they are launching and completing digital transformations with high return on investment.

The lack of relative progress at other banks is not at all surprising, since risk functions have had to meet a raft of postcrisis regulatory demands. Stress tests, SREP, resolution planning, IFRS9/CECL, ICAAP, Basel III, MIFID II, TRIM—the list is long and poised to grow. As a result, the focus has been on compliance through an expanded workforce rather than on building digital capabilities. Nearly 70 percent of survey respondents say they have added compliance personnel.

But as the trends accelerate, it seems likely that risk teams at lagging banks will redouble their digitization efforts. As banks move into this digital future, they need their risk functions to be a peer, matching the level of digitization in customer-facing activities and operations. As one risk executive stated, “The risk function should not be the bottleneck to a highly digital [bank].” A bank cannot achieve straight-through processing of its loan decisions if a human underwriter opines on the creditworthiness of customers. A bank

will waste its capital on unprofitable opportunities if the risk function can report emergent risks only once a month. A bank will face the constant threat of operational losses if it has not equipped its risk function to deal with cyberrisk and online fraud. Just 39 percent of respondents considered their risk function, as of now, to be a significant contributor to the bank’s overall transformation; risk teams want to do more.

## CHALLENGES TO DIGITAL RISK

Conducting digital risk transformations is complex as a result of several other issues as well (Exhibit 6).

The main challenges that risk managers highlight are *legacy IT systems* (86 percent) and a *lack of easily accessible, high-quality data* (63 percent). IT systems are often patchworks, and that can degrade data quality. The working group noted the contradiction involved in being encouraged to seek additional and creative data sources, even as trusted internal data cannot be fully mined given challenges with legacy IT systems.

The leadership of the risk function tends to be appropriately conservative in outlook and, in large part, not yet fully comfortable with digital delivery models. Forty-six percent of risk managers viewed *culture* as a main challenge to digitizing.

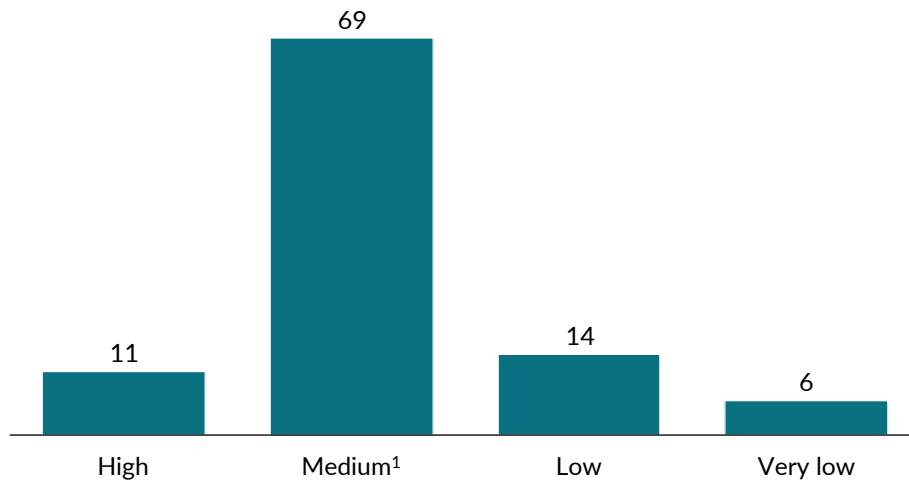
Risk staff often lack the most up-to-date knowledge of analytics and next-generation technologies that will be needed as the risk function evolves. Today, risk is dominated by experts well versed in activities such as credit underwriting, compliance, reporting, and collateral valuation. Fewer people have digital and analytical skills, and only a handful have business skills as well. Forty-three percent of survey respondents view *talent* as a main challenge to digitizing.

Risk management is fundamental to how a bank works. *Organizational complexities* abound because risk is deeply intertwined with thousands of day-to-day strategic decisions of internal stakeholders (business, operations, finance, and controls) and external stakeholders (customers and regulators). As a result, digitizing risk management and processes requires automating multiple layers with several functions. Thirty-seven percent of respondents state that a complex organizational structure was a key challenge to digitizing. Collaboration

## Exhibit 4 – Most managers are paying attention to digital risk

### Management attention to risk digitization programs and success to date

Share of participants in %, n=35



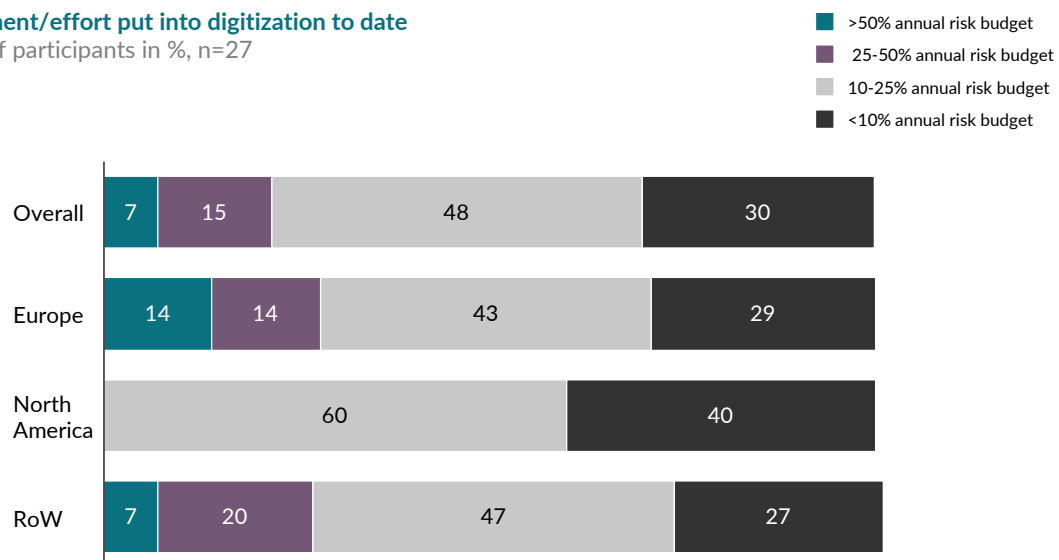
<sup>1</sup> Medium = management has started to digitize in some domains and disciplines within the risk function. Risk decisioning and processes are more automated than 3-5 years ago, but there is not a systematic digitization program

SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Exhibit 5 – Risk digitization is a small part of the annual risk budget

### Investment/effort put into digitization to date

Share of participants in %, n=27

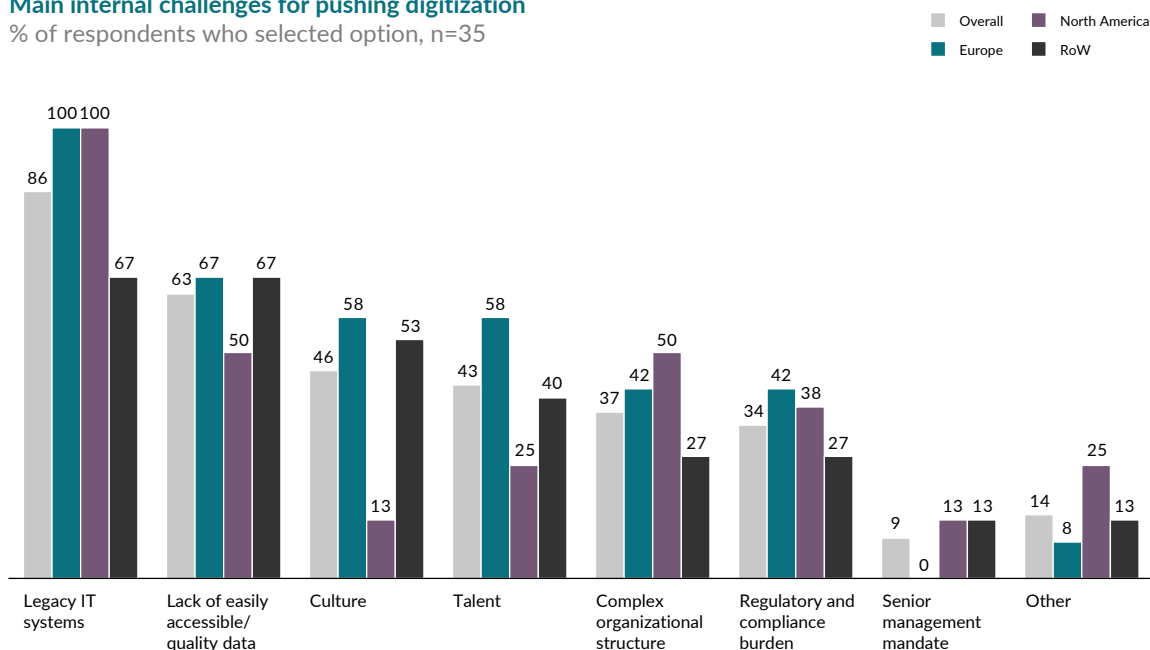


SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Exhibit 6 – Risk is challenged by legacy IT, poor data, conservative culture, and lack of digital skills

### Main internal challenges for pushing digitization

% of respondents who selected option, n=35

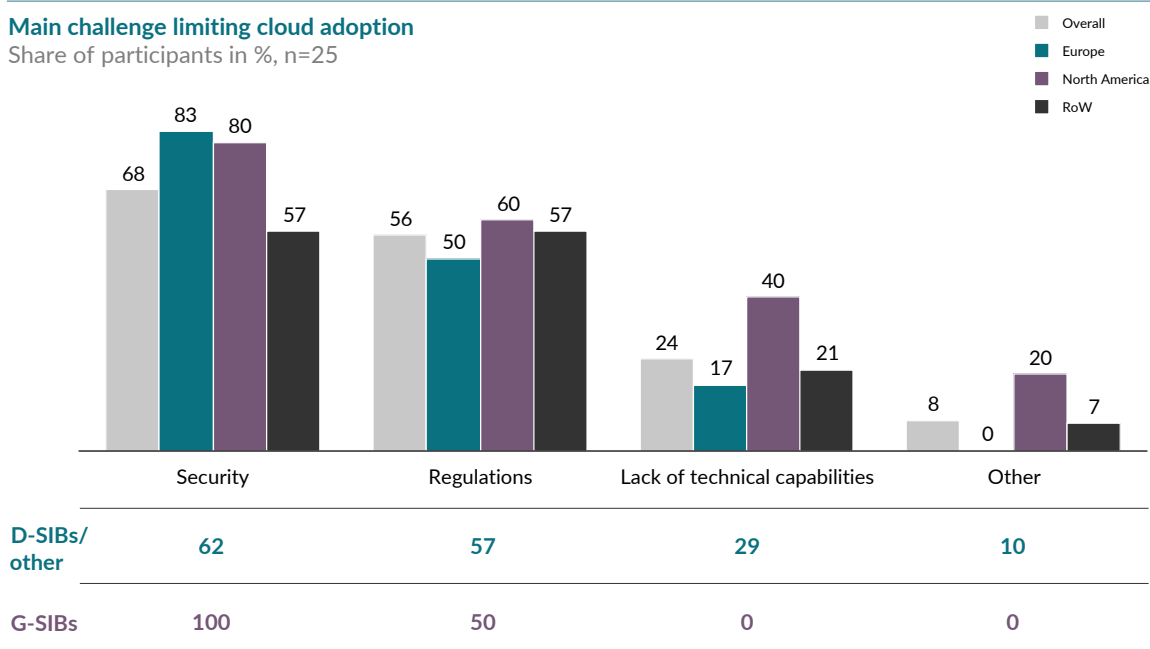


SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Exhibit 7 – The shift to cloud technologies is hindered by security concerns and regulatory requirements

### Main challenge limiting cloud adoption

Share of participants in %, n=25



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

is crucial to maintain the pace of change and operational day-to-day activities. As one risk manager stated, “Strategic alignment is needed between different groups ahead of time [to drive the risk] digitization.”

The fundamental nature of risk means that the function receives the closest scrutiny and must provide high levels of transparency, auditability, and completeness. This means that regulators are careful about the prospect that risk might adopt new technologies without sufficient due diligence. The result is a slow but careful pace of change as risk has to prove that its newly digitized processes and analytics do not substantially increase risk—or harm the customer. Thirty-four percent of respondents cite *regulatory burdens* as a key challenge.

In combination, several of these challenges can defeat the main thrust of digital risk: the development and adoption of new technologies. Other functions can adopt cutting-edge technologies, develop beta versions of new offerings, or test and refine minimum viable products in production. But this might not be feasible for all risk activities, since one misstep could lead to potentially serious disruptions in core risk activities or even affect a bank’s stability. This is particularly true for IT and cyberrisks. Native digital resilience should be a cherished value in a digital risk transformation. Regulators can require banks to limit the adoption of technology, follow specific rules, stick to standardized approaches, and so on. Exhibit 7 shows that 56 percent of the respondents state that regulations are a main challenge when adopting new technologies. The working group also observed that black-box machine-learning techniques have had a slow rate of adoption in regulatory-reviewed models.

• • •

*With these challenges, it is not surprising that digital risk remains a nascent field. Yet many banks are now realizing the value they are forgoing by not pushing harder. As we show next, the working groups have sketched out a vision of what might be achieved by banks that pursue digital risk and are already at work building important parts of it.*



“We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten. Don’t let yourself be lulled into inaction.”

*Bill Gates*



## 2. The extraordinary potential of digital risk

Bill Gates once said, “We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten. Don’t let yourself be lulled into inaction.”<sup>17</sup> The pace of innovation over the past ten years (including e-commerce, social media, mobile banking, and the sharing economy) underscores his message.

In that spirit, the working groups have proposed a bold and ambitious long-term vision for risk management to capture all the benefits of digitization (Exhibit 8). We take the perspective of each of four key stakeholder groups: risk executives, CEOs and heads of business, customers, and regulators. We then explain what this vision would mean for risk’s mandate and cost structure. Finally, we offer five case studies of how digitally advanced banks in our working groups are realizing the vision and capturing the economic opportunity. This vision can serve as the guide for the multiyear transformation effort we discuss in Chapter 4.

### SETTING A BOLD AND AMBITIOUS VISION

What might risk look like in ten years? The working groups outlined a vision for four groups of stakeholders.

#### Risk executives

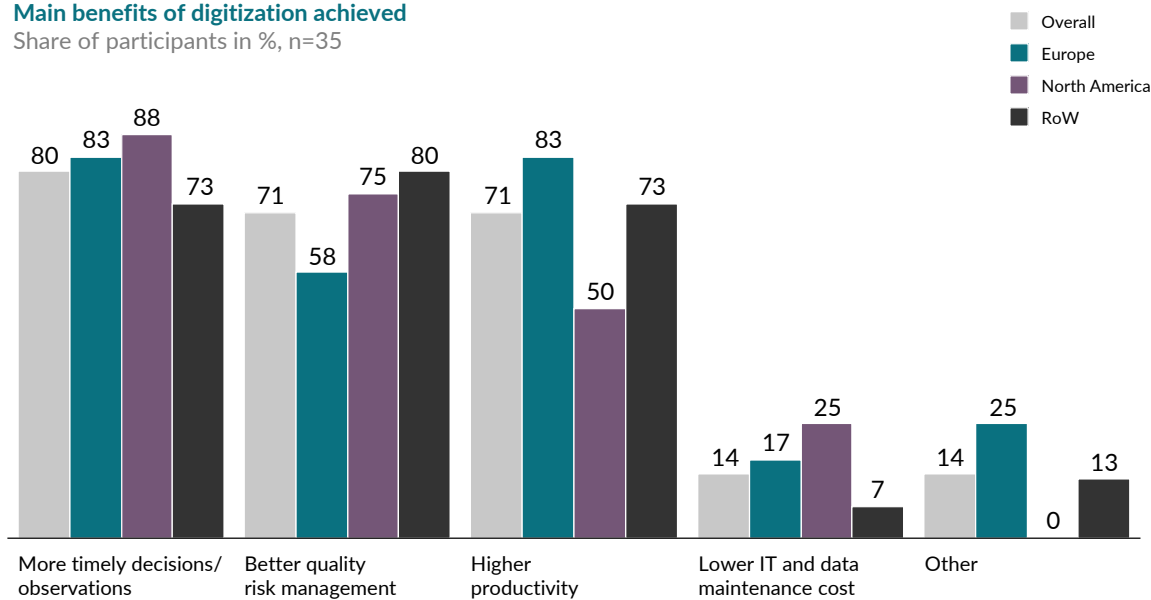
The risk function, which is both the enabler and benefactor of the digital risk transformation, would evolve in the following ways.

*From wrestling with small decisions to making and enabling strategic decisions.* As routine work is automated away, risk executives would focus on decisions with greater strategic implications and higher value. They would deploy advanced-analytics capabilities to help other stakeholders (such as the business) make more informed strategic decisions faster. These would be based much more on forward-looking views, would anticipate risk evolutions, and would offer insights into trade-offs. Risk executives, having zoomed out

### Exhibit 8 – Digitization should improve quality and timing of risk decisions and boost productivity

#### Main benefits of digitization achieved

Share of participants in %, n=35



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

from the daily operational grind, could then further contribute to analyses that help the bank optimize decisions and offerings (for example, they could assess the capital efficiency of new products under a wider range of scenarios before going to market). Additionally, they could design algorithms that give the front line detailed risk-based information on the customer's propensity to buy certain products.

*From keeping tabs on a highly manual risk function to leading a smarter, nimbler, and smaller group.* Some take the more radical view that as a whole 30 to 40 percent of risk's people might no longer be needed. They would oversee staff with skill sets that are much more geared towards data science and analytics. The group could be organized by these and other skills rather than by expertise in credit, market, or operational risk. As employees focus less on manual exceptions, risk executives would be able to rely on staff to make nimbler decisions.

*From assessing risks ex post facto to viewing emerging risks ex ante.* Risk executives would have an increasingly clear view of the risks that emerge from digitization. They would use the "nerve center", along with its powerful "engines" (see below) and improved connectivity, to detect emerging risks, immediately evaluate them, and set mitigation strategies in motion.

*From manually setting risk limits to dynamically setting and updating them through an automated nerve center.* Risk executives would design, build, and oversee automated credit- and market-risk engines with on-demand, live decision-making capabilities. These decision engines would be tightly connected to a central nerve center that sets risk limits, derived from the risk appetite. The nerve center would respond to identification of emerging risks, macro and micro scenario views, analyses of quality of past decisions, and so on. It would connect all these views and use adaptive models to adjust limits dynamically and then propel changes to all systems so that the total exposure envisioned by the risk appetite would be much more fluidly applied to the different businesses and segments. In this way, risk would be able to much more tightly manage the bank's exposure profile and increase risk-adjusted profitability.

*From reactively managing operational risk to using precise, preventive control mechanisms.* Risk executives would use advanced analytical tools to strengthen their grasp on operational risks through a robust control framework. For example, aberrant behavior could be detected as it happened by incorporating data from multiple sources (say, email/messaging text analysis, keyboard-rhythm detection, voice recognition, and facial recognition). Techniques from behavioral economics might flag the potential for such behavior, with debiasing methods used to mitigate it. Furthermore, the very processes that these controls monitor would be designed with "built-in compliance": wherever processes are digitized, they are much harder to tamper with, making it nearly impossible to, say, open accounts without customer consent.

## CEOs and heads of business

The relationship of CEOs and heads of business with risk is expected to become deeper and more closely intertwined in the long term. More than 80 percent of respondents say that risk's responsibilities will grow within the organization; 62 percent also expect, in a concomitant shift, that more activities will move from the first line of defense into risk (Exhibit 9).

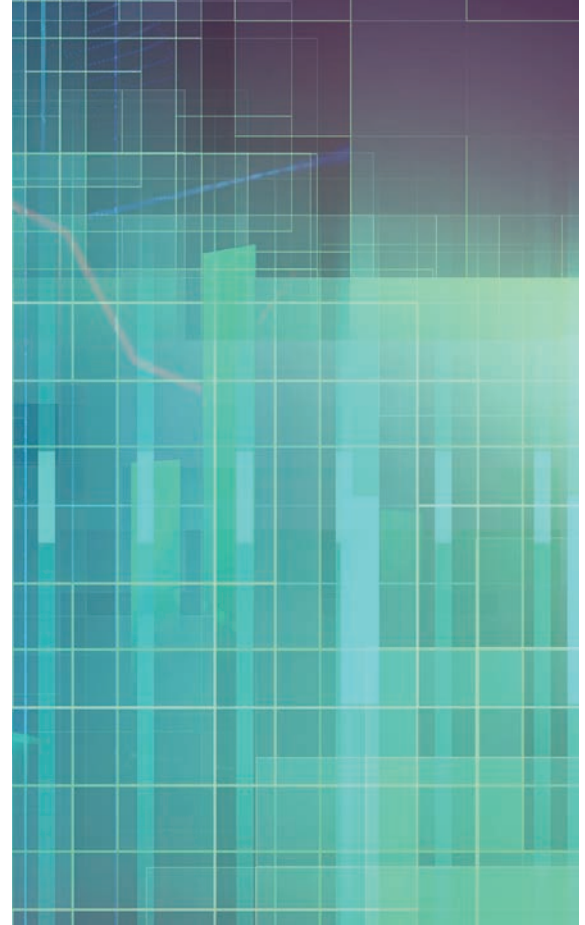
In that light, the working groups believe risk's role will evolve in the following ways.

*From tapping a variety of inconclusive opinions to obtaining automatically generated risk insights and strategic advice.* CEOs and heads of business would review strategic and automated advice on capital allocation and risk-oriented business decisions. Within seconds, advanced early-warning systems, probably plugged into real-time market data and current events, would undertake pattern recognition and provide guidance, including forward-looking suggestions to mitigate emerging risks.

*From making often qualitative business decisions to making quantitative and tailored business decisions.* Heads of businesses (and their units) would in all likelihood make increasingly precise business decisions in areas such as identifying origination opportunities, shrinking unwanted exposures, and managing investment portfolios. They could harness advanced

risk analytics to determine optimally differentiated product offerings and pricing for specific customer segments or even individuals.

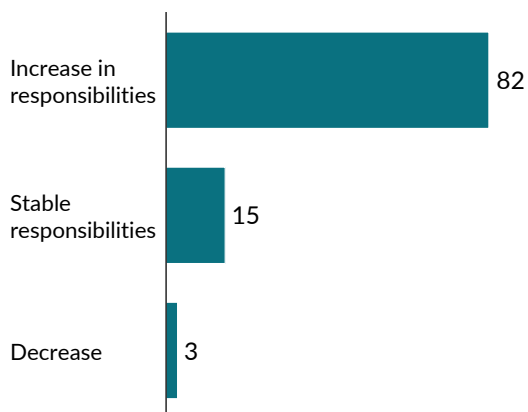
*From slogging through paper-based, number-heavy reports to visualizing portfolios in real time.* On phones and laptops, CEOs and heads of business would review risk data instantly sliced according to their preferences and presented live in a visual, intuitive manner. They would have, at their fingertips, the tools to highlight exposure concentrations or potential opportunities, while self-selected drill-downs could give a detailed view of all organizational risks.



## Exhibit 9 – Risk will take on more responsibility, including more activities from the 1st line

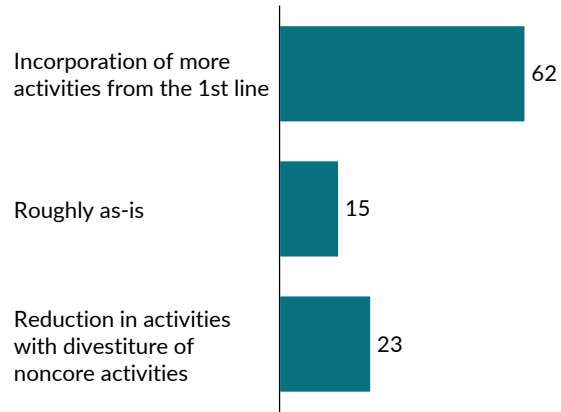
### 9a: Expected change in risk's responsibilities over the next 3-5 years

Share of participants in %, n=34



### 9b: Vision best describing what the risk management function will look like in the future

Share of participants in %, n=26



SOURCE: IIF/McKinsey 2017 Survey on the Future of Risk Management in the Digital Era

## Retail and corporate customers

As we have seen, the expectations of bank customers are shifting as a result of their digital experiences with online retailers, tech companies, and other entities, and this is changing their interactions with banks in fundamental ways. Customers will probably expect a bank to be embedded in their key life moments, intertwined with their own decision making, and anticipating and fulfilling their needs (Exhibit 10).

Indeed, ten years from now, we expect banks to be integrated with their customers' purchasing and financial-management needs in new and unique ways: anticipating key financial needs and moments, and their changing preferences; and acting as both financial advisor and data guardian.

Risk will be invisible to customers, despite being deeply rooted in the relationship with their banks. Yet that relationship will change in the following ways:

Retail customers will know only that instead of having to get in touch with the bank, their needs will be anticipated and met with personalized solutions that seem to arrive just when they're needed.

Corporate customers might get a financing offer immediately before the next stage of investment on a key project or as they strike a deal with a new supplier that needs vendor financing. At a roundtable of corporate banking leaders McKinsey recently sponsored, banks described how their corporate customers were swiftly digitizing. For example, manufacturers are adopting the technologies of Industry 4.0.<sup>18</sup> These customers say that in a world where their entire operations will be digitized, they will expect their banks to integrate digitally into their operations. In supply-chain financing, this would mean that supply needs that trigger a financing need would be foreseen and decided by the bank. No customer will want to halt a digital process to fill out an application to be decided by a risk department.

## Exhibit 10 – Risk will help the bank help its customers

### Embedded risk tools will meet customers' needs in a seamless and invisible way



SOURCE: McKinsey

Nor will retail customers have to fill out so much paperwork or repeatedly ask the bank for updates and service requests. When they want to add a new dependent, they would be able to make such changes to their account—or their credit card or loan—on the fly.

They will get money in their account from a lending decision in seconds instead of days. Their bank will offer intelligent financial advice, much better than the mass mailings they are used to receiving. The advice will blend risk and investment strategies and range from simple nudges to avoid late fees to sophisticated guidance for companies on their supply chains or from risk diagnostics and benchmarks to explanations of major threats on the horizon.

Gratified customers will come to see the bank as a trusted guardian of their money and information. Virtually impenetrable data security gives customers the assurance they crave. Advanced security measures protect the volume of data and flow of capital. Banks defeat hackers with powerful artificial-intelligence systems. Biometric identification techniques will give customers even easier and more secure access to their accounts.

## Regulators

The nature of the relationship between regulators and banks was closely debated by our working group. A consensus emerged that the relationship will probably shift in the following ways:

*From consuming reports to analyzing granular portfolio details quick and painlessly.* Regulatory reporting will become a thing of the past as regulators enjoy access to near-live data from banks. While our respondents were divided on whether regulators would have direct access, most imagine that the provision of data would be timely and painless. This kind of access could include drill-down dashboards and analytical tools that allow regulators to create the exposure views they need, as well as the ability to run impromptu stress tests and analyses.

*From scrutinizing banks (mostly) to overseeing a level playing field for banks and nonbank financial institutions.* Nonbanks (including fintechs and corporates with

a financing arm) would in all likelihood account for an increasing share of trading and lending activities and might therefore require no less scrutiny than banks do. As banking regulators oversee a wider range of increasingly interconnected institutions, they may leverage their own advanced analytical capabilities to pinpoint emerging systemic risks.

*From taking punitive measures to preventing noncompliant actions.* Instead of imposing fines after banks violate rules, regulators might be able to stop certain noncompliant activities as they happen or before they occur. With a real-time view of bank activities, regulators could flag and help prevent problems such as irresponsible lending or nonfinancial risk excesses, giving these authorities an extra shield to protect both customers and the economy.

## HOW THE VISION WOULD AFFECT THE RISK FUNCTION

This long-term vision has implications for both risk's mandate and its cost structure.

Most risk executives interviewed as part of our research said that the fundamental risk mandate would not change in the future. Risk would still act as a core control, assessing, controlling, and managing risks, while ensuring that banks comply with regulatory requirements. If anything, the mandate will expand: more than 80 percent of the survey respondents say they expect risk's responsibilities to increase (see Exhibit 9, on page 29).

In this expansion, risk would assume a more strategic role in banks as its decisions become embedded directly into customer journeys. And since risk would act in a more forward-looking way, offering insights into trade-offs for key decisions, risk would also be increasingly involved in managing for nonfinancial risks, including emerging or evolving ones, such as cyber risk and geopolitical risks.

Risk managers agree that a more digital state would involve considerable value, derived mainly from efficiencies and reduced losses but also, indirectly, from an enhanced customer experience and increased revenues. Twenty-eight percent of the respondents

expect automation to reduce costs by at least 30 percent. Nearly two-thirds think that a reduction of at least 15 percent is likely and that the time needed to make credit decisions will fall by at least 25 percent across portfolios.

The financial implications of digitization on risk management are substantial. Consider the value potential for a hypothetical bank with a \$1 trillion balance sheet and a high potential to digitize its risk activities. Say that this bank is a first mover in executing a committed, robust digital risk transformation program. We anticipate that relative to today's baseline, it could capture a total annual value, three years from now, of approximately \$600 million to \$1.1 billion, across both savings and increased revenue.

The annual savings alone could approach approximately \$400 million to \$700 million. The savings come from five levers (for more see "About our projections" on page 33). Note that the estimates assume successful management of the many variables that can affect a change program of this magnitude.

- **Robotics and automation.** FTE productivity will see significant gains of 10 to 20 percent from the current baseline of FTE expenditure (\$50 million to \$80 million in FTE value).<sup>19</sup> Our analysis suggests that these FTE gains will primarily come from the credit risk (e.g., SME underwriting, or collections call centers) and reporting functions where repetitive, administrative activities can be automated efficiently. Aligned with this is a smaller increase of risk-competent data engineers and scientists to derive and maintain the automated systems.
- **Reduced credit losses.** These will fall by 5 to 10 percent from the current baseline as analytical models become better at predicting credit defaults (a \$100 million to \$200 million reduction).<sup>20</sup> In fact, a number of working-group members discussed the use of a higher quantity and complexity of data (e.g., account behavioral information, online user behavior information, and even data from other banks due to PSDII), as well as analytical engines to achieve substantially higher accuracy on their current credit models.

- **Reduced operation and compliance related losses.**

The frequency and magnitude of operational losses and fines will decline by 8 to 10 percent from the current baseline as automation reduces human error and new multichannel surveillance techniques improve the detection of inappropriate employee behavior (\$70 million to \$85 million).<sup>21</sup> However, our working-group members also discussed the changing composition of the operation losses, as digital and analytics-driven operational risk (e.g., cyberrisk and model risk) take higher prominence even as they mitigate the more "traditional" operational risks.

- **Lower capital reserves.** Capital-holding costs will decline by 4 to 8 percent from the current baseline as capital is deployed more efficiently and RWAs decline given an improvement in data quality, process issues, and analytics (\$120 million to \$240 million). Credit and market risk RWAs will likely fall by 5 to 9 percent, especially under A-IRB regimes. Operational risk RWAs will be less affected due to its standardized regime and the capture of emerging risks.
- **Risk IT efficiency.** This will amount to about 10 to 20 percent of the current baseline of risk-specific data-center expenditures as risk functions optimize their application development and maintenance and consolidate their data—for instance, through a data lake—and migrate to the cloud (\$30 million to \$65 million).

These savings are achieved by running a number of modular, agile projects, of three to six months apiece. As a result, as banks implement the projects with the highest return first, the working groups recognized that return on investment would be higher (estimated at three times) in the first five years than in ten years (estimated at two times).

<sup>19</sup> Includes personnel in the first line performing risk-related activities.

<sup>20</sup> Assumes a starting GINI score of 50.

<sup>21</sup> Operational risk loss reduction analysis performed with data provided by ORX.



# About our projections

Calculating the potential of digital risk requires some assumptions about the composition of the balance sheet and nature of the bank. For example, sophisticated and already highly digitized banks will benefit less from the automation gains we discuss. Conversely, banks operating in high loss environments might benefit more from the improved accuracy of their predictive engines.

More specifically, we made the following assumptions in the five categories of savings, and in our revenue projections:

**Robotics and automation.** Banks report that their projects have shown efficiency gains of 70 to 80 percent are possible in manual, repetitive tasks (such as risk-system entry during underwriting, data anomaly detection and cleanup, and so on). We assume that efficiency gains can thus be expected to affect at least 30 percent of FTEs working on credit and operational risk, but far less in market risk which is already quite automated.

**Reduced credit losses.** We expect the typical average GINI of credit measurement engines (from underwriting, early-warning systems and collections) to increase from 50 to 70. However, we discount this by 50 percent, to account for changes in the credit environment, and challenges with implementation of the credit engine within credit processes.

**Reduced operation losses.** In operational risk, we applied loss reductions per operational risk type (such as internal/external fraud, employee practices,

project execution and delivery) that ranged from 20 to 30 percent, based on banks' experiences. We also accounted for increases in losses related to cybersecurity, technology risk, model risk, and data-related losses/fines.

**Lower capital reserves.** We used banks' estimates of the savings they have achieved, and apply a conservative 80 percent multiplier to these savings to account for better starting positions, including a starting capital ratio of 10 percent. Note that these savings are of course dependent on prevailing regulatory regimes.

**Risk IT efficiency.** We expect a 10 to 20 percent increase in efficiency, based on data consolidation and cloud migration activities. This is net of the expansion that is expected as more data becomes available and stored.

**Revenue increase.** We estimated only the effects of greater sales of credit products on net interest income, though other streams of revenue are also likely. We assume that the products in question account for only 20 percent of net interest income, and are primarily sold to retail and SME customers. Within this sub-segment, we expect 7 to 15 percent additional revenues, driven by new customer growth (such as unserved and unbanked segments), an increase in transactions per customer (from an increase in share of wallet), a reduction in churn, and a more precisely calibrated pricing. We anticipate that these additional revenues will only be available to first-mover banks.

Digitizing risk goes beyond saving money. If this same bank is a first mover in digitizing risk, we estimate that digitization could also contribute \$160 million to \$370 million in revenue to the bottom line—equivalent to about a 2 to 4 percent increase—through a combination of increased loan volumes and enhanced risk-based, one-to-one pricing. For example, better analytics should help the bank to acquire new borrowers as it taps markets previously deemed too risky and inaccessible. More granular data and more precise decision and pricing engines will help risk to price more closely to a customer's willingness to pay. Of course, such revenue increases will not be achievable for many banks; we reemphasize that only first movers with a committed program could reach similar gains.

Any long-term vision of the revenue opportunity should also include the growing potential for banks to participate in ecosystems that include nonbanking products and services. Imagine if banks were to gain a foothold in the early steps of the home-buying customer process now dominated by traditional real-estate agents. Some banks might even become platform companies, enabling businesses to connect with each other beyond peer-to-peer lending. Critically, the risk function will need to adjust its operating model appropriately to support the bank in this environment. The potential new revenue opportunity is not captured in the preceding analysis, but it must be on the radar of risk leaders.

Note that these estimates are high level, and based on typical benefits evidenced in digital risk initiatives. But they do show the potential for impact and the need for banks to go deeper and take a closer look at the opportunities from digitally transforming their own risk operations—opportunities that will produce impact within risk, and at scale in the rest of the bank, enabled by risk.

The working groups also noticed an unusual ability for banks to capture considerable benefits with limited investment (Exhibit 11). While each bank's story is a little different, there are common elements to the successes, and to the comparative failures. In the following, and in Chapters 3 and 4, we will tease out the key factors for success.

## **PRACTICAL INITIATIVES FOR THE NEAR TERM**

Even with the strong economics that a risk digitization program can generate in the long run, some banks considering the long-term vision might balk at the task that lies ahead. Banks at the digital forefront demonstrate that the challenge can be surmounted—generating substantial and tangible economic opportunities—by following a more immediate near-term digitization journey whose long-term vision guides its initiatives.

Here we describe in detail case studies of the work done by digitally advanced banks in five dimensions of enterprise risk management: risk ownership, appetite, and strategy; risk methodology, transparency, and insight; risk-related decisions and processes; risk data and technology; and risk organization, governance, and culture (Exhibit 12). Each case is particularly relevant to a dimension and typically touches on several others as well.

### **Digitizing an important regulatory response**

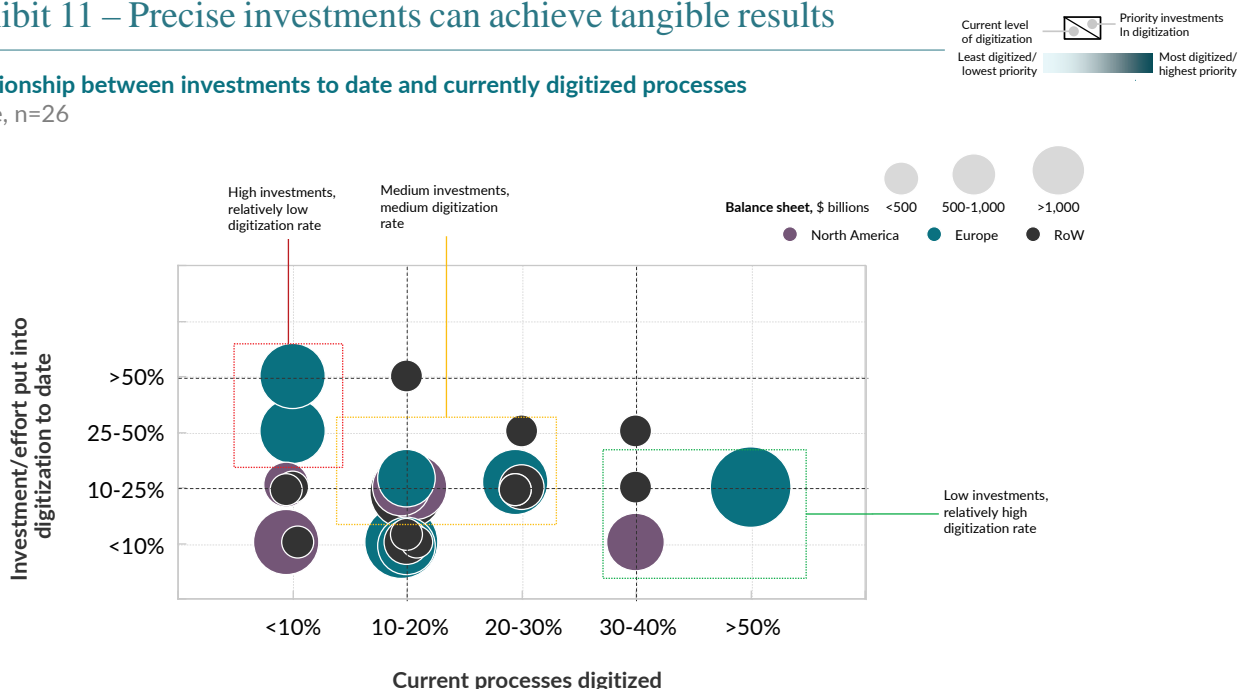
In this case, a universal bank digitized its stress-testing and scenario-planning activities, which had begun as a regulatory response. Universal banks typically assign more than 500 FTEs to the Federal Reserve's CCAR mandate. They identify significant risks, test different economic scenarios, prepare and aggregate data, and model balance sheets, credit losses, and income statements. Then they rerun the models hundreds of times as they report, review, and challenge the findings.

The bank's CCAR production process was generally inefficient, requiring a high volume of manual interventions. Most of the process ran sequentially, and work was often redone at stages along the way. So-called surge efforts were often needed as deadlines approached. The bank's data were often of low quality, requiring yet more manual effort. The bank spent so much time getting the initial product right that it had little time for one of the most significant parts of the CCAR mandate: the review and challenge, when governance forums and committees assess the final results.

## Exhibit 11 – Precise investments can achieve tangible results

### Relationship between investments to date and currently digitized processes

Score, n=26



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Exhibit 12 – Digitization investments and results vary across disciplines

### Current level of digitization vs. priority investments in digitization, n=35

☆ Case studies

Dimensions	Risk disciplines to digitize					Average per dimension
Risk ownership, appetite, and strategy	Risk appetite, limit setting, strategy, and governance ☆	Emerging risk identification	New product/process approval	Risk policies and procedures		Risk ownership, appetite, and strategy
Risk methodology, transparency, and insight	Risk reporting ☆	Risk portfolio management and monitoring	Risk modeling	Risk model validation and model risk management	Risk stress testing	Risk methodology, transparency, and insight
Risk data and technology	Risk data support	Risk technology development				Risk data and technology
Risk-related decisions and processes	Credit risk transaction approval ☆	Credit workout and collection	Credit loss mitigation	Credit restructuring		Credit-risk-related decisions and processes
	Market risk transaction approval and loss exceeds	Market risk loss mitigation				Market-risk-related decisions and processes
	Operational risk loss mitigation					Operational-risk-related decisions and processes
	ALM liquidity management ☆					ALM liquidity risk-related decisions and processes
Risk governance, organization, and culture	Risk organization design and sizing	Risk change and special project risk management ☆	Risk culture management	Regulatory management	External relations management	Risk governance, organization, and culture

SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

To address the problems, the bank first reengineered the processes. Next, it used automation and workflow digitization to streamline the system even further. It plans to follow this up with advanced-analytics solutions.

*Reengineering the process.* The bank designed a new end-to-end process. Representatives from all the relevant functions first mapped out the existing system (Exhibit 13). They identified strengths and pain points and used this information to create a smarter process flow.

The new mapping reordered sequential processes, making them parallel when activities did not rely on one another; for instance, it ran large components of balance-sheet modeling and loss forecasting at the same time. The bank also front-loaded certain activities to minimize surge time later; for example, it completed the bank-holding-company scenarios before the start of the production cycle, since they typically required only incremental adjustments. Finally, it improved the management of data by streamlining processes for conversions between different models, enhancing automatic controls for reconciliation, and improving the aggregation and transformation of data with more automatic feeds and new “slicing and dicing” capabilities.

*Automation and workflow digitization.* Documentation creation was a critical focus. The bank used a tool that takes structured input from multiple sources to generate documentation, automatically and dynamically, that can be edited before submission. This process can be dynamic, with live links to source inputs. Another focus was risk identification: the bank streamlined the collection of risk information and automated exposure checks and flags on key risks.

*Advanced-analytics solutions.* The bank is looking at machine-learning solutions that might make the models’ output more reliable, to avoid rework correcting downstream errors. The bank might also use natural-language processing to further automate its documentation process.

Already, as a result of the reengineering and digitization, production time has fallen by 30 to 50 percent, and 20 percent of FTE capacity has been freed. Rationalized, interconnected systems and data feeds will allow the bank to run additional scenarios, giving its decision makers more and more frequent insights. The bank took about three years to deliver a fully digitized CCAR process, and much of the impact was realized in the first year.

### **A comprehensive program to lower RWAs**

One global bank wanted to improve its accuracy in calculating risk-weighted assets (RWAs). It launched a global program across its banking and trading books, starting with efforts to address data quality issues such as unrecognized collateral, outdated ratings, misclassification of product types, and so on. It then reviewed its suite of models, and in many cases improved their calibration, addressed overrides and too-conservative buffers, and otherwise improved their accuracy, in particular by using new analytics.

One example was an anomaly detection algorithm which it applied to a large retail book containing tens of millions of customers. The algorithm detected outliers in the dataset (for example, abnormally high loan-to-value (LTV) ratios), correlated variables that typically should not both occur in the same customer segment (for example, high income, high risk), as well as structural outliers (such as a particular branch with consistently low LTVs).

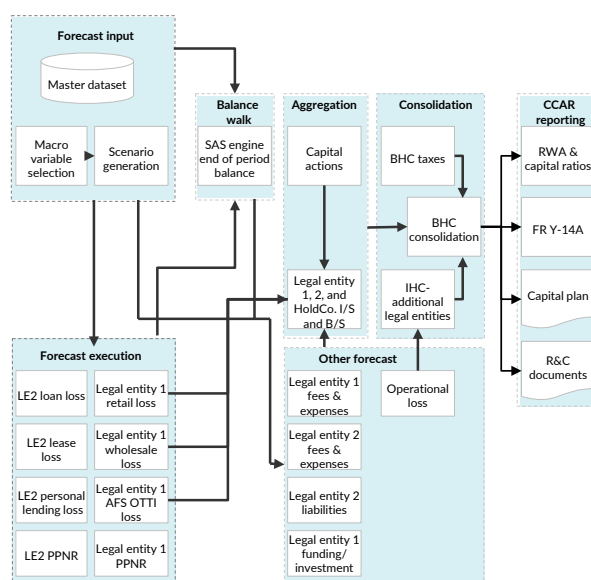
Finally, the bank made a number of strategic changes. It optimized its leverage, booking locations, and liquidity profile; and it made changes to the composition of its portfolio of businesses.

To deliver the program, the bank used an agile “war room” that reviewed the bank’s positions line-by-line, to find levers that could then be applied to the rest of the book. For example, it developed a checklist for the correct treatment of certain off-balance-sheet items. To date, the program has reduced RWAs by more than 10 percent. That includes many assets whose risk weights turned out to be too light, and had to be increased, helping the bank stay in compliance.

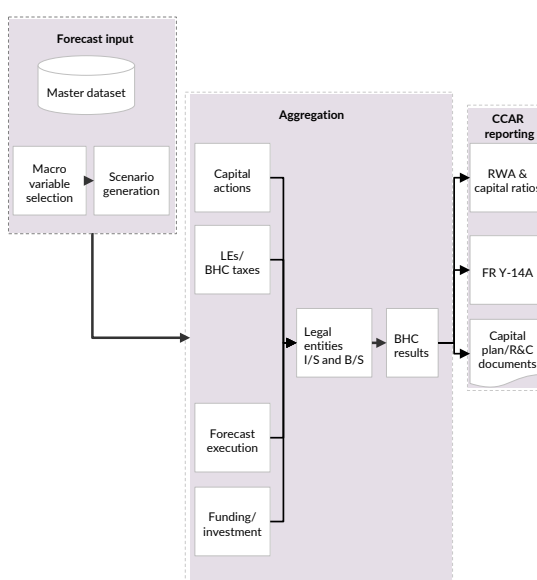
## Exhibit 13 – Digitizing an important regulatory response

### CCAR process was streamlined, with more parallel and digital processes introduced

Previous process



Digitized, streamlined process



SOURCE: McKinsey

### Taking the frustration out of mortgages

A medium sized European bank with more than five million customers set out to digitize its mortgage underwriting. Like most banks, it had a process that was slow, frustrating, and highly manual. Processes were bedeviled by multiple loops of data entry (many involving the customer), repetitive verifications in geographically dispersed locations, disparate data systems with nonreconciling records, low-performance credit engines requiring substantial manual adjustment, and legacy IT systems that couldn't produce a customer-pleasing digital interface.

The bank tested the economics of digitization to make sure that the investment would be sufficiently repaid by reduced credit losses. It then built a modular credit

engine, reusing and revamping existing analytics to power its digital channel. Tools pull information from various sources to formulate a complete credit picture of the customer. Next, an affordability calculator determines whether the customer has a sufficient cash flow. The bank built a digital fraud model, since it only had simple fraud rules (such as location checks, as well as the volume and frequency of transactions) for opening and managing accounts. Advanced analytical techniques, such as XGBoost, were investigated to improve how the bank determines the credit metrics of a deal: the probability of default (PD), the loss-given default (LGD), and the exposure at default (EAD). Simultaneously, the bank applies business and policy rules derived from the risk-appetite statement. The engine is flexible and tailored to various customer segments.

The bank also investigated ways to improve the customer experience, as delivered through a new app (Exhibit 14 shows two screenshots). Two standout features were the integration of a real-estate search engine, which filtered properties within the customer's risk capacity, and the offering of postmortgage services. These two features reduced sales losses as customers proceeded through the digital journey.

In just six months, the bank went from nearly 95 percent manual decision making to 70 percent straight-through processing. Customers had been frustrated by a bulky application form that asked for previously shared information and by the two- to three-day approval time; the new system is completely digital, and "time to yes" is often under a minute.

### Early-warning system for corporate and SME customers

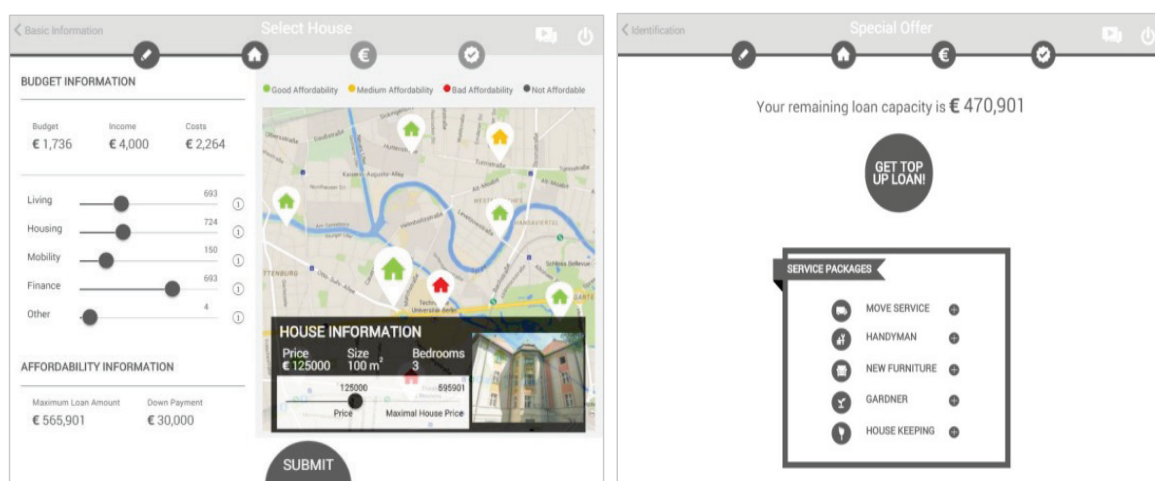
Risk functions can use digital tools to address the first signs of anomalies before customers enter delinquency. A large European bank improved its early-warning system's detection methodology for SME borrowers whose payments were between 1 and

90 days overdue, deploying tools for staff to manage the warnings.

First, the bank improved the early-warning system by combining traditional statistical triggers (short-term indebtedness, overdrafts, past-due installments) with behavioral elements. The risk engine could then assign each borrower a specific level of risk based on the credit-quality anomalies and behavioral-element mismatches. The predictive variable in the risk engine shifted from predicting default risk to IFRS9 stages, displaying closer alignment with recent regulatory changes. The final early-warning system used a machine-learning algorithm (XGBoost) that also provided a granular and optimal treatment/contact strategy for each account, using decision trees.

The next step was to feed this information into easy-to-use tools for both relationship managers and credit specialists. For relationship managers, the bank developed a web-based dashboard that offered a portfolio view with drill-down capabilities that could show the root cause of the warning (a nonperforming loan, say, or credit-default-swap spreads consistently above a threshold). An additional

## Exhibit 14 – One bank's new mortgage app



SOURCE: McKinsey

tool could produce a comprehensive analysis of the case, including the customer's credit history, key financial information, and current accounts, along with an automatically generated suggested mitigation plan. In complex cases, credit specialists could also access the underlying data to develop additional scenario analyses.

Full-scale implementation took seven to eight months after the initial proof of concept. The bank managed most of the work in-house, and IT consolidated several legacy systems.

The impact has been impressive: a 5 to 10 percent reduction in credit losses reported by segment and a 20 percent reduction in the number of accounts in IFRS9 Stage 2 (a stage that attracts higher provisions). A similar implementation in another bank showed that the share of customer action plans completed within 30 days of the first alert had increased from 20 percent to 60 percent. The bank also saw efficiency gains, with a 10 percent reduction in FTEs despite the significant increase in cases that were addressed.

## Stamping out fraud

Four major banks were troubled by fraud, in particular by “mule” accounts used to bypass the banks' safeguards against money laundering. Typically, high-risk accounts are flagged through manual reviews. A set of associated mule accounts passes the dirty money quickly from one bank to the next, hoping to get in and out before banks can catch on. Mule accounts tend to have distinct features, such as being open for less than a month, as well as having few economic relationships and large, infrequent cash debits.

To attack the problem, the banks started with their payment transaction data, covering 16 billion transactions and 360 million payment relationships. They integrated the information into a single data warehouse—the first step in its process (Exhibit 15).

While the banks knew they had instances of fraud, a key challenge was linking them, given the different formats in which the data were stored. To link the fraudulent transactions, they used “fuzzy matching” algorithms that work by making approximate matches between the times when data entries are made. Once

## Exhibit 15 – Stamping out fraud

### A three-step approach

**Integrated data from four major banks to create a network of transaction activity**



**Discovered hidden relationships using machine learning**



**Visualize results to enable repatriation of funds**



SOURCE: McKinsey



the payments were linked and mapped between banks, the four of them used Python to construct a payment network that depicted the path of each payment.

The banks then created a visualization tool through Tableau, Python, and JS, thus enabling investigators to follow the money easily as it flowed through complex networks between institutions (Exhibit 16). All told, the banks identified 15,000 mule accounts across their systems. After identifying a high-risk account, investigators could trace the incoming funds back to their source of origination and identify other criminal actors amid the network of fraudulent payments. They could also stop payment before the last mule account in the chain attempted to withdraw the funds, typically through prepaid cards, money-transfer services, and bitcoins. Once the automated detection system was in place, it freed up staff to focus on both remediation and analysis.

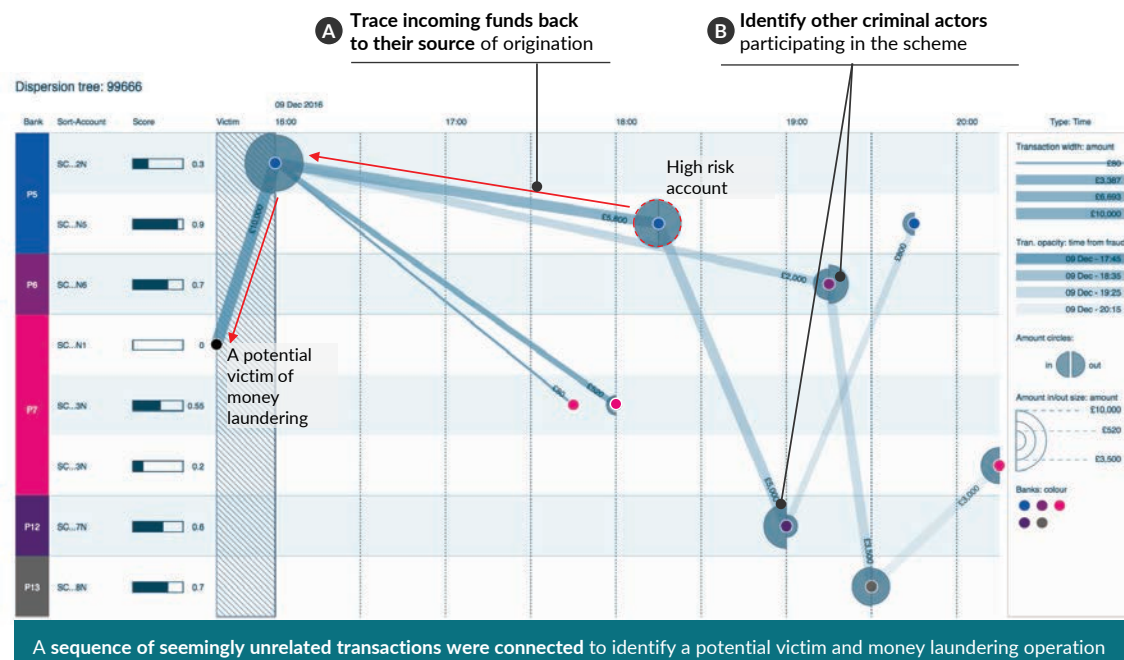
Analytical tools also helped another bank step up its fight against payment fraud. The bank was seeking ways to reduce invoice-redirection fraud, which had created tens of millions of dollars in losses from 2010 through 2015. The bank deployed a tool powered by machine learning to better monitor these activities and prioritize investigations. Two billion payment transactions were analyzed across 13 months, with a fraud incidence of one in fifty million. Fraud-detection rates increased significantly because the model could identify over 85 percent of fraud cases.

### Serving new customers

One bank in Latin America sensed an opportunity to serve a vast number of unbanked customers for whom traditional credit data (like credit card histories) did not exist. But new forms of data are becoming available on customer behavior: telecom usage, social media, retail purchases, and so on. These nontraditional data can be used

## Exhibit 16 – A simple visualization tool helped follow the money

After identifying a high risk account, this tool enabled investigators to:



SOURCE: McKinsey

to help craft a profile of potential customers and to estimate the potential for credit default.

The bank turned to a new partner, a food retailer, and gained access to its loyalty-card data on grocery purchases. A CHAID tree analysis and logistic regressions were used to identify “marker” products that helped differentiate between high- and low-income customers. The analyses also identified buying patterns predictive of default risk, such as a sudden increase in the purchase of alcoholic beverages. Buying baby products, on the other hand, signaled an increase in fiscal responsibility and correspondingly lower risk. Interestingly, a move from buying branded baby products to store-brand products suggested an increase in default risk.

By using analytics on these new data, the bank unlocked 10 percent growth in revenues. With the new customers, its losses were 30 percent lower than they were in its other segments, which it served with a traditional thin-file model. The digital effort netted \$30 million to \$40 million annual profits.

### Putting some teeth in a new culture

A US bank was concerned about issues with its data governance: it had a conservative culture, a patchwork set of policies, and an overly regulatory-minded focus. Morale on the risk team was low, since it was having difficulty with a greatly expanded workload. The team had added many new people, but they were mainly focused on tasks, and staff turnover was high.

The bank realized that a cultural shift enabling a more digital state is not just about enacting a new casual dress code; the right governance and operating model were needed to promote the right culture. The bank also sought to improve its enterprise risk-management framework, particularly for operational risk. It took three key actions in pursuing these goals. First, it redesigned its governance and enhanced its management of operational risks by creating a formal second line of defense for IT and cybersecurity risks. To do so, it reassigned governance and oversight activities from the central IT organization, which had traditionally looked after these risks, to the risk function.

In addition, the bank redesigned its crisis-management processes and created a detailed playbook for managing crises—for example, assigning roles and responsibilities—a significant step in ensuring business continuity in the face of the emerging and evolving risks of digitization. The bank has also launched a program to enhance the aggregation and reporting of its risk data (in compliance with BCBS 239) and to extract the business value inherent in those data. Strong data governance is critical in such cases; other banks have created an organization led by a chief data officer (CDO) to ensure the right oversight and data governance.

• • •

*Banks, not content to rest on their laurels, are finding innovative applications of digital risk. At one European bank, the annual process to review credit for corporate customers took a long time—70 to 150 hours per customer were spent gathering data, writing long credit memos of varying quality, and connecting more than ten tools and systems. The bank’s new digital tool cut the time by 40 percent for risk managers and for credit and credit committee members. Another bank is gaining insight into risky trader behavior by tracking and assessing topics and sentiment in communications via natural-language-processing techniques. And a US bank revamped its collections activity by using more data and applying machine-learning algorithms. The changes increased the predictive power of its existing system by 30 to 40 percent and cut charge-offs by 4 to 5 percent.*

*These stories illustrate the strong efficiencies, improved decision making, and enhanced customer experience that banks can achieve by focusing their efforts. They also shine a light on the building blocks of digital—the seven elements risk teams can use to digitize their work—as we explain next.*



### 3. Seven building blocks

To achieve the vision of digital risk outlined in Chapter 2, banks can utilize the seven building blocks of a digital transformation (see page 8): data management; process and workflow automation; advanced analytics and decision automation; cohesive, timely, and flexible infrastructure; smart visualization and interfaces; an external ecosystem; and talent and culture.

While banks do not necessarily need to fully master each of these building blocks, they will have to prioritize the ones that enable their strategy, developing appropriate strengths in each of these if their ambition is to be realized. Exhibit 17 shows the working group's views of the importance of each of the blocks; analytics leads the list. This chapter examines each building block and offers an overview on how they will have to be deployed to achieve the vision.

#### BLOCK 1: DATA MANAGEMENT

Data at banks' disposal today are characterized by increasing volume (number of records captured), velocity (pace of data captured and generated), and variety (including traditional structured data, such as payments and transactions; and new unstructured data such as clickstreams and chat transcripts). Consequently, the risk function needs to have a robust approach to the use and management of data to ensure appropriate quality in support of risk decisions.

Risk can no longer rely solely on traditional risk data (loan exposures, limit usage), but must identify and harness all the *right* data at their disposal to make the most timely and precise decisions. This will enable the risk function and the bank to anticipate decisions in the customer journey without burdening the client for more data than can be captured via other means.

#### Exhibit 17 – Advanced analytics and automation especially are seen as key capabilities for digitization—especially for underwriting and modeling

##### Usage of digital capabilities by discipline

Frequency of responses; n=24

	Data management			Analytics	Next-generation capabilities					Average dimension
	Cloud	Data lake	Richer, nontraditional data usage	Machine learning	Automation/robotics	Blockchain	Channel transformation (e.g., IoT)	Augmented/virtual reality	Other	
Credit-risk-transaction approval (including analysis and underwriting)	9	12	9	13	15	2	2	0	3	7
Risk appetite, limit setting, strategy, and governance	4	9	3	7	3	1	0	0	3	3
Risk modeling	6	12	10	14	8	0	0	1	1	6
Risk stress testing	4	8	6	6	9	0	0	1	2	4
Risk technology development	7	9	5	4	11	1	2	0	1	4
Average capability development	6	10	7	9	9	1	1	0	2	5

SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

As the cofounder of one fintech told us “It is important to pull as much data as possible from the ‘background’ so as to reduce what is asked of the customer.”

Many banks, often in response to innovations from fintechs, are forgoing (or reducing the prominence of) attributes that have been seen as stalwarts of risk modeling to introduce new, more timely, and more precise profiling attributes, such as payment patterns, purchasing history, and even online search. Banks are also experimenting with alternative sources of data for trading and operational risk. And naturally, with the need to measure newer forms of risk (cyber, reputational) comes the need to capture and analyze new types of data—for example, sentiment scores, location patterns, and behavioral anomalies. Figuring out what attributes are truly relevant requires capture, analysis, and testing over representative time frames. This means institutions will need to capture (and often buy) a considerable volume and variety of data to learn which attributes have predictive power. They can accelerate this path by joining interest groups and roundtables, as well as by partnering and sharing learnings with other market participants.

A prominent example of a growing data source with potential for the future is the Internet of Things (IoT), which refers to the network of all “smart” physical objects accessed through the Internet. Objects joining the IoT so far include vehicles, home appliances, and power grids, among others. The McKinsey Global Institute has estimated that high-potential IoT applications could have a total economic impact of \$3.9 trillion to \$11.1 trillion per year in 2025.<sup>22</sup>

Banks could potentially use IoT for real-time data on borrowers. As an example, for managing exposures to agricultural borrowers, soil monitors could perhaps provide data on the quality and yield of the soil, while weather alerts could give a glimpse into future harvests. In other sectors, IoT could provide monitoring and instantaneous notification of impending—or incurred—damage to systems and physical assets (for instance, a construction site flattened by a hurricane). Combining this wealth of data with the bank’s

traditional data on the borrower would help the bank to highly predictive decision making. IoT can also be used to improve customers’ experience in the bank branch, by partnering with retailers that are already monitoring device location and pedestrian traffic in their stores.

Given rising concerns about how organizations procure, use, and manage customer data, new regulation is accompanying this explosion in new data, so as to provide customers with privacy protections. The General Data Protection Regulation (GDPR), for instance, has been passed in the European Union to strengthen online privacy rights and harmonize data-protection rules. Banks, and the risk function in particular, must make sure they maintain appropriate data standards and policies, as well as robust remediation programs.

In making sense of this mass of data, the risk function must be mindful of having an effective and flexible infrastructure in place (more on this on page 49), the right perspective on what data to use, and a strong data-governance model.

Difficulties in ensuring the data are of appropriate quality may often arise due to complex organizational structures, unclear responsibilities between silos, and highly complex data architecture (e.g., fragmented, duplicate, and inconsistent sources). Many banks are overcoming these challenges by establishing enterprisewide governance capabilities. These include councils to drive consistent decisions, accountability models to enforce natural points of ownership, common taxonomies and dictionaries to ensure transparency of data and their purpose, quality measures to expose deficiencies and inform remediation, and lineage and metadata to ensure authorized sourcing and use. Such governance capabilities have evolved in banking in response to regulation but need to be expanded and tuned for broader risk and business purposes.

Many banks are still building the capabilities needed for strong data governance.

## BLOCK 2: PROCESS AND WORKFLOW AUTOMATION

Technologies can reduce the need for manual intervention in key risk activities by reducing the number of errors and process times. More than 60 percent of the respondents expect automation to reduce credit-risk-related costs by at least 15 percent, and the same percentage also expect automation to reduce credit-decision times by at least 25 percent (Exhibit 18).

Even though automation technology is not new, many risk functions are still far from maximizing its potential and reaching such levels of improvement. Our survey reveals that only about one in ten respondents has automated more than 40 percent of its processes, and up to three in ten have automated 10 percent or fewer of them (see “Tracking decisions,” on the next page, for more on how one bank automated its SME lending process).

A critical first step is reimagining a process through a zero-based design, as there is little point in automating a broken process. Risk must ensure that the process map itself is streamlined—that is, with unnecessary sequential steps removed. As we have already discussed, this involves obtaining the input of various stakeholders in the process, redesigning it so it is as close to full straight-through processing as possible, and clearly identifying the steps or activities that can't be automated feasibly (for instance, when a manual credit check is required or a customer might prefer to deal with paper rather than provide a digital signature).

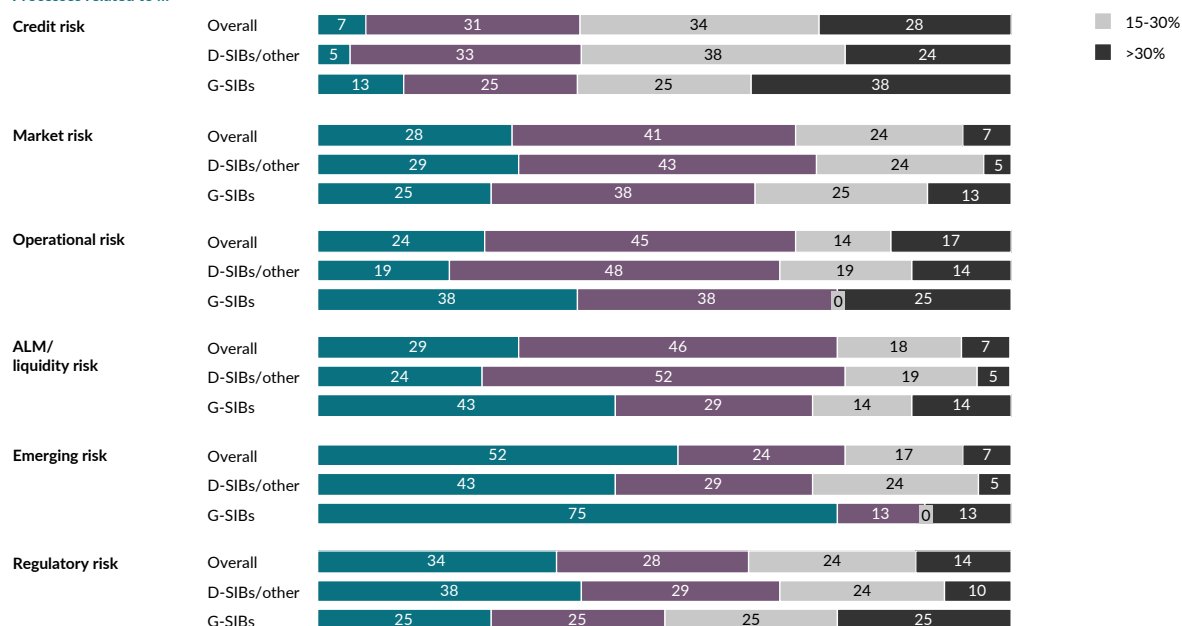
A fully straight-through process would leverage robotic process automation, powered by workflow-automation technology. RPA tackles repeatable manual tasks by using a computer program to manipulate existing application software in the same way a user would. RPA is well suited to the manual, repetitive, and time-consuming tasks many users

## Exhibit 18 – Credit and operational risk present the highest opportunity for cost reduction through automation

### Cost reduction potential of automation and robotics

Share of participants in %, n=29

Processes related to ...



Note: Sum may exceed 100 due to rounding

SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era



perform. Service providers that banks have partnered with in this space include Automation Anywhere, Blue Prism, Pega, and UiPath.

The use of RPA is still nascent in risk but is rapidly catching on elsewhere within banks. For example, one of them uses RPA to digitize its process to record maturity profiles across dozens of products when trades are executed and loans are disbursed. In the old

process, three different stakeholders, with varying levels of access to relevant databases, would fill in different layers of information in a manual spreadsheet. The process then moved backward, with each group performing redundant checks on what the other groups had entered.

To increase efficiency, the bank turned to robotics and workflow technology. Robots linked to each system extracted the necessary data, completing the entire workflow in under an hour, including data validation and cross-checks, which once took five days. It is not difficult to imagine similar RPA applications in processes such as CCAR production and reporting measures.

In processes requiring some human intervention, smart workflows can route and integrate tasks that humans and machines perform throughout the end-to-end process. Technology (such as cognitive agents) not only engages with stakeholders but can also work with a bank's back-end systems to ensure the streamlined delivery of the process. Furthermore, this technology enables risk to have full transparency, at the highest level of the end-to-end process, about ownership of specific steps of the process at any given moment.

Workflow automation and robotics can also be deployed in combination with advanced analytics (for example, machine learning) to further enhance the impact on efficiency and generate a particularly powerful form of automation. One northern European bank automated the workflow and the credit decision itself, reducing the time to yes for existing customers from approximately two days to a few minutes. The number of credit-office FTEs required to handle such cases dropped by about half. Risk can also consider specific technologies that could enhance automation—for instance, optical character recognition (which can make it possible to read documents digitally and extract the relevant terms) and natural-language processing.

In a few years' time, blockchain will also offer great potential for process automation, and to indirectly enhance risk management in many ways. See "The tantalizing potential of blockchain".

## Tracking decisions

One Asia-Pacific bank simplified and automated its SME/corporate lending process. It first redesigned the process from scratch, reducing both the need for multiple handoffs between functions and the number of steps, while streamlining the content of each. It also introduced a new workflow tool that provided a central location for documents, triage questions, and other requirements. The workflow tool sent each credit decision into one of four rule-based tracks:

- Fast track: just six screen clicks required to make a decision and virtually no wait time (about 60 percent of all cases)
- Green track: minimal human intervention, seven screen clicks, and two to eight hours of wait time (10 percent)
- Full track: more human intervention, seven screen clicks, and 24 to 48 hours of wait time (25 percent)
- Red track: the customer was declined credit (5 percent)

The bank used a rules engine to consolidate all business rules relevant for making the actual decision and isolate them from the application engine housing all the information elements pertaining to the formal application. The arrangement made the application engine easier to maintain.

### BLOCK 3: ADVANCED ANALYTICS AND DECISION AUTOMATION

Decisions too can be automated, through the use of mathematical models. To be sure, many decisions already are. But new models and algorithms can expand the range in three ways.

First, advanced analytics can handle more decision types, including prediction, the selection of optimal actions, and the extraction of insights. Second, analytics uses a wider variety of algorithms (including machine-learning algorithms such as random forest, XGBoost, and deep learning), which are now practical thanks to speedier and more powerful machines and richer data sets. These algorithms have been proven to increase accuracy in many cases.<sup>23</sup>

A critical question that the working groups discussed intensely was how to manage adoption and clearance by regulators and supervisors of new modeling and decision techniques. The short answer was that most banks had positive experiences with a staggered parallel approach, which we will discuss below.

The working groups were particularly interested in machine learning, which takes three main forms:

- **Supervised learning.** “Training data,” with known outputs, teach the algorithm to recognize similar outputs in the future. A target variable is defined, and the algorithm chooses from a set of predictor variables that best predict the outcome; typical examples include regression (linear and logistic), decision tree (including CHAID), random forest, and k-nearest neighbors. These algorithms are typically used to enhance predictions—for instance, predicting a fraud event or a stage, such as default or IFRS9 Stage 2, in a credit life cycle.
- **Reinforced learning.** An algorithm is provided with a reward function, often to determine the optimal action to select. Through a series of actual (trial-and-error) or simulated interactions with the environment, the algorithm learns the reward function of its actions within particular states of the environment. Examples of “learners” include the use of Monte-Carlo engines to assess the credit risk of structured specialized lending contracts,

## The tantalizing potential of blockchain

Blockchain, a form of distributed ledger, is a near-incorruptible list of transactions that is replicated, maintained, and validated concurrently by multiple stakeholders. Two of its features could make it attractive for risk managers. First it has inherent security through its distributed encryption technologies and a voting mechanism for maintaining the integrity of the list, as well as the potential to support so-called smart contracts, in which preset triggers automatically generate records. An algorithm can use these preconditions to execute the relevant part of the contract automatically and to update the distributed list, thereby providing for straight-through processing and greater efficiency. Second, and as important, blockchain is significantly enhancing levels of trust and security, making it much easier to put

automated controls in place and implement a de facto “built-in” level of basic risk management.

In banking, JPMorgan has adapted the Ethereum blockchain, with a private-key-encrypted transaction manager that shares only agreed details between the transaction's counterparts. This could allow it to run risk processes such as lending or portfolio management in a straight-through manner.

That said, our working groups actually thought that blockchain has the lowest direct impact of the new risk technologies. They see it as an asset in the front line, where it can instill higher confidence in authors and counterparties and reduce market and operational risk.

SARSA to define optimal collection strategies by learning the behavior of customers, and fictitious play in the risk management of large projects.

- **Unsupervised learning.** This has no predefined target outcome; rather, it is used primarily to extract insights. It examines the data and suggests ways to cluster them, which can then be augmented with additional knowledge. Examples of such clustering include the segmentation of clients in early-warning and collection portfolios, as well as techniques (such as K-means and PCA) to identify anomalous transactions in anti-money laundering (AML).

Third, advanced analytics can surface new types of insights buried in inaccessible formats (such as natural-language documents) or just not analyzed (for example, network risk from the failure of a systemic supply-chain node). Often, advanced analytics does this by using new forms of data. For example, semantic analysis, a branch of natural-language processing, has been successfully applied to news items to provide market sentiment on corporates (and thereby a credit-risk factor). Natural-language processing can also be transformed into natural-language generation, removing much of the risk-reporting burden. One fintech recently used it to generate workflows that streamline and automate the documentation of bank and regulatory policies in existing risk processes. On another note, some banks are extracting information from balance sheets and income statements to form a picture of the SME supply chain. They then apply graph-theory techniques to monitor the network risk inherent when large players dominate parts of such supply chains.

The working groups noted that analytics is advancing rapidly, with new applications arriving all the time. For example, some European banks are building microtargeted credit and churn models for SME customers; these then suggest the optimal case-specific interventions. This approach really works—one bank reported a 20 percent increase in cash collections, a 20 percent reduction in capital expenditures, a 10 percent growth in sales of new products, and a 20 percent reduction in churn.

Banks are also using new analytics to improve existing models. For example, a US bank combined deep-learning methods with its existing logistic-regression

models to improve the GINI of its CRE credit-loss models by 30 percent. The bank used Trepp's publicly available commercial real-estate data, analyzing more than 100,000 loans and 18 years of performance history to identify what drives default. The results spanned loan characteristics, asset characteristics (occupancy rate, rentable area), traditional finance ratios, and geographic data. A bank in Europe built a Monte-Carlo-based simulation model on CBRE data to achieve GINIs of about 70 percent.

A few guidelines for risk functions emerged from our research. First, experimenting with and understanding these techniques are often straightforward for risk modelers and open-source software (such as Python, R, and TensorFlow) provides a platform with many ready to use techniques. Critically, risk teams will need data scientists (discussed below) with business acumen and functional knowledge to combat the all-too-common problem of overfitting data. The experimentation point is critical, since for risk—as discussed earlier—"special conditions" apply, as it is the safeguard of the bank. A clear "lab" approach in which new things get tested thoroughly will help a lot.

Second, the analytics building block requires seamless integration with the others because it can yield benefits in both risk management and other functions. For example, machine-learning algorithms can be used to build up cognitive agents (such as IPsoft's Amelia) that can facilitate an overall user-friendly lending process.

Third, confidence can be built through testing, and by operating tested and cleared processes in parallel with novel techniques. This can give assurance to both bank management and regulators/supervisors. Risk teams should expose both communities to test results and clear a path to trust by providing a clear fact base.

Finally, risk can start with simple steps. Many working-group members described how they did not start by altering decision models, but rather put them in a "digital wrapper" to replicate the manual process in which decisions are often embedded today. In other words, the model followed exactly the same rules as before, but was digitally embedded at the right point in the process (at the key customer decision moment). No new approval is needed from regulators for such a move. Then, in a well-staggered and controlled

approach, these risk teams added small new elements to the digitally wrapped model—either new data or other decision techniques.

## BLOCK 4: COHESIVE, TIMELY, AND FLEXIBLE INFRASTRUCTURE

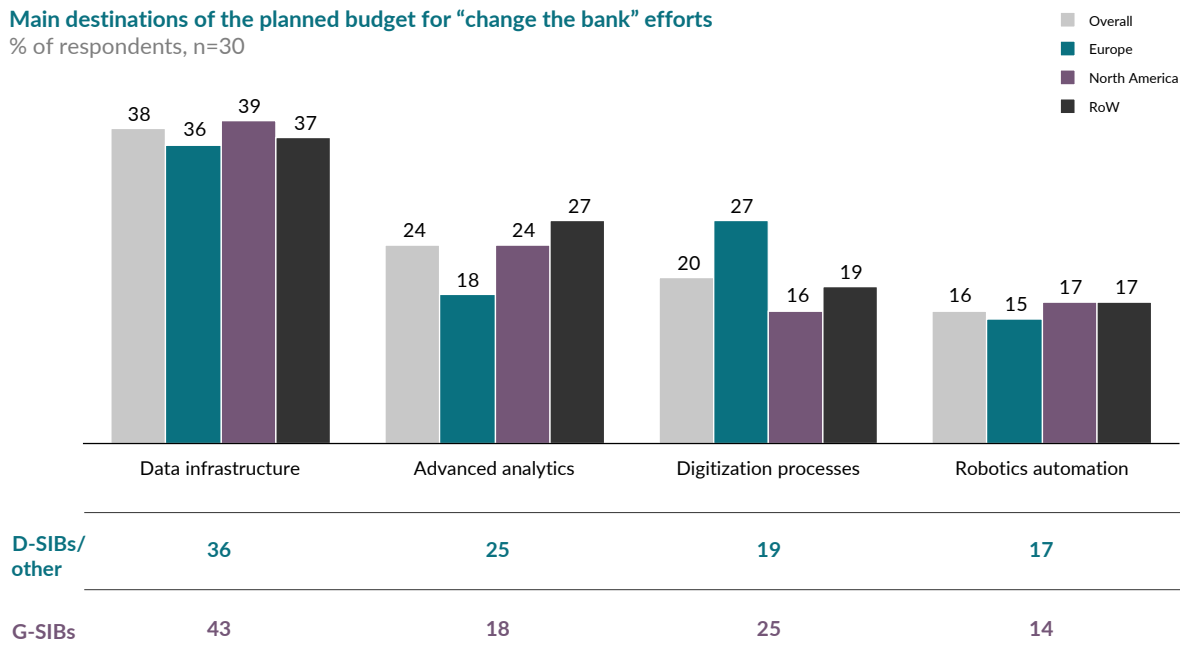
Exponentially growing masses of data have stressed banks' legacy data architectures, which are often linked to a very large number of sources of truth—at one bank, up to 1,000 sources—and intermediate data pools. That's probably why fixing the infrastructure is a key objective of banks' change efforts (Exhibit 19). Linking to well-defined "golden sources of data" can help ensure that a bank adheres to the highest standards of data quality. To achieve this, banks increasingly look to innovative technologies that can integrate with the existing data infrastructure. Cloud and data lakes can lower maintenance costs and allow banks to apply analytics more quickly to a more reliable set of data. Yet neither has caught on with very many risk groups to date.

The cloud underpins many potential improvements to risk processes by freeing risk from the constraint of legacy IT, cited by more than 80 percent of the survey respondents as a major challenge. The cloud's flexibility and scalability make it an integral piece of the infrastructure to support risk's digitization. Cloud computing pools resources and makes hardware "virtual," meaning that it can be rapidly scaled up (or down). The cloud is delivered through one of three as-a-service models:

- Infrastructure as a service (IaaS) is the most basic offering, providing users with computational and storage capacity. Amazon Web Services and Rackspace both offer IaaS.
- Platform as a service (PaaS) adds standardized and reusable business components, which are often sector-, geographic-, or business-specific APIs and analytics. Force.com, IBM's SmartCloud, and Windows Azure are all PaaS offerings.

## Exhibit 19 – Most of the budget for change efforts is aimed at improving IT and data infrastructure and implementing advanced analytics

**Main destinations of the planned budget for "change the bank" efforts**  
% of respondents, n=30



Note: The delta to 100% for each region were responses for a category titled "other."  
SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

- Software as a service (SaaS) is an actual application hosted in the cloud. SaaS offerings, which now span almost all industries, include Box, Office 365, Salesforce, and WebEx.

Cloud technologies can be either private (hosted on the premises or on dedicated servers within a facility) or public (hosted off-site in a shared facility).

Security and regulatory compliance concerns are the major barriers to adopting the cloud,<sup>24</sup> but they are already less significant than they were even a few years ago. SaaS, for example, is now often found in banks; providers such as Salesforce and Workday have been successful throughout the industry. IaaS, once considered far too risky even to consider, is now becoming mainstream in banking. Amazon's GovCloud, which hosts sensitive data and regulated workloads—some even belonging to the US National Security Agency—suggests that the cloud may indeed be suitable for sensitive banking data.

Data lakes—one example of a flexible, scalable part of a hybrid data environment—can be of great value to a digitized risk function, since they process a high volume of structured and unstructured data. The data lake itself doesn't necessarily generate great value; rather, it is the way the data lake integrates with simplified data warehouses that will generate the most value for banks. Some may even find it preferable to modify their consolidated data warehouses.

Data lakes can help risk in many ways. They allow for (near) real-time data ingestion and processing. They add significant processing power for advanced analytics and signal detection. Data lakes allow for new data-processing techniques. They make possible low-cost data storage that indefinitely houses highly granular data with full history. And they provide for storage of many types of data (structured, unstructured) in the same repository.

A number of banks now use data lakes; among our North-America-based survey respondents, 60 percent either already have them or plan to migrate to one in the next three years. As Exhibit 20 demonstrates, over 70 percent of banks intend to move to a data lake within the next three to five years or have already done

so. We emphasize the need for each bank to assess its situation and determine its data-infrastructure needs accordingly.

A data lake is not a one-size-fits-all solution. What is most crucially needed is a flexible data environment that can free a bank from a fragmented data architecture with redundant data warehouses and replicated data. Data lakes, as Exhibit 21 shows, can be effective in such a data environment.

The working groups offered two guidelines on the critical role of the risk data infrastructure. Since it must support several other building blocks, it has to offer seamless access to data and connectivity with bank systems. Second, the infrastructure should be the place where risk most clearly models a core value on which the entire future vision depends: digital resilience. Infrastructure and systems should flex in ways that resist breaches and defeat attacks.

Beyond the most important angle discussed above—using these infrastructure techniques for risk management—there is a second important aspect. Risk will need to further build out its capabilities in these areas to act as an effective second line of defense across all these topics.

## BLOCK 5: SMART VISUALIZATION AND INTERFACES

Smart visualization technologies and smart interfaces allow users to access intelligent business insights in a more intuitive and customizable way. The key technologies behind them include interactivity and dashboards, as well as augmented-reality technologies and cognitive agents.

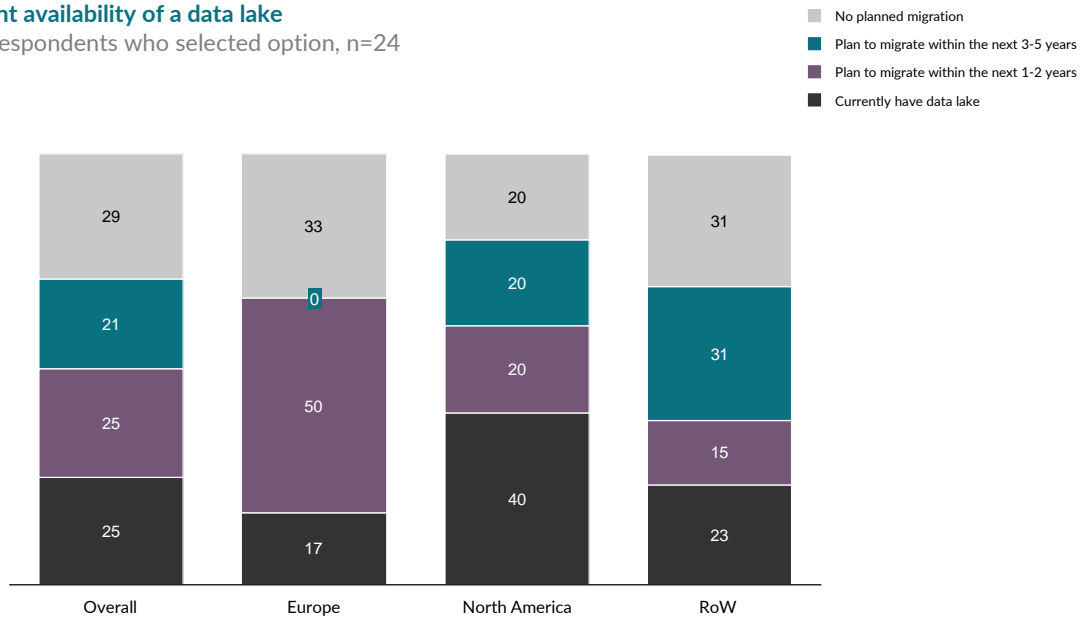
Customers make up one critical group of users because digital visualization tools can help them better understand their spending needs and financing capacity. A single app, replete with intuitive interfaces and functionalities, could conceivably embed itself across an entire customer journey, offering visualization tools throughout. Within apps and bank websites, customers can look at dashboards that present their spending histories and other information in highly intuitive ways, without any need

24 Nagendra Bommadevara, James Kaplan, and Irina Starikova, Leaders and laggards in enterprise cloud infrastructure adoption, McKinsey & Company, October 2016, McKinsey.com.

## Exhibit 20 – Most banks expect to use data lakes in coming years

### Current availability of a data lake

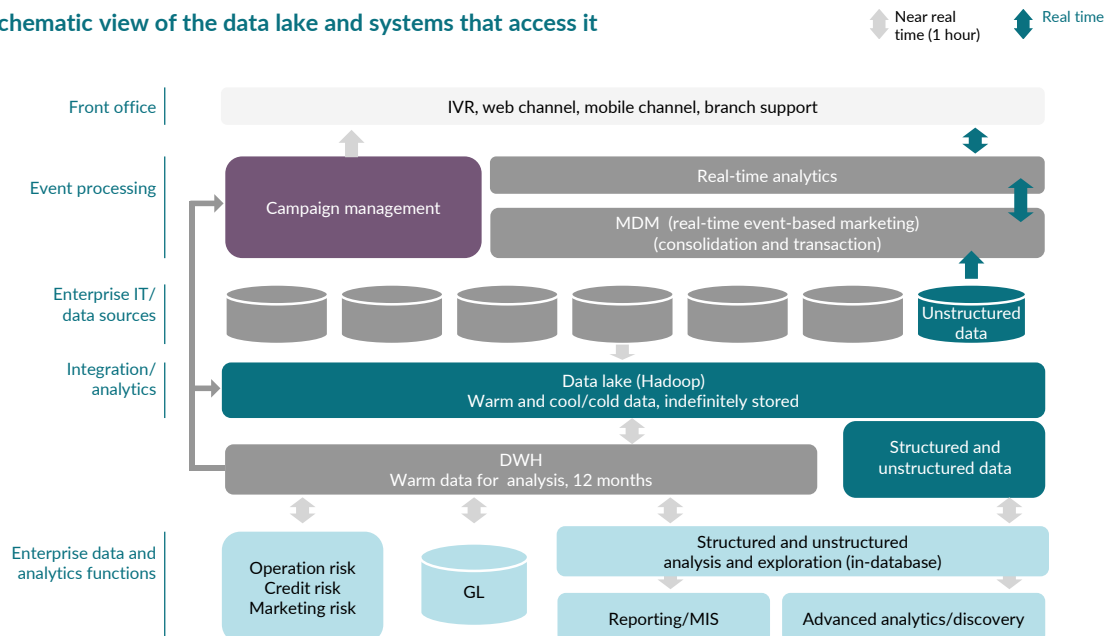
% of respondents who selected option, n=24



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Exhibit 21 – The data lake provides flexible access for analytics applications

### A schematic view of the data lake and systems that access it



Data storage based on data temperature. (hot – operation system usage – warm – cool – cold)

SOURCE: McKinsey



to parse through receipts and construct a view of their spending histories themselves. Working-group members also reported that visualization of financial status and some transparency into and reasoning behind the risk decision taken (for example, why a loan had not been granted) were key drivers of customer satisfaction in their firms, similar to speed of service. In some instances banks are equipping their interfaces with the ability to change parameters, letting customers see the direct implications of, say, changing the loan amounts.

One of the more advanced visualization technologies that can enhance the customer experience is augmented reality: information is digitally overlaid onto a real-world environment. This could take different forms. It could mean customers would get risk-informed information as overlays to objects they are looking to buy. So in mortgage or auto loan cases, for example, customers would get information on cash available, the suggested amount to use given other risk positions in the portfolio, suggested maturity, and amounts for potential lending. Another use case could be internally focused, where lending applications and portfolio information could be displayed in very intuitive ways using augmented and virtual reality. Manipulations on data, such as analyses, drill-downs, confirmations, and clearances, could be done in easy and intuitive ways—say, checking off, signing, and “moving” positions from one portfolio to the other. It would help employees focus on the key points, which would make their work easier and faster.

Risk and business users, a second critical constituency, can customize their information in ways that improve decision making. To perform multidimensional analyses on consolidated data, often on an ad hoc basis, business users can look to increasingly advanced visualization and dashboard applications, such as Tableau, Alteryx, and Qlikview, which help risk managers and business leaders to “slice and dice” risk data according to their own preferences. Thanks to these tools, informed decision making can become faster and more streamlined. Banks can also look to fintechs to help them introduce enhanced visualization technologies.

Augmented reality too might help risk managers to make decisions, much as it is being used to enhance

the customer experience. In the future, a global bank’s risk executive might view an interactive map through augmented-reality-enabled glasses, homing in on specific regions or countries and quickly overlaying risk data onto the map. These executives might even directly input new proposed risk limits through the same platform.

Banks have varying ambitions for visualization technologies, but the ability of smart visualization and interfaces to aid decision making was clear to survey respondents and working-group members. Indeed, almost 20 percent of the respondents predict that the more nascent visualization technologies, such as augmented (and virtual) reality, would have the highest impact on risk management. That’s a notable figure when you consider how generally conservative the risk function is.

## **BLOCK 6: EXTERNAL ECOSYSTEM**

Another element of digitizing risk is accessing external providers—fintechs, utilities, and collaborations with peer banks. Getting these relationships (or delivery models) right is a significant success factor because they can improve solutions and free up resources that can be redirected elsewhere.

### **Fintechs**

About 70 percent of risk managers surveyed see fintechs as enablers rather than attackers, though some certainly are attackers and should be addressed through a bank’s corporate strategy (Exhibit 22). Fintechs can help collect bad loans and match collectors and debt holders with sophisticated analytical and behavioral algorithms. They can act as intermediaries that focus on accessing the customer base of a bank without displacing it; for example, they can source valuable information about a bank’s customer base to improve models. Fintechs could also help risk to deliver better solutions across several disciplines, such as risk data support, risk-technology development, operational-risk-loss mitigation, and risk portfolio management.

One specific kind of fintech considers itself to be operating within what’s called the regtech space: they offer digital solutions that help banks manage and

meet regulatory requests. One CEO we interviewed said that regulatory-focused fintechs allow banks to “address the cost side” of regulatory management and to “increase transparency around risk.”

The working group suggested some guidelines for collaborating with fintechs. To minimize potential reputational risks, it is crucial for risk and the bank to undertake comprehensive due diligence on potential fintech partners. Second, don’t forget that these partnerships may be subject to regulatory scrutiny. As part of that, it should be clear that given increased attention to vendors and outsourcing, every risk framework and risk-management approach will need to be expanded to the parts of the value chain that are served or supported by a fintech. Third, the trigger to enter into a collaboration with fintechs should be strategy, not tactics. (One fintech CEO told us that banks often decided to engage his company because of tactical factors, such as an avoidable default.) To

participate in these collaborations on a strategic basis, a key first step is ensuring that risk and the front line are on the same page; business must be part of the strategic solutions that risk often needs.

## Utilities

Industry collaborations between banks in risk- and regulatory-related issues are now on the rise, particularly to reduce duplicative efforts. Industry utilities are springing up, and some risk teams already use them to fight money laundering, as well as for know-your-customer efforts, third-party risk management, and compliance with the FRTB. Once banks have considered the benefits and risks of an industry utility, they can generally establish it by transferring an existing platform from one or more banks to a shared platform, partnering with or purchasing an existing provider, or building one from scratch.

## Exhibit 22 – Fintechs are seen mainly as enablers for digitization

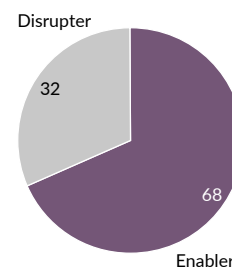
### 23a: Risk disciplines disrupted or enabled due to fintech and new technologies

Spread of mentions – enabling exceeding disrupting, n=32



### 23b: Sentiment on fintechs

Share of participants in %, n=32



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

The scope and application of industry utilities are expected to increase in different risk disciplines, such as stress testing, risk-portfolio management, model validation, risk-data support, emerging risk, and operational-risk-loss mitigation.

For stress testing, industry utilities can help reduce duplicative modeling efforts across banks. For portfolio management, banks can share rating-infrastructure information. Utilities can provide model-validation services by standardizing and automating both processes and tools. They can store data and clean up vendor information to support vendor-risk assessments and ongoing monitoring. They can also provide data-management and -aggregation services across risk, finance, and treasury. In addition, they represent an opportunity to counteract emerging risks (such as cyberrisk) and may be useful for sharing analytics and use cases to meet compliance surveillance requirements (for instance, in trading).

Before entering into an industry utility, a bank must assess certain key considerations. First, it should ask itself if it is practical to collaborate with others in the area at hand. It should look closely at developments in cyber and IT risks, and exposures that might arise through collaborations with others. Regulators are likely to look closely at these new vectors and their implications for the risk appetite, policies, and control frameworks. Then it has to know if it might be compromising a competitive advantage by entering into a utility partnership. Finally, it should evaluate the regulators' views and potential concerns about this shared utility. Even with one in place, the ultimate responsibility for meeting regulatory requirement and managing risks rests with the bank.

## **BLOCK 7: TALENT AND CULTURE**

Not surprisingly, talent is a crucial building block for achieving the vision of digital risk: more than 40 percent of survey respondents see talent as a major challenge to it. The working groups identified a diversity of talent—particularly the optimal blend of analytical and digital skill sets to supplement the existing risk expertise—as the main objective.

As more and more processes and decisions are automated, digital risk will require increasingly

analytical skills from its personnel. Almost three out of four survey respondents identify data science and modeling expertise as the most critical skills required in digitizing risk (Exhibit 23).

Nevertheless, there is a wide consensus that core risk-management skills will remain crucial for interpreting raw data and deriving appropriate insights. Although analytical profiles will represent a relevant share of the risk population, the majority is expected to consist of traditional risk managers (Exhibit 24).

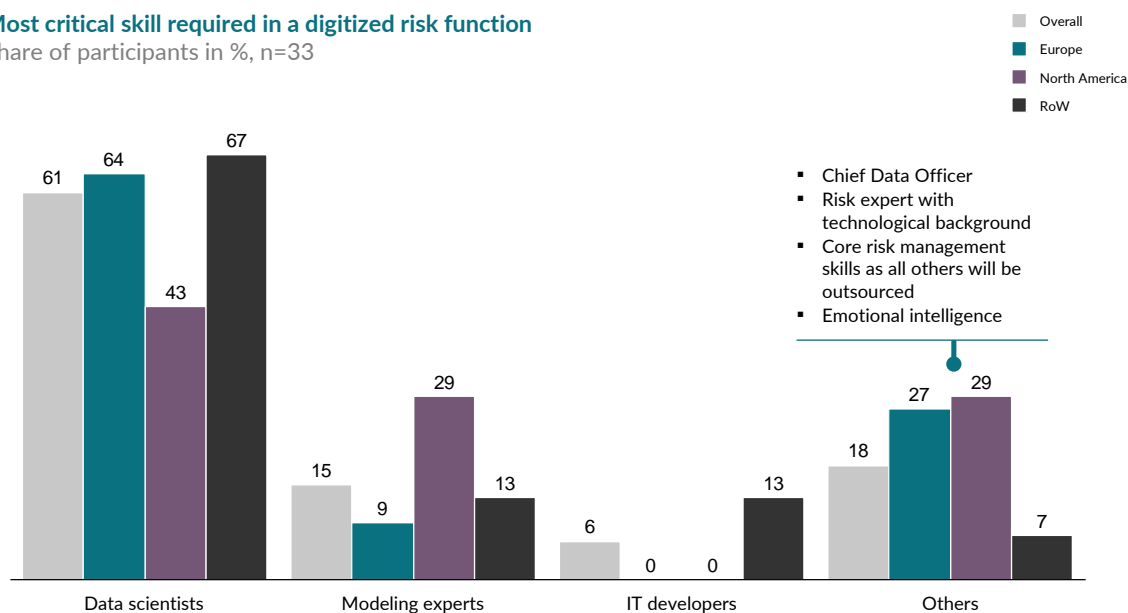
It isn't easy to hire and train more data scientists. As one executive put it, "The growth of the 'dataverse' is even outpacing the people who can understand the data itself." He added that "a software layer must be encoded into the things that data scientists would do, allowing others to perform many of the tasks of a data scientist." In other words, risk should digitize what its data scientists do, and offer it to others—DSaaS, to coin a phrase.

While this is a compelling vision, it is a few years away. We heard three guidelines from the working group. First, risk's talent management and hiring approaches have long been dominated by very classical procedures. To be successful in future, risk will have to find new, more innovative ways to find and manage talent. As mentioned, more collaboration with fintechs and other vendors is certainly one way. More collaboration within the bank—for example, by building a joint advanced-analytics center of competence—is another. Banks can be even more inventive. Instead of reactive recruiting through traditional channels (like job boards), they should scout out and join communities where digital talent resides (conferences, online developer forums), and put themselves directly in front of the talent pool. This sends a signal that the bank wants to be at the forefront of digital, a core value to the developers and data scientists that risk wants to hire. It will help that, as working-group members reported, risk has become much more attractive to talent again in the years after the crisis, as the ethically correct place to work, and even the platform from which to make the (financial) world a better place. Connect those attributes with digital, and it makes for a compelling job profile.

## Exhibit 23 – Risk will require deeper analytical skills ...

### Most critical skill required in a digitized risk function

Share of participants in %, n=33

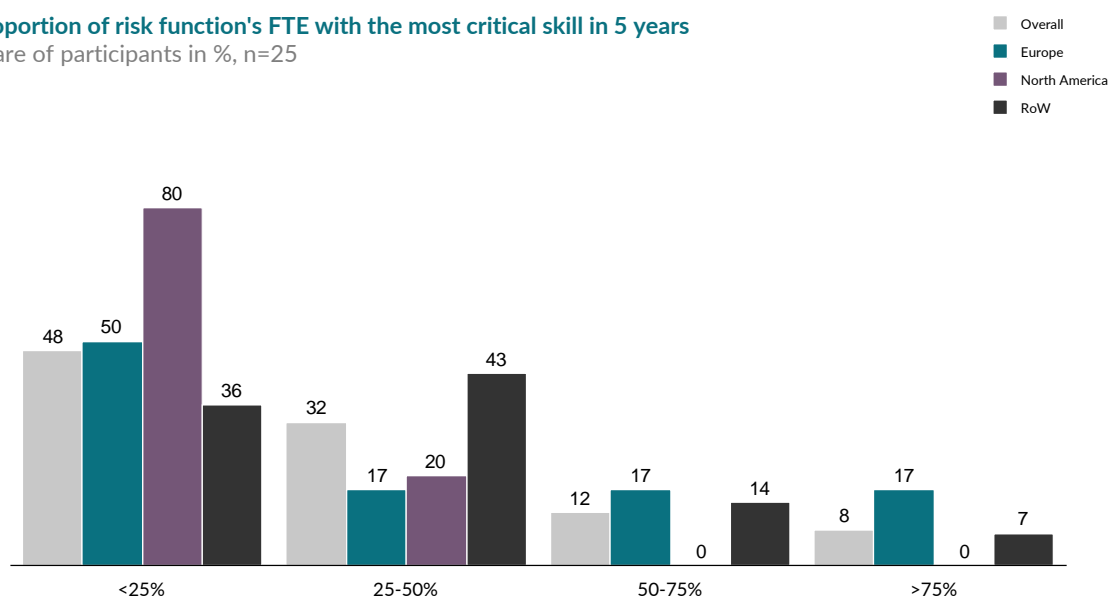


SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Exhibit 24 – ... but risk skills will still be paramount

### Proportion of risk function's FTE with the most critical skill in 5 years

Share of participants in %, n=25



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

Second, risk also needs to shrink the timeline for recruiting. The objective is simple: don't allow competitors to entice candidates away. Try to make an offer within one month from your first contact with a qualified applicant.

Finally, risk needs to be flexible on qualifications. It should hire based on eagerness and potential to learn the specialized details of the job. Many people working in technology do not have formal qualifications, and most won't have a risk background. Risk should develop a training program that allows less traditional hires to become well-versed in the core control function of the risk mandate.

A culture of innovation, another component of this building block, should pervade the whole organization, not only the risk function. Such a culture has three pillars: a test-and-learn mind-set, a more external orientation, and a less hierarchical structure.

In a digital-risk era, risk managers will learn by experimenting and failing. With a test-and-learn culture and flexible, agile ways of working in place (see Chapter 4), risk personnel will be able to develop new digital risk technologies continually and be flexible enough to deal with new customer trends and unforeseen regulatory requirements. However, this needs to be run in a "risk-special" way. The "try fast, fail fast" concept should be rewritten as "try fast; fail fast and safe; try again, better and safer." But even this softer concept will require risk to give up on its conservative culture, and develop a culture and mind-set of risk-managed agility.

It will also mean some hard measures, like parallel operations with new and old processes running alongside each other, effective (and ideally digitized) control frameworks), and a risk-specific process design that is "fail-safe built" and has controls integrated by nature. And of course, risk will also need to be mindful of potential regulatory reactions to a broad cultural shift within the function.

The nature of the digital world also requires organizations to embrace the external environment. The technology and analytical skills required in risk evolve constantly. Risk needs to be outward looking to keep up with best practices. People must be open-minded about new ideas and willing to challenge old orthodoxies.

A lower level of hierarchy is also crucial for digitized risk functions. Flat hierarchies enable a test-and-learn culture: they give risk personnel more room to adopt a (safeguarded) trial-and-error approach rather than the traditional feedback cycle that characterizes staid, hierarchical organizations.

At the target state, risk FTEs must be digital-savvy, with fluency in the languages of both risk and the business, and operate within an agile culture that values innovation and experimentation.

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*Every bank will need to assess its strengths in each of the seven building blocks, and the importance of each to its strategy. This will reveal gaps and priorities, which must be filled through a program of action. As we discuss next, the working groups provided many insights into the design and execution of such a program.*







# 4. A road map for successful transformation

So far, we have established that the risk function must transform for the digital era, set out a vision for risk, and suggested the blocks from which the vision can be built. Now, we discuss how to engineer the required change.

A digital risk transformation is anything but straightforward. It includes all the elements of a typical digital transformation, such as alignment among top executives, prioritizing specific high-ROI and time-bound initiatives, agile sprints to develop minimum viable products (MVPs), new talent profiles, and changing the culture to create more and better opportunities and to promote adoption. Lastly, it also triggers a fundamental rethink of the organizational model of risk.

However, more than in other parts of the bank, a transformation of risk must be handled with consummate care. Risk management is a fundamental banking activity, spanning the whole institution. Risk's decisions are intertwined with the day-to-day running of a bank. Risk is the bank's watchdog, and no digital improvement is worthwhile if it keeps the dog from effectively doing his job.

Risk is also frequently the face of the bank in its dealings with regulators and supervisors. Requirements must be weighed at every step, and live launches and prototypes of solutions must be carefully designed with that in mind. Regulators can add constraints and specific requirements for transformation programs, affecting the final output and timeline.

In sum, the digitization of risk has to be done with exceptional care, and it may take more time than it would in, say, digital marketing. But that does not mean it is impossible. Digital risk transformations are a reality. Forty-three percent of the interviewed respondents (and 70 percent of those at G-SIBs) currently have a digital risk transformation in place. The survey, working groups, and interviews revealed the secrets of making digital risk a reality. In this chapter, we will review these insights, as they pertain to the three main thrusts of a transformation:

- **Defining a vision for digital risk**, including a view on the key activities risk will perform in the future, and in what way; the corresponding mandate and role of risk; and the metrics that will be used to determine success

- **Determining the opportunities for digitization**, through a bottom-up assessment of risk processes, a plan for applying digital tools to the most promising activities, and a business case that estimates the total impact
- **Running a swarm of initiatives** that meets the strategic goals and captures the defined opportunities, through a considered approach to governance and the operating model and new techniques such as the agile sprints

## SETTING THE VISION

Banks that have successfully digitized risk typically began their journey by setting an aspirational vision for the function. Risk now needs to take a 360-degree view of itself and the digitizing bank, consider evolving risk types and directives and potential changes in the bank's business model, and completely reimagine its processes in a way that centers on customer needs and expectations. These considerations will inform a digital risk vision that sets the ambition for the program and clearly announces goals for both risk and the bank.

The vision should, in particular, *articulate risk's mandate and role*. It should also define a top-down operating model of risk within the digital bank of the future, its governance and organizational model (which might be fundamentally different from today's), and its talent management and culture. And it should not only offer an inspiring message but also define ambition precisely, *by designing metrics that can be used to gauge success*. (The vision will also have bearing on risk's governance, operating model, organization, and culture, as we discuss below.)

## Articulating the future activities, role, and mandate

Digitization will bring about new opportunities and challenges. As the bank and risk consider the function's mandate and role, they should measure digital's new potential—and challenges—in connection with every risk activity. Advanced-analytics tools, for example, will allow the risk function to provide strategic insights that can help steer the bank. Risk may have a greater role in safeguarding the bank from nonfinancial risks associated with digital, such as cyberrisk, data protection, model risk, and reputational risk. Substantial

opportunities may come from taking advantage of automated tools or data to track evolving risk under stressed scenarios. Some working-group members go even further and say that risk can start thinking about acting as a profit center. For example, some banks already offer disciplines such as valuation modeling, risk modeling, and analytics as a service to internal and external clients.

Risk will certainly evolve, providing additional oversight, insights, and challenges that propel the bank's strategic vision. Indeed, most of our survey respondents expect risk to take on more activities and responsibility. At the same time, they expect that risk will remain the bank's backbone, making sure that all lines of defense are working.

An important factor in the discussion of risk's portfolio of activities will be the bank's interpretation of the lines of defense in its processes, and particularly in those journeys with heavy automation. For example, if underwriting decisions are made on the spot in a self-serve app on customers' smartphones, then what is the first line of defense, and what is the second?

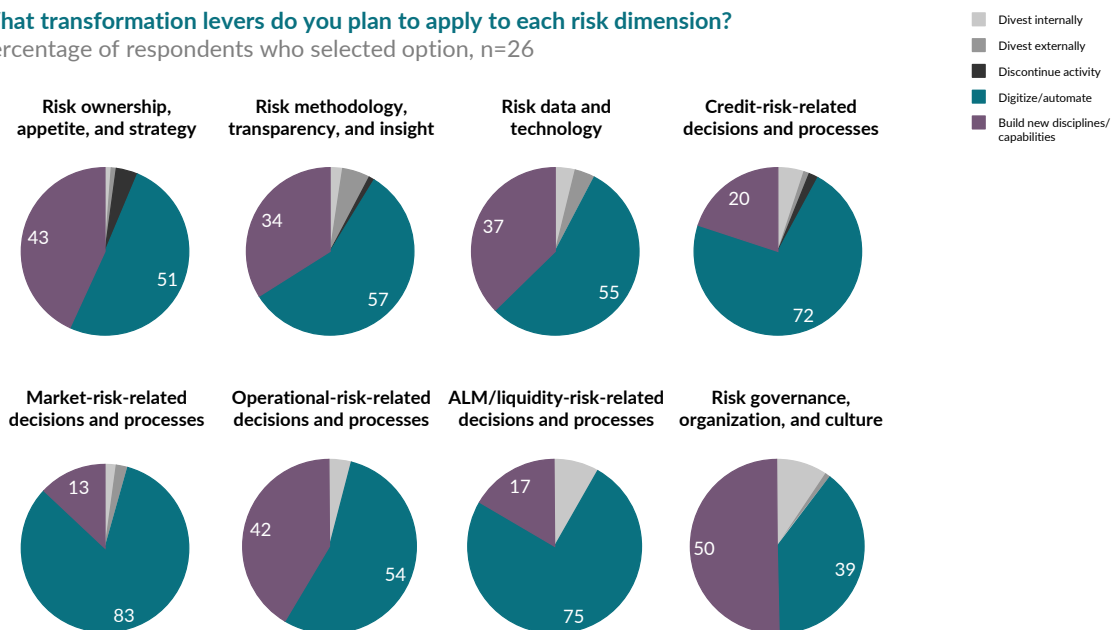
With this far-ranging, open-ended view, the bank and its risk group should review all of the current and potential activities and decide for each whether risk will maintain ownership of the activity or whether it should be moved to another group in the bank or a third-party provider. For those activities that risk retains, it must decide on its role, typically either a pure "controller" or as a strategic partner. Additionally, it must agree with the bank on areas where the risk function will have veto rights—for instance, strategic risk and conduct decisions that occur during the normal course of business, decisions on matters that breach the bank's risk appetite, or decisions that are less material but occur in areas where the risk-control framework is weaker.

Some indication of how banks are working through these issues emerged from the working groups. Right now, the survey shows that only a few banks are thinking about divesting risk activities to other groups in the bank, and fewer still are thinking about outsourcing them to third parties, though this may well change as risk's portfolio changes (Exhibit 25).

## Exhibit 25 – Automation and building new capabilities will be risk's dominant levers

### What transformation levers do you plan to apply to each risk dimension?

Percentage of respondents who selected option, n=26



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

## Setting success metrics

Risk's mandate should be underpinned by well-defined and easy-to-understand success metrics. Two forms of metrics are vital: milestones and key performance indicators (KPIs).

*Milestones.* Risk sponsors and the project-management office (PMO) should work together to outline the ultimate goals they want to achieve and translate this into measurable and communicable milestones linked to outcomes. For instance, 60 percent of the underwriting decisions for SME loans should be automated within the first three months of the transformation journey.

*KPIs.* Key performance indicators should be defined hand in hand with success metrics and based on the objectives of the digital risk transformation. Given the risk specificities we discussed earlier, a clear set of “shadow” risk indicators in parallel to the performance indicators is key to reassuring transformation owners, key sponsors, and regulators of the real “risk-adjusted” success.



## UNDERSTANDING THE OPPORTUNITIES

Leading risk teams use three steps to find and prioritize the most promising avenues of digitization.

### Diagnose the potential

A good first step is to develop a thorough view of the complete set of risk processes, including the associated risk activities and risk disciplines. Each process should be assessed to identify those that offer the greatest opportunity in terms of revenue enablement, loss/risk reduction, and efficiency or cost reduction. At many risk teams, five processes typically offer good opportunities (credit approvals, risk appetite and limit setting, modeling, stress testing, and risk technology/cyber risk). Opportunities vary by institution, so banks should perform diagnostics to determine their own unique configuration. Banks should also review their current risk and business digitization initiatives with this new approach and validate their potential impact. It is not uncommon for certain initiatives to be paused or rescoped to maximize impact.

### Apply solution levers to each opportunity

Once the greatest opportunities have been identified, risk teams need to evaluate all these opportunities (such as credit-risk transaction approval, AML, and so on) to determine the optimal tools and techniques to apply in their digitization. Four of the building blocks are particularly relevant here: process and workflow automation, advanced analytics and decision automation, smart visualization and interfaces, and external ecosystems. For example, the digitization of AML will typically involve some use of advanced analytics (often machine learning) to clean up the data and remove false positives; in case management, the application of automation to workflows will be particularly important. Some banks are also partnering with fintechs in the external ecosystem to accelerate their innovation in rapid credit scoring.

Banks should not wait for perfect starting conditions before mobilizing; there are typically several obvious no-regret moves that can be taken immediately. This might involve using readily available bank data to build a core analytic module, and integrating new modules as other data sources become available. Alternatively,

integrating two or more of the data sets on hand can generate significant value.

With the digitization techniques identified, banks can start to think about the process. They should plan for a controlled and “risk-aware” change process, in which MVPs are particularly relevant. A tightly focused scope and modest ambition can help the bank understand mechanics, run the proof of concept, and then scale.

Initiatives do not require complete reinvention; instead of creating highly sophisticated solutions, they can build on previous efforts. Indeed, it’s a good idea to understand the links to other digitization efforts already underway, in risk and throughout the bank. An effective initiative may simply improve an existing analytical solution by adding new cutting-edge algorithms through iterative test-and-learn processes. The design, engineering, and change management may then be embedded in the operating model. In fact, 75 percent of current digital risk transformation plans

follow this careful approach, rather than embarking on a “big-bang” transformation (Exhibit 26).

### Develop the business case

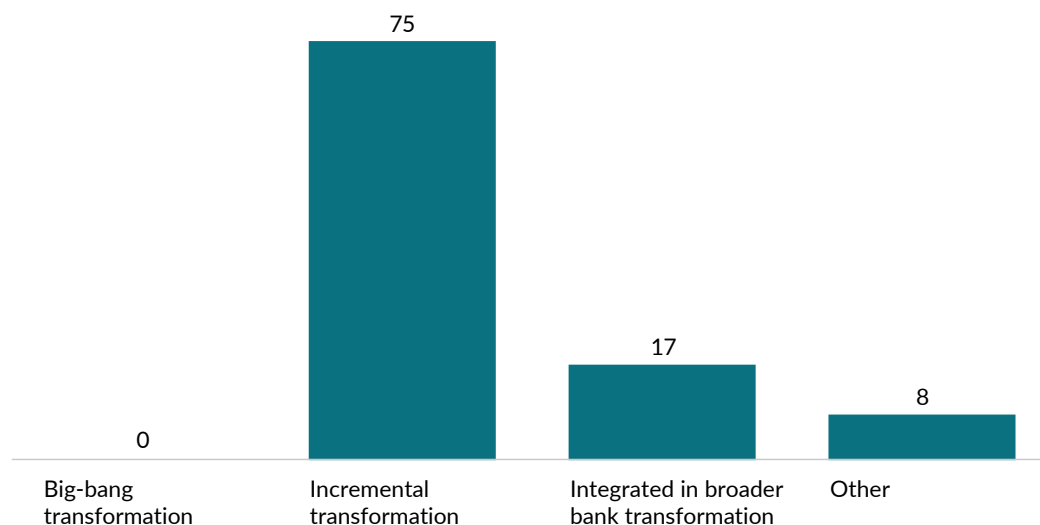
The business case defines the target value and savings that can be captured based on the opportunities identified, as well as the necessary investment based on the solution levers applied, initiative by initiative.

To determine potential value, three types of benefits should be estimated: expansion of current revenues and new sources of income, risk and loss reduction, and cost reduction. For instance, in digitizing some portion of mortgage underwriting, a bank could estimate the potential efficiencies as well as the revenue uplift from an enhanced customer experience. As they develop the business case, banks must bear in mind the special needs of risk. First, there is a clear and strict boundary condition: the overall soundness of the control function cannot be compromised. Second,

## Exhibit 26 – Risk groups are adopting an incremental transformation approach

### Description of the transformation approach

Share of participants in %, n=12



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

given the interconnectedness of risk with the rest of the bank, the business case is driven not only by the impact within risk but also by the impact risk initiatives enable in other areas. As one interviewee put it, “There is no way channels can be truly digital without working with risk.”

A firm understanding of the ROI of each of the initiatives will allow the bank and risk to prioritize initiatives appropriately. Some of the initiatives can be accomplished quickly, delivering rapid impact and financing the rest of the transformation.

## RUNNING A SWARM OF INITIATIVES

The banks and fintechs offered a number of ideas about how to run the change program while taking into account the particular needs of risk. Their guidance falls into four main categories: drawing a road map, defining governance and the operating model, setting an agile pace, and helping people make the change.

### Draw a road map

Complex journeys can be confusing. Banks can design a road map—a single if somewhat large sheet of paper—that includes a set of precursor activities (such as mobilizing talent and putting governance in place). The map should outline the work to be done in data management and infrastructure, which will affect the entire effort. And it should show a series of waves of use cases, or initiatives. These initiatives would naturally be the priorities identified earlier. Their sequence should also consider dependencies; for example, it is better to transform a journey front to back rather than to digitize elements of various journeys, which might result in an exceptional experience until the final step when a manual process kicks in, squandering the goodwill earned up to that point. Other factors involved in the sequencing of initiatives include the progress of similar work underway elsewhere in the bank; the anticipated reaction (agreeable or challenging) from regulators and supervisors; and the safety precautions that each initiative needs, such as running new and old processes in parallel for some time.

### Define governance and the operating model

Good structure is important, not only for the success of the transformation, but also because many banks find

that the transformation model can evolve naturally into a long-term organizational structure for the function. Three governance approaches work well for executing a successful transformation program. All work best if the organization shifts to an agile operating approach ensuring efficiency and speed.

- **Individual projects.** This model works best when there isn't enough organizational support to launch a large-scale effort or if legacy systems are strong enough to enable long-term digitization. The risk leadership measures delivery—whether the project is on time, of a sufficiently high quality, and within budget. This is the most common approach and may use a build-operate-transfer (BOT) model: a new process is built outside of core operations and later integrated in the core business; the old process is then phased out.
- **The digital factory.** Units that follow this model lead the change effort, prioritize and coordinate across initiatives, and steward the change budget. Such a unit is set up as a service center, which some are calling a “digital factory,” and measured on effective and efficient delivery (Exhibit 27). The program handles change activities, handing the back-end integration and run-rate operations back to the relevant units. This model requires moderate organizational support. The bank will also have to preserve a good portion of the legacy systems in the target state.
- **Digital-native approach.** A new organizational group leads the change effort and operates the end products and IT systems. The group, which builds new systems in a digital-native environment, can be set up as a separate business unit reporting to the head of the organization and run in parallel to the traditional bank. It requires full organizational backing, with a sufficient budget and talent. This approach is most appropriate when existing systems are not ready for change and require a complete overhaul. However, it is also the most difficult and ambitious model for risk to undertake and operate.

As part of governance, risk organizations should also think about their relationships with partners and regulators. Risk will need to build the skills to manage an ecosystem of partners, especially fintechs and



regtechs. Risk must also communicate openly with external stakeholders, including customers, other financial institutions, and regulators, within banking and potentially other industries.

Risk will also need to settle on an operating model for the transformation. The massive “waterfall programs” of the past are less common in the industry. New methodologies and concepts (such as agile and test-and-learn) are gaining ground. These approaches allow teams to focus their energy quickly on projects that have a real impact, while abandoning the laggards or those that are discovered will not have the expected impact.

### Set an agile pace

Agile ways of working are the key to a digital risk transformation program’s success. The “fail fast” mantra of digital companies might be rewritten for risk as “fail fast, safely.” But even this softer concept will require risk to give up on its conservative culture and develop a culture and mind-set of risk-managed agility.

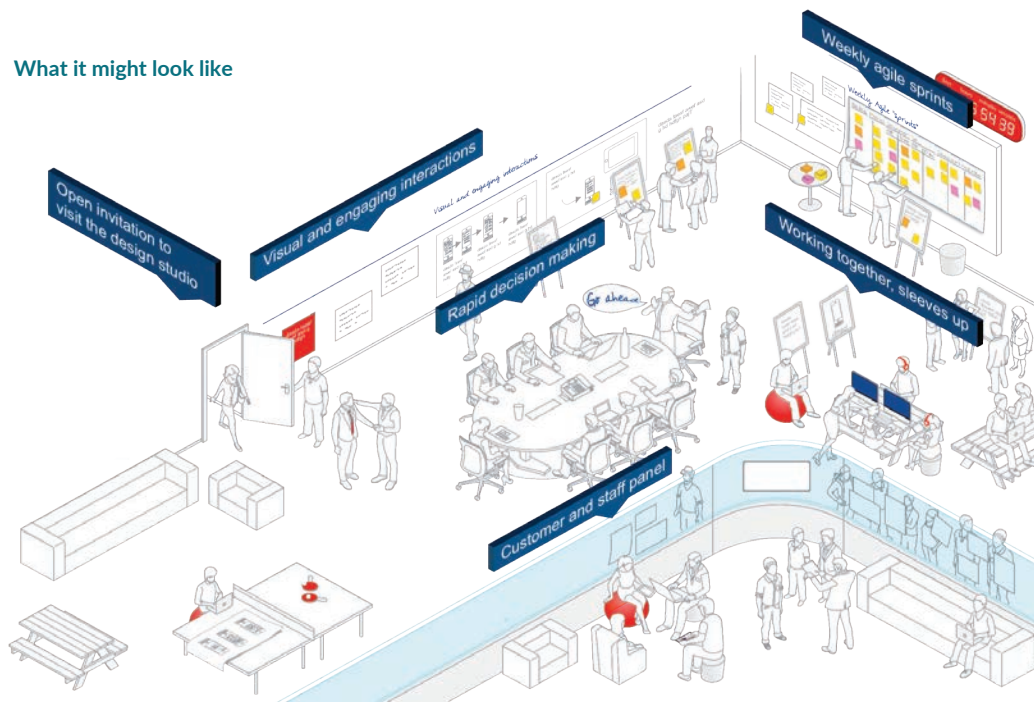
It will also mean some hard measures, such as parallel operations with new and old processes running alongside each other, effective (and ideally digitized) control frameworks, and a risk-specific process design that is built “fail-safe” with integrated controls. More back-testing will likely be needed before digitized processes go live. And of course, risk will also need to be mindful of potential regulatory reactions to a broad cultural shift within the function.

A swarm of short sprints, coupled with a series of quickly developed and tested MVPs, accelerates the process and breaks down traditional organizational silos. One bank that was building a fully digital lending product went through six MVPs in just 16 weeks to get to a product it could roll out more broadly (Exhibit 28).

The transition to agile must be carefully designed. Step-by-step changes allow employees and the organization as a whole to digest the changes and get accustomed to the novelties from a cultural point of view, for agile represents a real shift in culture.

## Exhibit 27 – A digital factory can speed the work

### What it might look like



SOURCE: McKinsey

Successful transformational journeys have shown that any long-term vision should be a guide, not a blueprint. A long-term vision is not carved in stone; the vision instead steers the organization to the right path. While forecasts are rarely completely wrong, the road to completion often turns out to be quite different from what it seemed at first. For these reasons, banks must constantly update, assess, and revise their vision of the digital risk transformation by taking into account new information, a changing environment, and different expectations.

### Help people make the change

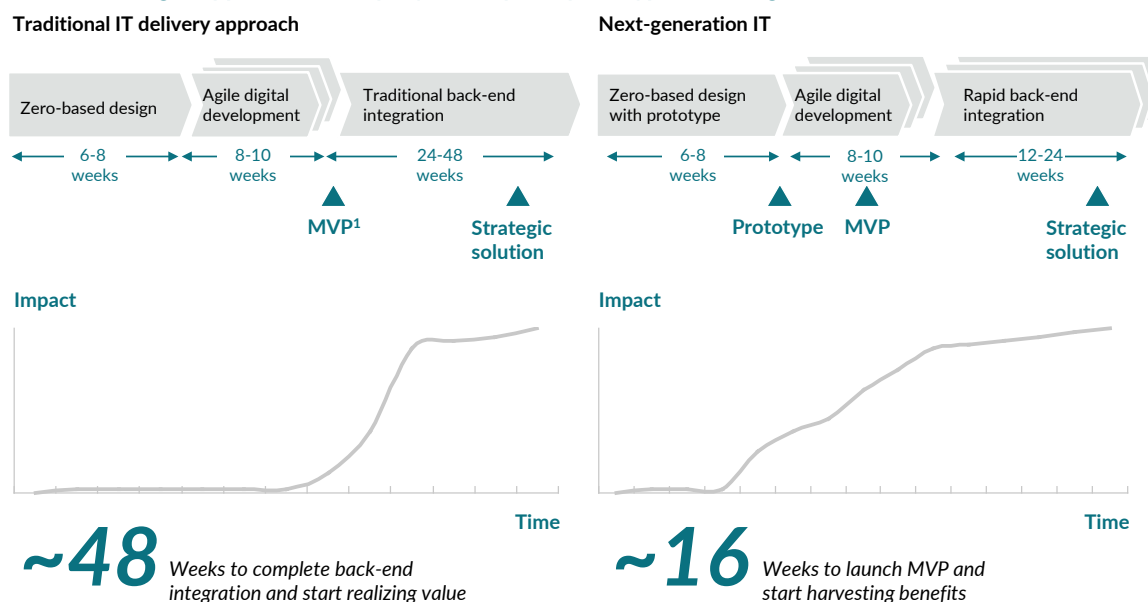
Different kinds of people and skills are needed at various points in the journey. In an agile squad or “scrum” dedicated to automation and the development of first-generation analytics tools (for instance, a credit engine), risk will need moderately skilled data scientists; a substantial number of digital designers, who will start automating the bulk of the bank’s manual processes; and

a few “scrum masters” with strong managerial and communication skills.

For scrums that tackle deeply analytical tasks such as cutting credit losses and optimizing capital, a different mix of skills is needed. Advanced-analytics knowledge is even more important. Digital-designer profiles are less needed.

## Exhibit 28 – Next-generation IT can get risk-related products to market in 16 weeks

### A bank used agile approaches to rapidly develop and prototype a new digital tool



<sup>1</sup> MVP: Minimum viable product  
SOURCE: McKinsey

As it looks inside and outside the bank for people to fill these scrums (and the larger “tribes” that are also characteristic of agile organizations), risk must create a compelling employee value proposition (EVP) to define the essence and benefits of the job. Done right, an EVP will retain top people and lure new talent, so that a bank can compete with external digital players. It should explain how and why a job in risk will enhance the career of the person who holds it, as well as the prospects of the bank as a whole. The EVP should not be limited to monetary incentives: it ought to include nonmonetary benefits such as the number of weekly hours devoted to digital professional development, and participation in risk digital roundtables or enrollment in analytics courses to keep skills relevant. Rotations between risk, operations, technology, and the business can also enhance the EVP; they help people understand problems from many angles and develop more effective solutions.

In addition to technical profiles, risk should mine its existing workforce for high performers who can step into a “translator” role, serving as the bridge between the highly technical and analytical team members and the risk managers. Eighty-five percent of the respondents see this as the most feasible way to get top talent (Exhibit 29).

Risk should consider making fundamental changes to its recruiting strategy: recruit from communities where digital talent resides, such as conferences and online developer forums; shrink recruiting-process timelines; and be flexible about qualifications by putting more emphasis on eagerness and potential to learn.

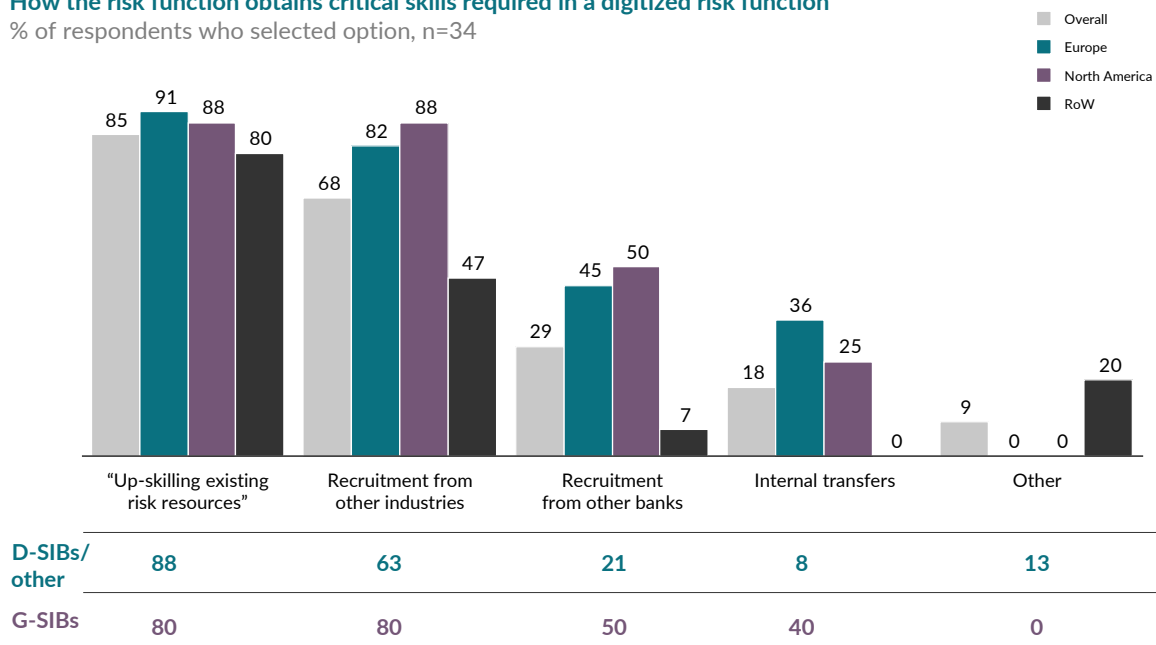
All in all, risk should accumulate skills quickly, not wait for a perfect mix of profiles.

The assimilation of talent and the shift in the skills needed for the digital risk transformation will inevitably change the organization’s culture. Three insights stand out from the research:

## Exhibit 29 – Banks see “upskilling” staff and recruiting from other industries as primary levers to close the skill gap

### How the risk function obtains critical skills required in a digitized risk function

% of respondents who selected option, n=34



SOURCE: IIF/McKinsey 2017 survey on the future of risk management in the digital era

- **Build a test-and-learn culture.** Get the team to learn by creating a safe place for experiments to fail. Focus on prioritizing measurable evidence and learning. Support teams by breaking down specialized skill silos in order to distribute knowledge. Praise experiments, successful or not, and focus on what was learned. And task senior managers with mentoring responsibilities.
- **Promote a greater external orientation.** To fully enable digital risk, people must keep their minds open to new ideas and be willing to challenge old orthodoxies. Risk should organize meetings and innovative roundtables on risk-related topics to encourage the right attitudes and foster internal discussion so that the bank finds and tests the most advanced ideas.
- **Promote a less hierarchical organization.** To allow innovative ideas to flourish, risk should deemphasize hierarchies. Flatter environments (such as those at many tech companies and digitally advanced banks) prize creativity, no matter where it begins. Risk should take ideas that bubble up from below seriously. It should task everyone with an “obligation to dissent” to get better decisions and ensure that all employees feel empowered and valued. And it should introduce peer feedback in regular 360-degree performance assessments.

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*Digital's potential for risk is vast and mostly untapped. But to seize it, the risk function must move forcefully and yet carefully. This is digital transformation the “risk way.” We hope that this report offers risk leaders insight into the current state of the function, the potential it has in a digital world, and the actions that can lift it to the next level.*

# Authors:

## **Institute of International Finance**

Andrés Portilla  
Managing Director, Regulatory Affairs  
aportilla@iif.com

Jaime Vazquez  
Policy Advisor in Regulatory Affairs  
jvazquez@iif.com

## **McKinsey & Company**

Holger Harreis  
Partner, Düsseldorf  
Holger\_Harreis@McKinsey.com

Luca Pancaldi  
Partner, Milan  
Luca\_Pancaldi@McKinsey.com

Kayvaun Rowshankish  
Partner, New York  
Kayvaun\_Rowshankish@McKinsey.com

Hamid Samandari  
Senior Partner, New York  
Hamid\_Samandari@McKinsey.com

Senior Expert, Director of Research: Rajdeep Dash

Editor: Mark Staples

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